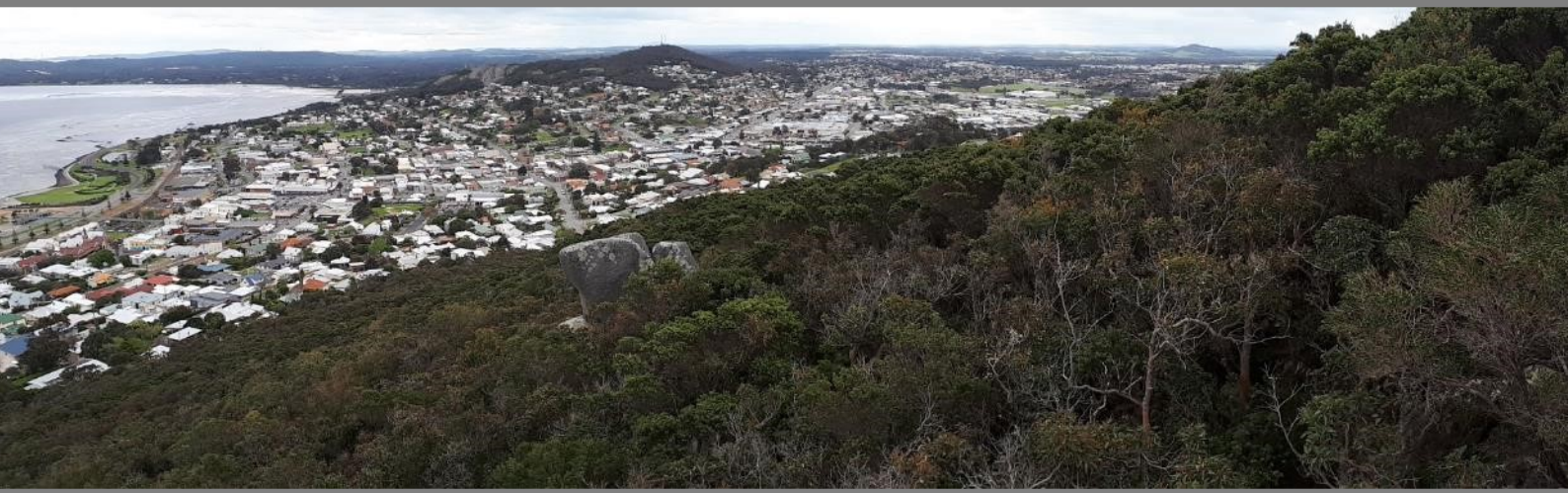


Biological Survey: Albany Ring Road



Report prepared for
Main Roads Western Australia
July 2020

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1 SUMMARY

Main Roads Great Southern Region are proposing to construct stage two and three of the Albany Ring Road Project. Southern Ecology was engaged to assess a broad project envelope (344 ha) for potential environmental constraints.

FLORA

- A total of 343 plant taxa from 65 families were recorded within and adjacent to 32 floristic quadrats established in the Survey Area.
- Populations of four Priority-listed flora were recorded: - *Synaphea incurva* (P1), *Boronia crassipes* (P3), *Andersonia* sp. Jamesii (J. Liddelow 84) (P4) and *Thysanotus isantherus* (P4). A previously recorded population of *Prasophyllum paulinae* (P1) is known from the Survey Area; the potential exists for it to re-emerge following fire.
- Five Declared Pests and/or Weeds of National Significance (WONS) were recorded: - Blackberry (**Rubus* species complex), Bridal Creeper (**Asparagus asparagoides*), Gorse (**Ulex europaeus*), Arum Lily (**Zantedeschia aethiopica*) and Lantana (**Lantana camara*).
- Vegetation condition graded from Completely Degraded to Excellent; Large areas of vegetation associated with shire reserves and intact wetlands on private property were classified as Excellent.
- Thirteen vegetation associations were described: - four occur exclusively in wetland habitats (*Homalospermum firmum/Callistemon glaucus* Peat Thicket, *Evandra aristata* Sedgeland, *Taxandria juniperina* Closed Forest and *Melaleuca preissiana* Low Woodland), three are associated with granite outcrops (*Taxandria marginata*, *Gastrolobium bilobum* and *Leucopogon assimilis* Shrublands) and six generally occur on uplands (*Hakea* spp. Shrubland/Woodland Complex, Jarrah/Marri/Sheoak Laterite Forest, Jarrah/Sheoak/*E. staeri* Sandy Woodland, Marri/Jarrah Coastal Hills Forest, Marri/Jarrah Forest/Peppermint Woodland and Peppermint Low Forest).
- Two Threatened and four Priority Ecological Communities occur in the vicinity; no vegetation in the Survey Area meets the requisite criteria for these communities. Several vegetation associations can be consigned as being significant due to their association with wetlands, granite refugia, low reservation status or low overall extent.

FAUNA

- Five significant fauna species were present within the Survey Area: - Carnaby's Cockatoo (*Calyptorhynchus latirostris*) (T-EN), Baudin's Cockatoo (*Calyptorhynchus baudinii*) (T-EN), Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) (T-VN), Western Ringtail Possum (*Pseudocheirus occidentalis*) (T-CR), and Southern Brown Bandicoot (*Isodon obesulus* subsp. *fusciventer*) (P4).
- Western Ringtail Possum (WRP) scats were observed widely across the Survey Area, in multiple habitats of varying condition. *Core* and *supporting* habitats and *potential habitat linkages* were identified.
- Foraging and potential breeding habitat for three Black Cockatoo species occurred throughout the Survey Area, in all the Eucalypt Woodland/Forest habitats. Large areas of potential roosting sites were identified among both native and introduced tree species.
- No hollows were determined to be occupied or showed recent use by Cockatoo species. 60 trees contained hollows potentially suitable for the Carnaby's Cockatoo; 18 trees contained hollows potentially suitable for Forest Red-tailed Black Cockatoo and three trees contained hollows potentially suitable for Baudin's Cockatoo. In total, 754 potential breeding trees were recorded (DBH ≥ 500mm, with or without hollows) comprising of four tree species.

2 INTRODUCTION

2.1 Project Background

Main Roads Great Southern Region are proposing to construct a heavy haulage route around the City of Albany for the transport of materials to the City's port, called the Albany Ring Road Project. The project is a staged development to support freight growth and long-term transport needs in the City of Albany in Western Australia. The project will connect Albany Highway, South Western Highway, Lower Denmark Road and Hanrahan Road allowing access to the Southern Ports Authority Albany Port (Figure 1). Stage one of the project, the construction and upgrade of Menang Drive to Chester Pass Road to Albany Highway was completed in 2017. Stages two and three are proposed.

Southern Ecology was engaged by Main Roads to assess the project envelope (the Survey Area) for potential constraints related to vegetation, flora, fauna or other environmentally sensitive sites. This report presents the results from survey effort from 2017 to 2020 for the project. The total Survey Area is 344 hectares (ha).

2.2 Scope and Objectives

The objective of the biological survey is to delineate key flora, fauna, soil, groundwater and surface water (wetlands) values within the Survey Area and to determine potential sensitivity to impact. The outcome of the survey and information supplied in the biological survey report will be used to inform the environmental assessment and approvals process. The scope of works included the following:

- Complete a desktop assessment of the survey area to identify:
 - Biological features and constraints which may be in or nearby the survey area.
 - Significant flora, vegetation/ecological communities, fauna, soil/land system, groundwater and surface water values and potential sensitivity to impact.
 - Likelihood of occurrence assessment for Threatened/Priority flora and fauna species that potentially occur.
 - Identify broad pre-European vegetation type(s).
- Conduct a detailed two-phase vegetation and flora survey to:
 - Verify and ground truth the desktop assessment findings.
 - Undertake vegetation association and condition mapping, including defining patches of planted and remnant native vegetation.
 - Identify and map the presence of any Threatened or Priority ecological communities (TECs or PECs).
 - Complete patch assessments for vegetation types which may potentially align with TECs against approved conservation advice.
 - Complete targeted searches to record the presence of any Threatened and Priority flora, Weeds of National Significance (WoNS) or Declared Pests, and map the extent of populations if encountered. Any Threatened flora to be mapped with a differential GPS.
 - Assess the flora species diversity, density, composition, structure and weed cover within marked quadrats.

- Conduct a Level 1 fauna survey, black cockatoo habitat and WRP assessments to:
 - Identify and map fauna habitat, including a summary of conservation significant fauna considered likely or possible to occur, or fauna recorded in each habitat type.
 - Map wetland habitat and riparian habitat if present.
 - Record native and non-native fauna within the Survey Area.
 - Identify and map of black cockatoo foraging habitat, roosting, potential breeding and actual breeding trees as per Commonwealth guidelines¹.
 - Identify and map Western Ringtail habitat as per Commonwealth guidelines.
- Provide a combined flora, vegetation, fauna and black cockatoo and western ringtail possum assessment report.

2.3 Local and Regional Context

2.3.1 Location and tenure

The Survey Area is located within the Southern Jarrah Forest subregion of the Jarrah Forest Interim Biogeographic Regionalisation of Australia (IBRA) Region (Department of the Environment [DotE] 2014a). It intersects shire reserves, private property and road reserves mainly to the west of the City of Albany and is centred on Link Rd, South Coast Highway, George St, Lower Denmark Rd and Albany Port Rd (Figure 1).

The Survey Area includes one large City of Albany reserve with remnant vegetation (Res 28465, 28466 & 28467; corner of South Coast Highway and George St) that is vested for gravel extraction and rubbish purposes. Several smaller reserves within the Survey Area are vested for railway, drainage, public utilities or other purposes. One gazetted conservation reserve (Gledhow Nature Reserve) and one Public Park (Mt Melville) occur within the vicinity of the Survey Area (Appendix B).

2.3.2 Biological Environment

The Survey Area occurs circles the western and southern interface between the urban and agricultural zones of Albany that was largely cleared for agricultural purposes in the 19th and 20th century. Three large patches of remnant vegetation remain within the Survey Area: Eucalypt and She-Oak Woodlands on George St Reserve (~30 ha), Forest and Granites on the lower southern slopes of Mt Melville (~12 ha) and a large wetland on Link Rd (6 ha). Other significant corridors of vegetation occur along Lower Denmark Rd and many narrow road reserves throughout the Survey Area continue to support native species. Large areas between Lower Denmark Rd and the Albany Port Rd have regenerated after clearing and/or have been planted with non-indigenous Eucalypts and Pine Trees.

Broad scale pre-European vegetation mapping (Shepherd *et al.* 2002) that overlies the Survey Area indicates the native vegetation is currently (or was previously) composed of three associations:

- Albany_3 - "*Forest. Mainly jarrah and marri Eucalyptus marginata, Corymbia calophylla.*"
- Albany_51 - "*Sedgeland. Cyperaceae, Restionaceae, Juncaceae.*"

¹ Biota undertook additional assessments of potential cockatoo breeding trees in 2019, which incorporated a reassessment of some trees (those occurring in the disturbance envelope) previously assessed by Southern Ecology in 2017, plus additional trees due to an expansion of the project footprint.

- Albany_978 - “Low forest, woodland or low woodland with scattered trees *Eucalyptus marginata*, *Banksia* spp., *Allocasuarina* spp.”

The Survey Area also occurs within the zone mapped during the Albany Regional Vegetation Survey (Sandiford and Barrett 2010), which provides meso-scale vegetation information and provides a context for assessing the regional conservation significance of vegetation associations. Eleven mapping Units have previously been mapped within the Survey Area:

- *Evandra aristata* Sedgeland (Unit 46)
- *Gastrolobium bilobum*/*Hakea elliptica* Granite Shrubland/Yate Woodland (Unit 23)
- *Hakea* spp Shrubland/Woodland Complex (Unit 31)
- *Homalospermum firmum*/*Callistemon glaucus* Peat Thicket (Unit 47)
- Jarrah/Marri/Sheoak Laterite Forest (Unit 12)
- Jarrah/Sheoak/*E. staeri* Sandy Woodland (Unit 13)
- Marri/Jarrah Coastal Hills Forest (Unit 17)
- Marri/Jarrah Forest/Peppermint Woodland (Unit 10)
- Peppermint Low Forest (Unit 2)
- *Taxandria juniperina* Closed Forest (Unit 59)
- *Taxandria marginata* Granite Shrubland (Unit 24).

2.3.3 Surface Water and Hydrology

The northern section of the Survey Area (Link Rd) intersects a broad drainage channel that supports a large area of seasonally wet or inundated wetland vegetation, which sheds water westward into Five Mile Creek and eventually into Lake Powell. The hydrology of the southern section of the Survey Area (Lower George St, Lower Denmark Rd) is largely altered by artificial channels installed early in the late 19th to make the peaty swaps more suitable for agriculture. These drains divert water south of the Survey Area into Robinson and eventually empty into Princess Royal Harbour.

Oyster Harbor represents the closest Nationally Important Wetland, with occurs 8 km east of the Survey Area and is hydrologically discrete. No Ramsar wetlands occur within the vicinity of the Survey Area.

2.3.4 Soil-Landscapes

Seven soil-landscapes (Department of Agriculture and Food Western Australia [DAFWA] 2017) are mapped within the Survey Area:

- Collis yellow duplex - “Gravelly yellow duplex soils; Jarrah-Marri forest.”
- Dempster crest - “Sands and laterite on elongate crests; Jarrah-Albany Blackbutt-Marri forest.”
- Dempster slope - “Sands and gravels on smooth slopes; Albany blackbutt-sheoak low forest.”
- Gardner granite - “Granite outcrop.”
- Mataband yellow duplex - “Gravelly yellow and yellow duplex soils; Jarrah-Marri-Yellow Tingle forest.”
- Minor Valleys S7 slope - “Broad valleys in sedimentary rocks; 30 m relief; smooth slopes. Deep sands and iron podzols on slopes; Albany Blackbutt-jarrah-sheoak woodland. Podzols and yellow duplex soils on floors; paperbark woodland, teatree heath.”
- Owingup Subsystem - “Plains with swamps, lunettes and dunes. Yellow solonchic soils, organic loams and diatomaceous earth. Wattle-Paperbark thickets, Teatree heath and reeds. Podzols on dunes; Banksia-Sheoak woodland.”

2.4 State and Commonwealth Conservation and Pest Categories

Commonwealth and State regulatory authorities maintain lists of vegetation, flora and fauna that are assigned into categories of conservation significance or pest status. An overview of the codes and categories used for conservation and pest status in Western Australia that are relevant to this biological survey are provided in Appendix A.

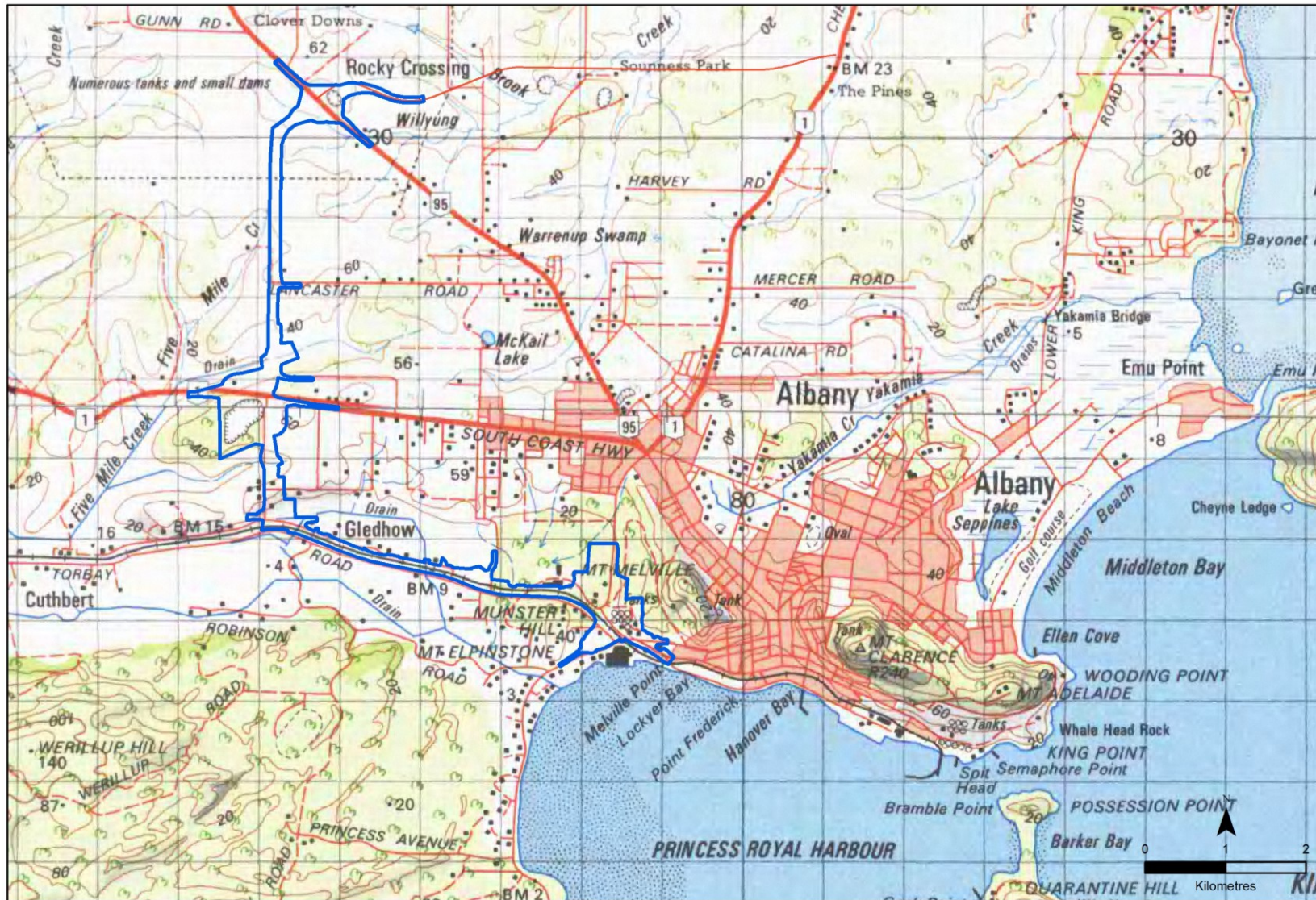


Figure 1. Survey Area location

3 METHODS

3.1 Personnel

The assessment was conducted by Damien Rathbone (botanist) and Dr Sandra Gilfillan (zoologist), with field assistance by Keith Smith, Anna de-Haan, Dylan Lehmann, Kirsty Vogel and Fin Pope-Gilby.

The flora survey (desktop and field assessment) was primarily conducted by Damien Rathbone (BScHons Plant Science, Scientific License 012382). Damien has over 14 years of experience conducting biological surveys in southern Western Australia. Within the South Coast region, he has previously undertaken Department of Biodiversity, Conservation and Attractions (DBCA) regional surveys (Albany Regional Vegetation Survey, Fitzgerald River National Park Flora Survey, Ravensthorpe Range Flora Survey), threatened species survey and recovery implementation, and has 10 scientific publications. Damien is also an accredited interpreter for dieback assessments on DBCA estate (Accreditation PDI-032).

Dr Sandra Gilfillan has worked extensively in the Great Southern and South Coast regions for the past 20 years. She has extensive experience in threatened species recovery planning, research and monitoring, including work on both Western Ringtail Possums (DBCA and Oyster Harbour Catchment Group) and Carnaby's Cockatoo (BirdLife Western Australia) and has a well-developed knowledge of the faunal ecology of the region.

3.2 Desktop Assessment

A desktop assessment of known or potential significant vegetation, flora and fauna within a 10 km radius of the Survey Area (the Study Area) was undertaken using the following sources:

- NatureMap (DBCA 2019a; results attached in Appendix H).
- Protected Matters Search Tool (PMST) (Department of the Environment and Energy [DotEE] 2019a; results attached in Appendix H).
- Threatened and Priority flora and fauna records from [DBCA] and/or the Western Australian Herbarium as supplied by Main Roads (16th July 2019) (mapped in Appendix B).
- PEC and TEC mapping from the Species and Communities Branch, DBCA, as supplied by Main Roads (16th July 2019) (mapped in Appendix B).

Prior to conducting the survey, the records returned from the database searches were assessed for their spatial accuracy. All valid species recorded were reviewed to determine key morphological characteristics, flowering times, habitat preferences and the likelihood and location of potentially suitable habitat within the Survey Area. This information was used to optimise the targeted flora and fauna surveys and the location of floristic quadrats (section 3.5, 3.6 and 3.9).

3.3 Likelihood of Occurrence Assessment

Following the field survey, all conservation significant flora and fauna species identified in the database searches that were not detected during the survey were assessed to determine their likelihood of occurrence in the Survey Area (post-survey likelihood of occurrence, Appendix F). Habitat suitability was determined from information in herbarium voucher labels, published descriptions, and knowledge from the authors. Survey effectiveness reflected the probability of detecting a particular species where

suitable habitat was present, which could be dependent on thoroughness of the survey, flowering period or timing of emergence (i.e. annuals or disturbance responsive species). Each species in the post-survey likelihood of occurrence (Appendix F) was assessed on a case by case basis according to the general categories summarized in Table 1.

Table 1. Matrix of habitat suitability and effectiveness of field surveys to determine the likely presence of conservation significant flora and fauna post survey.

		Survey Effectiveness		
		No survey limitations present that would have prevented detection; all habitats were thoroughly surveyed	Moderate survey limitations present (i.e. inconspicuous or cryptic species; dense vegetation)	Major survey limitations present (i.e. species is a post fire ephemeral and habitat are long unburnt; habitat inaccessible)
Habitat and Proximity	Species reliably recorded within close vicinity (<2 km) and suitable habitat present	Unlikely	Possible	Likely
	Species previously recorded within vicinity (2-10 km) but suitable habitat unknown	Unlikely	Possible	Possible
	Species previously recorded within vicinity (2-10 km) and suitable habitat present	Unlikely	Possible	Possible
	No suitable habitat appears to be present	Highly Unlikely	Unlikely	Possible

3.4 Field Assessment

3.4.1 Field Survey Schedule and Type

Various field surveys for vegetation, flora and fauna were undertaken over three years and included three spring seasons (October 2017 to October 2019) (Table 2). The majority of the Survey Area was assessed in 2017 and 2018; some minor additional areas were included in 2019 and 2020 due to potential changes in the project envelope. Some key areas (such as the known population of *Prasophyllum paulinae*) were surveyed over repetitive seasons.

Surveys were conducted in accordance with the Environmental Protection Authority (EPA) Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016a), Technical Guidance - Sampling methods for Terrestrial Vertebrate Fauna Surveys (EPA and DEC 2010) and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) guidance for significant species (e.g. black cockatoos). Overall the survey effort comprised:

- Detailed flora and vegetation survey for the entire survey area.
- Targeted flora survey for *Prasophyllum paulinae* (including a targeted regional survey, see Appendix I).
- Level 1 fauna survey.
- Targeted fauna survey for Western Ringtail Possum.
- Targeted fauna survey for Black Cockatoos (Carnaby's Cockatoo (*Calyptorhynchus latirostris*) Baudin's Cockatoo (*Calyptorhynchus baudinii*); and Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*).

Survey effort derived from GPS tracklogs is shown on Map E, Appendix B.

Table 2. Field dates, survey type and approximate time expended.

Date	Personnel	Survey Type	Area	Survey Effort (hours)
24 th October 2017	Damien Rathbone, Sandra Gilfillan	Vegetation Mapping, Targeted flora survey of upland and granites. Targeted Fauna Survey, Fauna Habitat Assessment	Survey Area	14
25-26 th October 2017	Sandra Gilfillan	Targeted Fauna Survey, Fauna Habitat Assessment and Cockatoo Tree Assessment	Survey Area	6
31 st October 2017	Sandra Gilfillan and Dylan Lehmann	Targeted Fauna Survey, Fauna Habitat Assessment and Cockatoo Tree Assessment	Survey Area	14
7 th November 2017	Damien Rathbone, Sandra Gilfillan and Dylan Lehmann	Targeted flora survey of wetlands. Targeted Fauna Survey, Fauna Habitat Assessment and Cockatoo Tree Assessment	Survey Area	21
9 th November 2017	Damien Rathbone, Sandra Gilfillan	Vegetation Mapping, Targeted flora survey of wetlands. Targeted Fauna Survey, Fauna Habitat Assessment and Cockatoo Tree Assessment	Survey Area	12.5
13 th November 2017	Sandra Gilfillan and Kirsty Vogel	Targeted Fauna Survey, Fauna Habitat Assessment and Cockatoo Tree Assessment	Survey Area	14
15 th November 2017	Sandra Gilfillan and Kirsty Vogel	Targeted Fauna Survey, Fauna Habitat Assessment and Cockatoo Tree Assessment	Survey Area	12
21 st November 2017	Sandra Gilfillan and Dylan Lehmann	Targeted Fauna Survey, Fauna Habitat Assessment and Cockatoo Tree Assessment	Survey Area	10
22 st November 2017	Damien Rathbone and Fin Pope-Gilby	Floristic Quadrat Assessment	Survey Area	10
23 rd November 2017	Damien Rathbone, Fin Pope-Gilby and Sandra Gilfillan	Floristic Quadrat Assessment, Targeted Fauna Survey and Fauna Habitat Assessment	Survey Area	21
24 st November 2017	Damien Rathbone and Fin Pope-Gilby	Floristic Quadrat Assessment	Survey Area	14
27 st November 2017	Damien Rathbone and Fin Pope-Gilby	Floristic Quadrat Assessment	Survey Area	14
28 th November 2017	Damien Rathbone and Fin Pope-Gilby, Sandra Gilfillan	Floristic Quadrat Assessment, Targeted Fauna Survey and Fauna Habitat Assessment	Survey Area	21
30 th November 2017	Damien Rathbone, Sandra Gilfillan and Dylan Lehmann	Targeted Flora Survey, Targeted Fauna Survey, Fauna Habitat Assessment and Cockatoo Tree Assessment	Survey Area	10
7 th December 2017	Sandra Gilfillan	Targeted Fauna Survey and Fauna Habitat Assessment	Survey Area	5
11 th December 2017	Sandra Gilfillan	Targeted Fauna Survey, Fauna Habitat Assessment and Cockatoo Tree Assessment	Survey Area	3
13-14 th December 2017	Sandra Gilfillan	Targeted Fauna Survey, Fauna Habitat Assessment and Cockatoo Tree Assessment	Survey Area	8
22 nd January 2018	Sandra Gilfillan	Targeted Fauna Survey and Fauna Habitat Assessment	Survey Area	4
20 th September 2018	Damien Rathbone	Targeted Flora Survey of uplands and Granites	Survey Area	7
17 th October 2018	Damien Rathbone	Targeted Flora Survey	Survey Area	7
30 th October 2018	Damien Rathbone, Keith Smith, Anna de-Haan	Targeted Flora Survey for <i>Prasophyllum paulinae</i>	Survey Area	15
21 st November 2018	Damien Rathbone	Targeted Flora Survey of Wetlands	Survey Area	7
30 th July 2019	Damien Rathbone	Targeted Flora Survey	Survey Area	7
2 nd , 8 th , 9 th , 13 th , 19 th August 2019	Damien Rathbone	Vegetation Mapping and Targeted Flora Survey	Survey Area and Additional 2019 Survey Areas	24
12-13 th August 2019	Sandra Gilfillan	Targeted Fauna Survey and Fauna Habitat Assessment	Additional 2019 Survey Areas	8
18 th October 2019	Damien Rathbone, Keith Smith	Targeted Flora Survey (including <i>Prasophyllum paulinae</i>)	Survey Area and Additional 2019 Survey Areas	16
3-4 th and 11 th July 2020	Damien Rathbone, Kirsty Vogel	Vegetation Assessment, Fauna Habitat Assessment and Cockatoo Tree Assessment	Additional 2020 Survey Areas	22
TOTAL:				326.5

3.4.2 Weather

Daily weather observations recorded from Albany were used to describe local rainfall and temperatures preceding the survey (Figure 2). Overall rainfall in the three-year survey period was below average, counteracted by a mean to above mean rainfall in the two months preceding spring in each year.

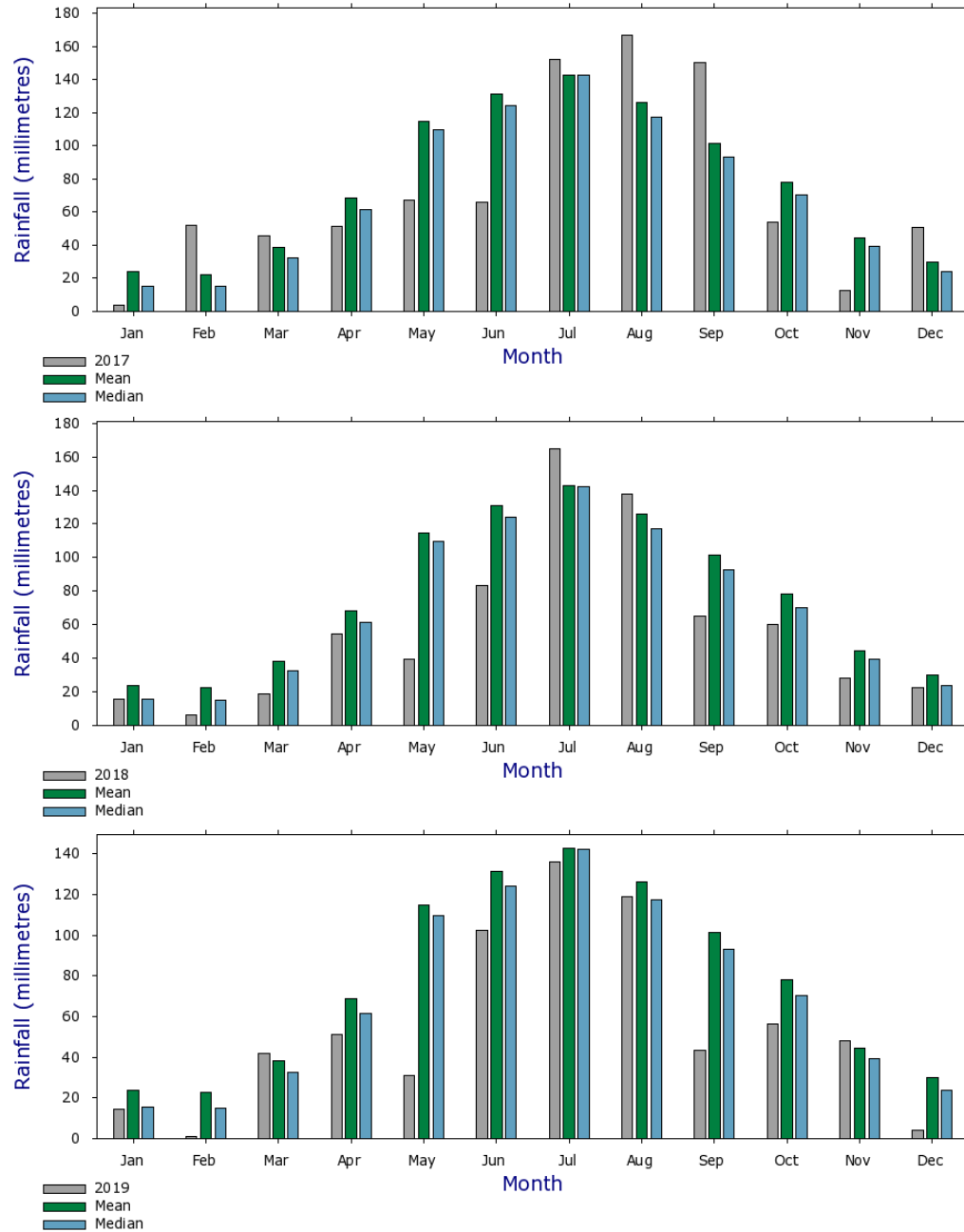


Figure 2. Rainfall statistics for 36 months that encompassed the assessment period compared with historical averages (all years available) from the nearest weather station (Albany 9500) (BOM 2019).

3.5 Vegetation Assessment

The vegetation and flora survey were undertaken in accordance with requirements of the EPA guidance document (EPA 2016a). Information acquired during the desktop review assisted in the design of the field survey. Pre-survey planning involved the examination of 1:5,000 scale orthophotos, soil and topography layers and existing records of conservation significant flora and vegetation.

The Survey Area was traversed by foot and vehicle and a vegetation assessment was conducted using floristic quadrats where the following attributes were recorded:

- Location and site description – GPS coordinate of NW corner using a handheld GPS (Garmin 64), other corners were measured using a vertex (Nikon 36) and compass. Quadrats dimensions are 10 m x 10 m unless stated. All four corners are marked with posts (temporarily) and UV stable flagging tape (3-5 years longevity).
- Species inventory – all vascular plant species present, including weed species. Species that were not confidently identified during the field survey were collected for identification in the Albany Regional Herbarium or Western Australian Herbarium.
- Foliar cover – the estimated percentage cover for each stratum and dominant species (up to three) within each stratum were noted. Vegetation structure was recorded in accordance with the National Vegetation Information System (Executive Steering Committee for Australian Vegetation Information [ESCAVI] 2003).
- Vegetation condition – according to the current vegetation condition classification (Table 3).
- Photographs – four photographs overlooking the quadrat were combined into a panorama.

The intensity of sampling with quadrats in each vegetation community varied depending on the area of extent, condition and species turnover. Regulatory guidance (EPA 2016a) indicates a minimum of three quadrats per vegetation type is recommended. In this survey, quadrats were specifically placed in vegetation with the highest apparent condition category and the number of quadrats was largely dependent on the total area of each community. Five associations were assessed by three or more quadrats (maximum of nine quadrats) and granite mosaics (included three associations as mosaics) were assessed in four quadrats. Three associations were assessed by less than three quadrats (*Taxandria juniperina* Closed Forest, *Evandra aristata* Sedgeland and Marri/Jarraah Coastal Hills Forest) due to a low overall extent or low extent in Good to Excellent condition. Two associations were not assessed by quadrats as were predominantly in Completely Degraded condition (assessed by opportunistic mapping sites only).

Quadrat information was used to define vegetation types that were manually aligned with Units described in the Albany Regional Vegetation Survey (Sandiford and Barrett 2010). Floristic similarity was assessed using two-way tables and field observations. Cladistics analysis was not conducted and was not considered necessary for alignment with these Units.

Table 3. Vegetation condition scale (EPA 2016a).

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance or 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 (dieback can be present in this category, but impacts are inconspicuous).
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 the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees and shrubs.

3.6 Targeted Flora Search

Targeted searches for potential Threatened and Priority flora identified from the desktop assessment were conducted over several field visits the Survey Area (details provided in Table 2). The searches were conducted in the appropriate season to detect most of the Threatened or Priority species considered possible to occur. The Survey Area was initially assessed to identify vegetation types and condition (see section 3.5). Vegetation and habitat types that were identified as potentially suitable for Threatened or Priority flora were surveyed by an intensive pattern of meandering transects. Where encountered, population census and site information of Threatened or Priority flora was recorded using a handheld GPS (Garmin 64) and in accordance with the Threatened and Priority Flora Report Form Field Manual (Department of Environment and Conservation [DEC] 2010). Population size was determined by either direct counts, or by estimation of plant density using transects or suitably sized quadrats. Additional regional targeted survey (outside the Survey Area) was conducted for *Prasophyllum paulinae* (P1), detailed in Appendix I.

3.7 Weeds

Cleared or pasture areas were not comprehensively surveyed, therefore not all weeds within the Survey were necessarily recorded. All weeds considered to be significant (Declared pests (DPIRD 2019) or Weeds of National Significance (WoNS) (DotEE 2019b)) or that were commonly encountered within remnant vegetation were recorded and/or mapped.

3.8 Fauna Habitat Assessment

A fauna habitat assessment was undertaken for conservation significant fauna that could potentially occur in the Survey Area determined from the desktop survey. The fauna habitat assessment primarily focused on the identification of fauna habitat based on vegetation type. Opportunistic recording of evidence (sightings, bird calls, tracks, scats, bones and feeding signs) of conservation significant fauna was also undertaken.

The likelihood of occurrence of significant fauna was determined by an assessment of the availability of potentially suitable habitat; its current know distribution and on any actual opportunistic sightings or signs of a species.

3.9 Targeted Fauna Search

Identification and quantification of habitat for Western Ringtail Possum and three species of Black Cockatoo (Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-tailed Black Cockatoo) was specifically undertaken within the Survey Area, in accordance with EPBC Act guidelines (DEWHA 2009; DSEWPaC 2012). Habitat quality was categorised to identify important areas for each species.

3.9.1 Western Ringtail Possum (*Pseudocheirus occidentalis*) (T-CR)

The EPBC Act Significant Impact Guidelines for the WRP pertain only to the population occurring on the southern Swan Coastal Plain (DEWHA 2009), and to date, no guidelines have been developed for the South Coast population, which can be defined as a significant population under the aforementioned guidelines.

The South Coast population of WRP differs from the Swan Coastal Plain population in terms of habitat preference, refuge types and possibly other aspects of their ecology. For example, the presence of Peppermint (*Agonis flexuosa*) is not necessary for the presence of the species; habitats with high densities are largely confined to Marri/Jarrah/Sheoak communities within 20 km of the coast; diets can be quite broad and a small percentage of individuals use refugia on the ground (Van Helden *et al.* 2018; Van Helden unpub. data; Van Helden and Close pers. com.; Mathieson *et al.* in review; Gilfillan 2008 and S. Gilfillan pers. obs.). The EPBC Act Significant Impact Guidelines for the Swan Coastal Plain may therefore have limited application to the South Coast population.

The EPBC Act Significant Impact Guidelines categorised three areas as important for the WRP: *Core habitat*, *Primary corridors* and *Supporting habitat*. As these definitions in themselves are not specific to the Swan Coastal Plain they can potentially be used interchangeably. Using these habitat categories as a guide, plus current available data on Western Ringtail Possum ecology, habitat categories were defined for the South Coast population².

Habitat category definitions were defined for the South Coast population by:

1. Surveying for signs of the species within the Survey Area. Presence within a habitat patch was assessed by the observation of dreys and scats. All dreys seen were recorded. Absence of dreys, however, does not indicate absence of WRP (Gilfillan 2008). Scat searches were comprehensive, covering the entire remnant, therefore they provided an indication of the distribution of the species. The area of occupancy of WRP was based on the presence of scats or dreys. Where either of these signs were observed it was assumed that WRP would be using any continuous vegetation of similar habitat type extending from where the observations were made. Scat abundance is not an accurate measure of absolute abundance unless scat deposition and decay rates are known, but can be used as an indication of relative abundance (Wayne *et al.* 2006). In this survey the number of individual scat observations was used to aid the delineation of Western Ringtail Possum habitat.
2. Correlating available data on densities and home ranges of WRP with vegetation type. Data on densities was gathered from the following sources (Biota in prep; 2018; 2019: Gilfillan and Comer 2018; Van Helden *et al.* 2018; Van Helden pers. com.).

² NB: the defined categories should be considered draft (for details see Gilfillan 2019) and it is recommended they are presented to the Western Ringtail Possum Recovery Team for discussion and review.

- Gathering expert opinion of what constitutes habitat categories. Western Ringtail Possum researchers from the University of Western Australia were consulted on this matter (Paul Close and Bronte Van Helden).

The habitat categories and their definitions are outlined in Table 4. The extent of these categories within the Survey Area was mapped (Appendix B). In addition, the habitat categories were mapped (desktop assessment only) within a 5 km buffer of the Survey Area to give a regional context (see Gilfillan and Rathbone 2019).

Table 4. Habitat categories of Western Ringtail Possums (adapted from DEWHA (2009)).

Habitat Category	Areas mapped within the Survey Area.
<p>Core</p> <ul style="list-style-type: none"> likely contain sites necessary for breeding and dispersal, and support recruitment and population maintenance large remnants able to support multiple home ranges 	<ul style="list-style-type: none"> Any remnant patch >1ha with an established density of > 1/ha; <p>OR</p> <ul style="list-style-type: none"> Any remnant patch with an established abundance of >50 As a precautionary principal, any Jarrah, Marri or Sheoak forest or woodland, or Peppermint Low Forest remnant that is >50 ha in size until densities are established Urban areas with gardens generally having a > 30% canopy cover plus movement pathway such as fences and rooves
<p>Supporting</p> <ul style="list-style-type: none"> likely contain lower numbers of individuals and possibly survivorship likely provide an opportunity for an immigration source and emigration destination to allow for natural fluctuations in the species' fecundity may be breeding occurring or not can be native or non-native vegetation, including urban gardens 	<ul style="list-style-type: none"> any area with an established density of <1/ha, or established as individuals present (excluding linkages) <p>OR</p> <ul style="list-style-type: none"> any area with an established abundance of <50, or established as individuals present (excluding linkages) As a precautionary principal, any Jarrah, Marri or Sheoak forest or woodland, or Peppermint Low Forest remnant that is < 50 ha in size until densities are established Urban areas with gardens generally having a < 30% canopy cover and less movement pathways
<p>Linkage</p> <ul style="list-style-type: none"> no resident individuals, movement of animals only do not need to be continuous, but can contain small gaps, as Western Ringtail Possums can come to the ground to move short distances any structure that allows movement of individuals at a small to medium scale (e.g. street-scape/road-side non-native plantings, wind-breaks, plantations, fence lines) 	<ul style="list-style-type: none"> Linkage; scats or record of ringtail Linkage likely; no evidence of WRP, however links two areas of occupied habitat Linkage possible; no evidence of WRP, but links areas of vegetation that are potential habitat for WRP
<p>Primary Corridor</p> <ul style="list-style-type: none"> provide major connectivity between areas of occupation regional scale containing multiple home ranges breeding occurring provides movements and habitat (residents) 	<ul style="list-style-type: none"> Coastal Corridor (from West Cape Howe NP to Cheyne's Beach – this may extend either east or west with new records)

3.9.2 Black Cockatoo Species

Black Cockatoos (Carnaby's Cockatoo (*Calyptorhynchus latirostris*) (T-EN); Baudin's Cockatoo (*Calyptorhynchus baudinii*) (T-EN); and Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii* subsp. *naso*) (T-VU))

Breeding, foraging and roosting habitat was assessed in accordance with the EPBC Act Referral guidelines for the three threatened Black Cockatoo species (Table 5) (Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC 2012). This included recording the species, location, number and behaviour of any observed Black Cockatoos; recording the number, location and species of breeding trees above or equal to a diameter at breast height (DBH) of 500 mm and notes on whether trees contain hollows; the presence and extent of potential and known foraging habitat (identification of areas with known feeding species and observations of feeding evidence); and the presence and extent of potential roosting habitat. For Tuart (*Eucalyptus gomphocephala*) many trees branched well below breast height. In these cases, the diameter was measured below the first branch. For Pine (*Pinus radiata*) only an estimate of whether the DBH was greater than or less than 500 mm was taken, as the value of pines as a food source is not dependent on this threshold value. Pine saplings were recorded and specifically noted as such.

The survey timing potentially coincided with the use of hollows by nesting cockatoos, however the assessment was made only from ground level therefore limiting the detectability of active, or recently active hollows. Where a hollow was visible but an assessment of suitability or hollow entrance could not be made, the notation of 'possible' was made (a follow-up detailed assessment of breeding trees using a drone was undertaken by Biota (2019b).

Recording of feeding evidence by Black Cockatoos was not exhaustive, but a sufficient sample of records were taken for each habitat patch, in order to assist in characterising that patch as current feeding habitat. However, any area within the range of the black cockatoos that contains known food or plant species is considered to be potential foraging habitat for the species (DSEWPaC 2012).

Table 5. Habitat categories of Black Cockatoos (adapted from DEWHA (2009) and DSEWPaC (2012)).

High quality foraging habitat (high_feed)	habitat patches consisting of a high coverage of feeding trees with a mature canopy. (NB: Pines not included in habitat assessment)
High quality breeding habitat (high_breed)	habitat patches consisting of a high number of potential breeding trees (≥ 500 mm DBH)
High quality roosting habitat (high_roost)	habitat patches consisting of a high number of potential roosting trees
Low quality foraging habitat (low_feed)	habitat patches consisting of a low coverage of feeding trees with a mature canopy
Low quality breeding habitat (low_breed)	habitat patches consisting of a low number of potential breeding trees (≥ 500 mm DBH)
Low quality roosting habitat (low_roost)	habitat patches consisting of a low number of potential roosting trees

3.10 Regional Significance of Fauna Habitat

A regional perspective on the significance of fauna habitat within the Survey Area was determined by comparing the extent of vegetation associations suitable for significant species as a proportion of the total habitat within the Albany Regional Vegetation Survey Area (approximately 30 km radius around Albany) (Sandiford and Barrett 2010). Regional significance is also discussed with respect to the range of the conservation significant species.

3.11 Survey Limitations

In accordance with the EPA (2016a) document *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment* and EPA (2010) an assessment of potential survey limitations was undertaken (Table 6). No avoidable limitations were identified that can be expected to have affected the reliability of the results of the field survey.

Seasonal conditions preceding the field assessment have the potential to affect the emergence of annual species and the flowering of perennial species. The Survey Area occurs within a high rainfall zone and the assessment was conducted after close to average rainfall (Figure 3.1.2). Consequently, soil moisture conditions were not considered a major limitation for the emergence and flowering of Threatened or Priority flora species.

The information provided within this report is accurate and correct to the best of the author's knowledge. However, no liability is accepted for loss, damage or injury arising from its use. Plant populations can fluctuate over time, particularly after disturbance events such as fire and drought. Consequently, all mapping, vegetation descriptions and population estimates within this report should not be considered accurate indefinitely.

Table 6. Assessment of potential survey limitations for flora and fauna.

Potential for limitation	Assessment
Availability of contextual information	<p>Flora: Regional vegetation mapping (Sandiford and Barrett 2010) and flora records from the DBCA were available to allow for an appropriate level of contextual information prior to the field survey. Due to the proximity to Albany the environmental values within the survey area are considerably to be well documented.</p> <p>Fauna: There has been no comprehensive classification of fauna habitats across the region, so it was necessary to base fauna habitats on ARVS vegetation units. No regional biological (fauna) survey has been carried out for the region. Local assessments for Western Ringtail Possum were considered during the assessment (Oyster Harbour Catchment Group surveys (Mt Melville and Mt Adelaide/Clarence)).</p>
Personnel experience	<p>Flora and fauna: The senior ecologists conducting the assessments are competent with extensive experience (>10 years) in surveying south coast biota.</p>
Proportion of flora and fauna recorded or identification issues	<p>Flora: All specimens collected were identified to species level. The survey intensity (including surveys from 2017 to 2020) is considered sufficient to have recorded all or most of the native species present in the Survey Area.</p> <p>Fauna: Five out of 14 species potentially occurring were identified in the field (by signs only): three species of Black Cockatoo (feeding signs only); Western Ringtail Possum (scats and dreys); Quenda (diggings). For non-targeted fauna species only opportunistic sampling was undertaken, thus this was biased toward species that can easily be detected by sightings or by prominent signs such as scats or diggings. For example, Quenda diggings are easily detected and therefore the distribution of Quenda determined by the survey is likely to be a close approximation of its true distribution. Nocturnal, cryptic, less common species or seasonal visitors were not likely to have been identified during the survey. For example, the Brush-tailed Phascogale is a nocturnal species and is very difficult to detect by signs and requires trapping to determine presence. For these reasons the focus in this survey was on identifying potential suitable habitat rather than presence of these species.</p>
Extent of survey and site access	<p>Flora: The area of survey is relatively large, however is mainly non-native vegetation. The areas of intact native vegetation were adequately surveyed and no major access restrictions were present. The survey intensity (including surveys in 2017, 2018, 2019 and 2020) is considered sufficient to have recorded most of the native species present in the Survey Area.</p> <p>Fauna: The intensity of the targeted fauna surveys was adequate; all areas of remnant vegetation were surveyed completely. Access was generally not hindered, traversing the wetlands on Link Rd is challenging and at times impossible due to very thick vegetation and blackberry infestations.</p>
Timing/weather/season/cycle	<p>Flora: The survey timing was undertaken specifically to target potential significant flora determined from the desktop assessment. Surveys were stratified from early to late Spring over multiple years, which therefore captured a wide breadth of flowering times. Within the southern Jarrah forest region September and October is appropriate for botanical surveys in upland areas; November to January is appropriate for lowland/wetland areas.</p> <p>Whilst below average rainfall occurred in all three years, this was counteracted by high rainfall preceding the spring surveys, such that the seasonal conditions were considered appropriate for recording the flora values present.</p> <p>Fauna: Timing of surveys may not have been within the breeding season of the Forest Red-tailed Black Cockatoo (breeding can occur at any time of year depending on resource availability).</p>
Disturbances (e.g. fire, flood, accidental human intervention etc.) which affected results of survey	<p>Flora: Large areas of Survey Area on Lower Denmark road adjacent to the railway line were slashed in 2019, therefore may change the short-term structure and floristics of those areas. Most of the fire ages present were estimated to be > 5 years, therefore the previous fire regime is not expected to affect the recording of the flora values present. Some long unburnt areas may have reduced to ability to detect some fire ephemeral species (see desktop assessment for more details).</p> <p>Fauna: No disturbances were likely to have affected the fauna survey results.</p>

4 FLORA RESULTS

4.1 Desktop Assessment

4.1.1 Flora

The desktop assessment identified that 70 conservation significant flora have previously been recorded in the vicinity (<10 km) of the Survey Area (mapped in Appendix B). A post-survey likelihood of occurrence assessment of conservation significant flora (Appendix E) was undertaken following the field visits to determine the suitability of habitats encountered and the effectiveness of the survey effort and timing. The assessment determined the following conclusions:

- Five species identified in the desktop assessment were recorded in the Survey Area.
- Suitable or potentially suitable habitat for 38 conservation significant flora was present in the Survey Area, based on general soil and landform characteristics. However, none of these species were recorded during the survey. No survey limitations (i.e. flowering time, absence of disturbance) were identified for any of these species that would have prevented their detection during the survey, therefore they are considered unlikely to be present.
- One threatened orchid, *Caladenia harringtoniae* (T) was considered to potentially occur associated with granite on Mt Melville. Targeted surveys were conducted at the appropriate time of year and no individuals were detected. However, there remains the possibility for this species to emerge after fire.
- Four Priority-listed annual taxa that occur in wetlands/damplands were considered possible to occur within the Survey Area: *Drosera paleacea* (P1), *Gonocarpus simplex* (P4), *Microtis pulchella* (P4) and *Microtis quadrata* (P4). These taxa flower in summer and are most prolific after fire, therefore would have been difficult or impossible to detect during the survey (fire has been absent from the majority of the Survey Area for >10 years).
- Two Priority-listed species are inconspicuous and may not have been flowering during the surveys, therefore may have been difficult to detect if in low numbers (*Schoenus* sp. Grassy (E. Gude & J. Harvey 250) (P2) and *Laxmannia jamesii* (P4)).
- Fourteen species were considered 'Unlikely' to occur as no (or very limited) suitable habitat was present in the Survey Area.
- Five species were considered 'Unlikely' to occur as the Survey Area is outside their known range (records in the study area are geo-spatial errors).

4.1.2 Vegetation

The desktop assessment determined that two TECs may occur within the Survey Area: "*Subtropical and temperate saltmarsh*" (Vulnerable) and "*Proteaceae Dominated Kwongkan Shrublands*" (Endangered) (DotEE 2019a) (Mapped in Appendix B). The "*Subtropical and temperate saltmarsh*" community is confined to the saline tidal margins of Princess Royal Harbour and Torbay inlet and is considered highly unlikely to occur with the Survey Area. The "*Proteaceae Dominated Kwongkan Shrublands*" only applies to vegetation within the Southeast Coastal Floristic Province, therefore cannot be applied within the Survey Area.

Four PECs occur directly adjacent to the Survey Area (DPaW 2019b, Appendix B). *Banksia coccinea* Thicket (P1), Coastal *Melaleuca incana/Taxandria juniperina* (P1), *Banksia littoralis/Melaleuca incana* (P1) and *Astartea scoparia* Swamp Thicket (P1). All of these communities were considered during the field assessment.

4.2 Field Assessment

4.2.1 Vegetation

Thirteen native vegetation associations were described from the Survey Area: - four occur exclusively in wetland habitats, three are associated with granite outcrops and six generally occur on uplands of sand or predominantly laterite. Three granite shrublands/woodland combinations occurred that varied below the resolution of mapping used in this assessment 1:5000, therefore were mapped as mosaics (all mosaics represent 50% proportions of each association) (Table 7).

Remnant vegetation covered a total of 82 ha (24%) of the 344 ha Survey Area and was represented in condition scales grading from Completely Degraded (native understory very sparse or absent) to Excellent (no obvious disturbance). The condition of the majority of the remnant vegetation (61%) was classified as Very Good or Excellent.

Remaining areas were mainly comprised of roads, tracks, commercial or residential areas and pasture. Five additional non-native vegetation types were mapped (total of 98.99 ha), comprised of weeds, revegetation or plantations.

Vegetation descriptions for native and non-native vegetation is provided below; mapping is provided in Appendix B.

Table 7. Extent (ha) and condition of remnant and non-native vegetation in the Survey Area.

Vegetation Association (ARVS Unit)	Condition					Total:
	Completely Degraded	Degraded	Good	Very Good	Excellent	
Uplands						
<i>Hakea</i> spp. Shrubland/Woodland Complex (31)		1.72		0.47	2.52	4.71
Jarrah/Marri/Sheoak Laterite Forest (12a)	4.34	5.97	0.40	3.10	19.90	33.71
Jarrah/Sheoak/ <i>E. staeri</i> Sandy Woodland (13)		0.94			3.29	4.24
Marri/Jarrah Coastal Hills Forest (17)					2.13	2.13
Marri/Jarrah Forest/Peppermint Woodland (10)	0.70	3.61	1.17	5.59		11.07
Peppermint Low Forest (2)	1.42					1.42
Granites						
<i>Taxandria marginata</i> Granite Shrubland (24)		0.85		0.42	0.58	1.85
<i>Gastrobium bilobum</i> Granite Shrubland/Yate Woodland (23)	0.14	0.56		0.42	0.23	1.35
<i>Leucopogon assimilis</i> Granite Shrubland (25)					0.35	0.35
Wetlands						
<i>Evandra aristata</i> Sedgeland (46)				0.64		0.64
<i>Homalospermum firmum</i> / <i>Callistemon glaucus</i> Peat Thicket (47)	1.93	1.68		1.96	4.96	10.53
<i>Melaleuca preissiana</i> Low Woodland (49)	1.12			0.06		1.18
<i>Taxandria juniperina</i> Closed Forest (59)	4.44	1.57	0.10	2.75		8.86
Sub-total:	14.09	16.9	1.67	15.41	33.96	82.03
Non-native Vegetation						
<i>Mature Planted Trees (Iron Barks, Blue Gum, Tuart, other Eucalypts and Peppermint generally > 10 years old)</i>						75.26
<i>Woody Weeds (Victorian Tea Tree, Taylorina, Sydney Wattle, Kangaroo Acacia or Bamboo with isolated native plants)</i>						7.14
<i>Other Weeds (Watsonia, Bracken Fern or Blackberry with isolated native plants)</i>						2.16
<i>Revegetation (mixed shrubs and trees generally <10 years old)</i>						5.58
<i>Isolated Plants (Pasture and herbaceous weeds with isolated native plants)</i>						9.60
Completely Cleared						162.16
					Grand Total:	343.93

Hakea spp. Shrubland/Woodland Complex:

Soil: White sand with heavy laterite gravel and rocks (<30mm)

Landform: Hill crest

Represented in quadrat 1, 2, 3 & 32

Total of 4.71 ha, Degraded to Excellent Condition

Concordant with Unit 31(Sandiford and Barrett 2010)



Lifeform	% Cover	Dominant taxa
Mallee <10m	10-30%	<i>Eucalyptus marginata</i> , <i>Eucalyptus staeri</i> , <i>Allocasuarina fraseriana</i>
Shrubs >2m	10-70%	<i>Hakea ferruginea</i> , <i>Hakea lasiantha</i> , <i>Hakea ceratophylla</i> , <i>Hakea trifurcata</i> , <i>Hakea lasiantha</i>
Shrubs 1-2m	10-30%	<i>Acacia browniana</i> var. <i>browniana</i> , <i>Acacia myrtifolia</i> , <i>Agonis theiformis</i> , <i>Allocasuarina humilis</i> , <i>Beaufortia decussata</i> , <i>Petrophile diversifolia</i> , <i>Leucopogon verticillatus</i> , <i>Leucopogon obovatus</i> subsp. <i>obovatus</i>
Shrubs <1m	10-30%	<i>Hibbertia microphylla</i> , <i>Hovea trisperma</i> , <i>Dasypogon bromeliifolius</i> , <i>Synaphea gracillima</i> , <i>Xanthorrhoea platyphylla</i> , <i>Sphaerolobium grandiflorum</i> , <i>Sphenotoma capitata</i> , <i>Pultenaea verruculosa</i> , <i>Andersonia</i> sp. Jamesii (J. Liddelow 84)
Sedges	<10%	<i>Lepidosperma drummondii</i> , <i>Lepyrodia hermaphrodita</i> , <i>Anarthria gracilis</i> , <i>Anarthria prolifera</i> , <i>Mesomelaena tetragona</i> , <i>Tetraria octandra</i>

Jarrah/Marri/Sheoak Laterite Forest:

Soil: Grey sand with laterite gravel

Landform: Middle to upper hill-slopes

Represented in quadrat 4, 5, 6 & 7

Total of 33.71 ha, Completely Degraded to Excellent condition

Concordant with Unit 12a (Sandiford and Barrett 2010)



Lifeform	% Cover	Dominant taxa
Tree >10m	30-70%	<i>Eucalyptus marginata</i> , <i>Corymbia calophylla</i> , <i>Allocasuarina fraseriana</i>
Shrubs >2m	10-30%	<i>Banksia grandis</i> , <i>Persoonia longifolia</i> (dieback free areas only), <i>Hakea amplexicaulis</i>
Shrubs 1-2m	10-30%	<i>Beaufortia decussata</i> , <i>Bossiaea linophylla</i> , <i>Agonis theiformis</i> , <i>Xanthorrhoea platyphylla</i> , <i>Leucopogon verticillatus</i>
Shrubs <1m	10-30%	<i>Acacia browniana</i> var. <i>browniana</i> , <i>Dasypogon bromeliifolius</i> , <i>Hibbertia cunninghamii</i> , <i>Logania serpyllifolia</i> subsp. <i>serpyllifolia</i>
Sedges	30/70 %	<i>Patersonia umbrosa</i> var. <i>umbrosa</i> , <i>Desmodcladus fasciculatus</i> , <i>Tetraria octandra</i> , <i>Lomandra pauciflora</i> , <i>Tetraria</i> sp. Jarrah Forest (R. Davis 7391)

Jarrah/Sheoak/E. staeri Sandy Woodland:

Soil: Grey sand

Landform: Middle hill-slopes

Represented in quadrat 8, 21 & 25

Total 4.23 ha, Degraded to Excellent condition

Concordant with Unit 13 (Sandiford and Barrett 2010)



Lifeform	% Cover	Dominant taxa
Tree >10m	30-70%	<i>Eucalyptus marginata</i> , <i>Eucalyptus staeri</i> , <i>Allocasuarina fraseriana</i> , <i>Corymbia calophylla</i>
Shrubs >2m	10-30%	<i>Banksia grandis</i> (dieback free areas only)
Shrubs 1-2m	10-30%	<i>Bossiaea linophylla</i> , <i>Agonis theiformis</i> , <i>Xanthorrhoea platyphylla</i> , <i>Leucopogon verticillatus</i> , <i>Hakea ruscifolia</i> , <i>Leucopogon obovatus</i> subsp. <i>obovatus</i>
Shrubs <1m	10-30%	<i>Acacia browniana</i> var. <i>browniana</i> , <i>Dasyopogon bromeliifolius</i> , <i>Hibbertia cunninghamii</i> , <i>Xanthosia rotundifolia</i> , <i>Opercularia hispidula</i> , <i>Hibbertia cuneiformis</i>
Sedges	30/70 %	<i>Anarthria scabra</i> , <i>Patersonia umbrosa</i> var. <i>umbrosa</i> , <i>Tetraria octandra</i> , <i>Tetraria</i> sp. Jarrah Forest (R. Davis 7391), <i>Johnsonia lupulina</i>

Marri/Jarrah Coastal Hills Forest:

Soil: Brown loamy sand, granite boulders

Landform: Middle - upper hill-slopes

Represented in quadrat 11 & 12

Total 2.13 ha, Excellent condition

Concordant with Unit 17 (Sandiford and Barrett 2010)



Lifeform	% Cover	Dominant taxa
Tree >10m	30-70%	<i>Corymbia calophylla</i> , <i>Eucalyptus cornuta</i> , <i>Agonis flexuosa</i>
Shrubs >2m	<10%	<i>Bossiaea linophylla</i> , <i>Gastrolobium bilobum</i>
Shrubs 1-2m	10-30%	<i>Hovea elliptica</i> , <i>Leucopogon obovatus</i> subsp. <i>obovatus</i>
Shrubs <1m	10-30%	<i>Tremandra stelligera</i> , <i>Opercularia hispidula</i> , <i>Hibbertia cuneiformis</i> , <i>Hibbertia furfuracea</i> ,
Sedges/Grasses	10-30%	<i>Loxocarya cinerea</i> , <i>Microlaena stipoides</i> , <i>Poa porphyroclados</i> , <i>Stypantra glauca</i> , <i>Tetrarrhena laevis</i> , <i>Tetraria octandra</i> , <i>Lepidosperma tenue</i>

Marri/Jarrah Forest/Peppermint Woodland:

Soil: Brown or grey sand, sometimes granite boulders

Landform: Middle - lower hill-slopes

Represented in quadrat 9, 15 & 20

Total 11.07 ha, Completely Degraded to Excellent condition

Concordant with Unit 10 (Sandiford and Barrett 2010)



Lifeform	% Cover	Dominant taxa
Tree >10m	30-70%	<i>Corymbia calophylla</i> , <i>Eucalyptus marginata</i> , <i>Eucalyptus cornuta</i> , <i>Agonis flexuosa</i>
Shrubs >2m	<10%	<i>Bossiaea linophylla</i> , <i>Hovea elliptica</i> , <i>Agonis theiformis</i>
Shrubs 1-2m	10-30%	<i>Hovea elliptica</i> , <i>Leucopogon obovatus</i> subsp. <i>obovatus</i>
Shrubs <1m	10-30%	<i>Pteridium esculentum</i> , <i>Tremandra stelligera</i> , <i>Opercularia hispidula</i> , <i>Hibbertia furfuracea</i> , <i>Hibbertia cuneiformis</i> , <i>Xanthosia rotundifolia</i>
Sedges/Grasses	30-70%	<i>Loxocarya cinerea</i> , <i>Tetrarrhena laevis</i> , <i>Tetraria octandra</i>

Peppermint Low Forest:

Soil: White sand

Landform: Lower hill-slopes, dunes

Not represented in quadrats

Total 1.42 ha, Completely Degraded condition

Concordant with Unit 2 (Sandiford and Barrett 2010)



Lifeform	% Cover	Dominant taxa
Tree >10m	30-70%	<i>Agonis flexuosa</i>
Ground	<10%	* <i>Aira caryophyllea</i> , * <i>Anthoxanthum odoratum</i> , * <i>Briza minor</i>

***Taxandria marginata* Granite Shrubland:**

Soil: Shallow brown loam or sand
Landform: Granite outcrop
Represented in quadrat 10 and 19
Total 1.85 ha, Degraded to Excellent condition
Concordant with Unit 24 (Sandiford and Barrett 2010)



Lifeform	% Cover	Dominant taxa
Shrubs >2m	10-30%	<i>Taxandria marginata</i> , <i>Anthocercis viscosa</i> , <i>Dodonaea ceratocarpa</i> , <i>Acacia crassiuscula</i>
Sedges/Grasses	10-30%	<i>Lepidosperma hopperi</i> , <i>Lepidosperma tenue</i> , <i>Patersonia limbata</i> , <i>Stypantra glauca</i>

***Gastrolobium bilobum* Granite Shrubland/Yate Woodland:**

Soil: Shallow brown loam or sand
Landform: Granite outcrop
Represented in quadrat 14
Total in mosaic 1.35 ha, Completely Degraded to Excellent condition
Concordant with Unit 23 (Sandiford and Barrett 2010)



Lifeform	% Cover	Dominant taxa
Tree >10m	<10%	<i>Eucalyptus cornuta</i>
Shrubs 1-2m	10-30%	<i>Gastrolobium bilobum</i> , <i>Dodonaea ceratocarpa</i> , <i>Hibbertia furfuracea</i> , <i>Leucopogon obovatus</i> subsp. <i>obovatus</i> , <i>Pimelea rosea</i> subsp. <i>rosea</i>
Sedges/Grasses	30-70%	<i>Lepidosperma hopperi</i> , <i>Lepidosperma tenue</i> , <i>Stypantra glauca</i> , <i>Loxocarya cinerea</i>

Leucopogon assimilis Granite Shrubland:

Soil: Shallow brown loam or sand
 Landform: Granite outcrop
 Represented in quadrat 13
 Total in mosaic 0.35 ha, Excellent condition
 Concordant with Unit 25 (Sandiford and Barrett 2010)



Lifeform	% Cover	Dominant taxa
Tree >10m	<10%	<i>Eucalyptus cornuta</i>
Shrubs >2m	30-70%	<i>Gastrolobium bilobum</i> , <i>Dodonaea ceratocarpa</i>
Shrubs <1m	10-30%	<i>Leucopogon assimilis</i> , <i>Leucopogon obovatus</i> subsp. <i>obovatus</i> , <i>Hibbertia diamesogenos</i> , <i>Leucopogon pendulus</i> , <i>Verticordia plumosa</i> , <i>Andersonia sprengelioides</i>
Sedges/Grasses/Herbs	30-70%	<i>Borya sphaerocephala</i> , <i>Stypandra glauca</i> , <i>Loxocarya cinerea</i> , <i>Microlaena stipoides</i> , <i>Neurachne alopecuroidea</i>

Evandra aristata Sedgeland:

Soil: Grey sand
 Landform: Wetland/valley floor
 Represented in quadrat 18
 Total 0.64 ha, Very Good condition
 Concordant with Unit 46 (Sandiford and Barrett 2010)



Lifeform	% Cover	Dominant taxa
Tree <10m	<10%	<i>Nuytsia floribunda</i>
Shrubs 1-2m	10-30%	<i>Beaufortia sparsa</i> , <i>Adenanthos obovatus</i> , <i>Jacksonia horrida</i> , <i>Melaleuca thymoides</i> , <i>Taxandria parviceps</i>
Shrubs <1m	10-30%	<i>Hypocalymma strictum</i> , <i>Boronia crenulata</i> , <i>Boronia spathulata</i> , <i>Dampiera linearis</i> , <i>Dasyopogon bromeliifolius</i>
Sedges/Grasses/Herbs	30-70%	<i>Evandra aristata</i> , <i>Gymnoschoenus anceps</i> , <i>Anarthria laevis</i> , <i>Anarthria prolifera</i> , <i>Anarthria scabra</i> , <i>Xyris lanata</i>

***Homalospermum firmum*/Callistemon glaucus Peat Thicket:**

Soil: Grey sand, with peat

Landform: Wetland/valley floor

Represented in quadrat 16, 17, 22, 23, 24, 26, 27, 28, 29

Total 10.53 ha, Degraded to Excellent

Concordant with Unit 47 (Sandiford and Barrett 2010)



Lifeform	% Cover	Dominant taxa
Shrubs 1-2m	30-70%	<i>Callistemon glaucus</i> , <i>Homalospermum firmum</i> , <i>Taxandria linearifolia</i> , <i>Boronia crassipes</i> , <i>Hakea linearis</i> , <i>Sphaerolobium vimineum</i>
Sedges	>70%	<i>Empodisma gracillimum</i> , <i>Gymnoschoenus anceps</i> , <i>Leptocarpus tenax</i> , <i>Schoenus multiglumis</i> , <i>Xyris lanata</i>

***Melaleuca preissiana* Low Woodland:**

Soil: Sand

Landform: Wetland/valley floor

Not represented in quadrats

Total 1.18 ha, Completely Degraded to Very Good condition

Concordant with Unit 49 (Sandiford and Barrett 2010)



Lifeform	% Cover	Dominant taxa
Shrubs >2m	30-70%	<i>Melaleuca preissiana</i> , <i>Melaleuca raphiophylla</i>
Ground	>70%	* <i>Holcus lanatus</i> , * <i>Anthoxanthum odoratum</i> , <i>Baumea species</i> , <i>Centella asiatica</i>

***Taxandria juniperina* Closed Forest:**

Soil: Sand

Landform: Wetland/valley floor

Represented in quadrat 30 & 31

Total 8.86 ha, Completely Degraded to Excellent condition

Concordant with Unit 59 (Sandiford and Barrett 2010)



Lifeform	% Cover	Dominant taxa
Shrubs >2m	>70%	<i>Taxandria juniperina</i> , <i>Homalospermum firmum</i> , <i>Astartea species</i>
Grasses	>10%	<i>Leptocarpus scariosus</i> , <i>Baumea acuta</i> , <i>Lepidosperma striatum</i>

Non-native Vegetation

Mature Planted Trees (Iron Barks, Blue Gum, Tuart, other Eucalypts and Peppermint generally > 10 years old)



Woody Weeds (Victorian Tea Tree, Taylorina, Sydney Wattle, Kangaroo Acacia or Bamboo with isolated native plants)



Other Weeds (Watsonia, Bracken Fern or Blackberry with isolated native plants)



Revegetation (mixed shrubs and trees generally <10 years old)



Isolated Plants (Pasture and herbaceous weeds with isolated native plants)



4.2.2 Regional and Local Significance of Vegetation

Four vegetation types described from the Survey Area are considered wetland habitats as they are dependent on surface or subsurface expression of ground water (*Homalospermum firmum*/*Callistemon glaucus* Peat Thicket, *Evandra aristata* Sedgeland, *Taxandria juniperina* Closed Forest and *Melaleuca preissiana* Low Woodland). Three vegetation types are associated with granite outcrops, which are considered to be significant due to their restricted distribution, high number of conservation significant taxa and their role as climate refugia (*Taxandria marginata*, *Gastrolobium bilobum* and *Leucopogon assimilis* Shrublands).

Within the local region, there is approximately 35% total remnant vegetation, of which 19% and 39% occur in IUCN or Crown reserves, respectively (includes Albany Regional Vegetation Survey Area of 125,415 ha) (Sandiford and Barrett 2010). The current extent of pre-European vegetation associations in the Survey Area are above 30% at state and local government jurisdictions (Table 8). When aligned with mapping Units in the Albany Regional Vegetation Survey, eight of the 13 associations from the Survey Area have very low overall extent or low representation in reserves or (Table 9). Conservation criteria applied in the Albany Regional Vegetation Survey defines that six of the association are rare (<1,500 ha in total) and five are poorly represented in the conservation estate (<10% in IUCN reserves).

Table 8. Extent (ha) of pre-European vegetation associations from the Survey Area (Government of Western Australia [GoWA] 2019).

Vegetation Association	Western Australia			City of Albany (LGA)		
	Pre-European Extent	Current Extent	% Remaining	Pre-European Extent	Current Extent	% Remaining
3 - Medium forest; jarrah-marri	2,661,405	1,803,437	68	50,509	16,025	32
51 - Sedgeland; reed swamps, occasionally with heath	59,085	33,058	56	17,586	5,751	33
978 - Low forest; jarrah, <i>Eucalyptus staeri</i> & <i>Allocasuarina fraseriana</i>	53,231	18,856	36	52,154	18,720	36

Table 9. Overall extent and reservation status of vegetation associations from the Survey Area and local status derived from the Albany Regional Vegetation Survey (Sandiford and Barrett 2010). Includes IUCN I-IV reserves with Albany Region (<35 km radius).

Vegetation Type	Current Extent		Reserve IUCN I-IV	
	ha	%	ha	%
<i>Leucopogon assimilis</i> Granite Shrubland	17	0.1	8	50
<i>Taxandria marginata</i> Granite Shrubland	109	0.2	21	19.1
<i>Gastrolobium bilobum</i> Granite Shrubland/Yate Woodland	163	0.4	2	1.3
<i>Melaleuca preissiana</i> Low Woodland	679	1.5	53	7.7
<i>Taxandria juniperina</i> Closed Forest	779	1.8	77	9.9
Peppermint Low Forest	1,232	2.8	281	22.8
Marri/Jarrah Coastal Hills Forest (17)	1,238	2.8	625	50.5
Marri/Jarrah Forest/Peppermint Woodland	1,597	3.6	107	6.7
<i>Evandra aristata</i> Sedgeland (46)	1,747	4	219	12.5
<i>Homalospermum firmum</i> / <i>Callistemon glaucus</i> Peat Thicket (47)	2,083	4.7	263	12.6
<i>Hakea</i> spp. Shrubland/Woodland Complex (31)	2,366	5.4	1073	45.4
Jarrah/Sheoak/ <i>E. staeri</i> Sandy Woodland (13)	5,148	11.7	1334	25.9
Jarrah/Marri/Sheoak Laterite Forest	13,144	29.8	1,273	9.8

Two TECs are known in the vicinity the Survey Area; no vegetation meets the requisite criteria for either community. *Subtropical and Temperate Coastal Saltmarsh* TEC (Vulnerable) occurs approximately 100m from the Survey Area on the margin of Princess Royal Harbor and is confined to marine saline habitats (DotE 2013). The Survey Area falls outside (~6 km) the South East Coastal Botanical Province, therefore the Proteaceae Dominated Kwongkan Shrubland TEC (Endangered) is not applicable to vegetation within the Survey Area (DotE 2014b).

Four PECs occur directly adjacent to the Survey Area (DBCA 2019b, Appendix B). *Banksia coccinea* Thicket (P1), Coastal *Melaleuca incana/Taxandria juniperina* (P1) and *Banksia littoralis/Melaleuca incana* (P1) have distinctive dominant species that are absent from the Survey Area. *Astartea scoparia* Swamp Thicket (P1) may have previously occurred in the wetland areas on Lower Denmark Road that is now obscured by a high level of disturbance and altered drainage. No PECs were recorded in the Survey Area.

4.2.3 Flora

Thirty-two floristic quadrats were established within the Survey Area (Appendix D). A total of 343 taxa from 65 families, including 62 weeds were recorded from the Survey Area (including opportunistic observations; Appendix C). The plant families most represented were Myrtaceae (40 taxa), Fabaceae (38), Cyperaceae (27) and Proteaceae (25). Quadrat diversity varied from nine to 51 taxa per quadrat, with an average of 23.3. The most species rich vegetation was *Hakea* spp. Shrubland/Woodland Complex (average 36.5 taxa per quadrat) and the lowest was *Taxandria juniperina* Closed Forest (average 13 taxa per quadrat).

4.2.4 Conservation Significant Flora

Habitat or populations of five significant flora were recorded or are previously known from the Survey Area that are mapped (Appendix B) and discussed below. Population and location data are provided in Appendix F and Threatened and Priority Flora forms are provided in Appendix G.

***Prasophyllum paulinae* (P1)**

Prasophyllum paulinae is a Priority 1 taxon from the Orchidaceae family, known only from two wetland habitats in the vicinity of Albany, both recorded following fire. The first voucher and type specimen were collected in 1988 and 1993, respectively, from a regenerating swamp on private property (P222501) that occurs within the Survey Area. The taxon was named in dedication to the late Pauline Herberle (Jones and Clements 1996), the family of who still own the property. The precise location of the early collections is uncertain due to inaccurate geo-tags, but was noted to be locally frequent within a degraded swamp with black, peaty, alkaline soil on the Herberle's property, Frederick Street, Gledhow (Western Australian Herbarium Accession no. 04514238).

Extensive survey was undertaken of the Herberle's property (in the Survey Area) over several days in spring 2017, 2018 and 2019. All suitable habitat was occupied by a common congener, *Prasophyllum macrostachyum* (Plate 1), and no individuals concordant with the description of *P. paulinae* were detected. A large area of regenerating wetland vegetation and seasonally inundated firebreaks occur at the southern end of the Herberle's property, which is considered the most likely location of the early collections of *P. paulinae*. Currently the area is composed of a tall, long unburnt (>20 years) closed forest of *Taxandria juniperina* and *Homalospermum firmum* (Plate 2). This area has been defined as a known population location for *P. paulinae* (Appendix B). The failure to detect *P. paulinae* during the surveys does not exclude its presence from the previously known habitat or its potential to emerge in future years, particularly after fire.

Prasophyllum paulinae is also known from one other population in a peat wetland at Two Peoples Bay, east of Albany. Population monitoring after a fire in 2010, indicates it co-occurred with other *Prasophyllum* species and that numbers peaked (over 100 individuals) two years after the fire, then declined thereafter. The last plants (23 individuals) were seen in 2015 (Anna de Haan pers. comm.).

Suitable habitat for *Prasophyllum paulinae* is considered to be recently burnt *Homalospermum firmum*/*Callistemon glaucus* Peat Thicket and *Taxandria juniperina* Closed Forest. A total of 19.25 ha of these Units occurs within the Survey Area that are long unburnt (mapped in Appendix B). Targeted survey for *Prasophyllum paulinae* in these areas over consecutive springs has not detected any individuals. However, the potential exists for it to emerge following fire within this habitat.

Regional surveys for *Prasophyllum paulinae* were undertaken by Southern Ecology in spring 2019, which successfully detected some individuals (outside the Survey Area) that meet the taxonomic

description of the taxon. The details of these surveys are presented in a separate report (Rathbone 2020).



Plate 1 and 2. *Prasophyllum macrostachyum*, the common congener of *P. paulinae* (P1) found within the Survey Area and the regional distribution of *P. paulinae* (DPaW 2019a).

***Synaphea incurva* (P3)**

Synaphea incurva is a Priority 3 taxon from the Proteaceae family, known from a very narrow range between Redmond State Forest and Hassel National Park (Plate 4). It is commonly associated with heath or woodlands with laterite gravel and sand. Two populations, totalling eight individuals were recorded on road verges in the Survey Area (Plate 3).

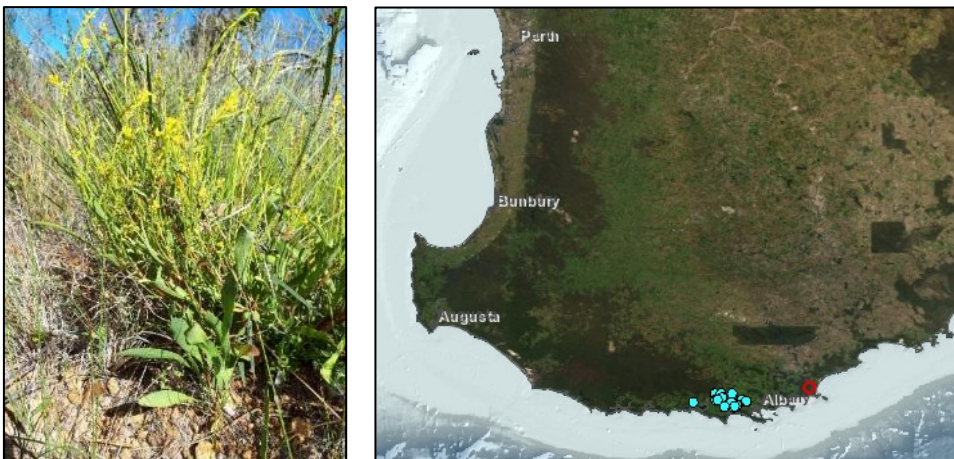


Plate 3 and 4. *Synaphea incurva* (P3) and regional distribution (DPaW 2019a).

***Boronia crassipes* (P3)**

Boronia crassipes is a Priority 3 taxon from the Rutaceae family, known from wetlands between Albany and Walpole (Plate 6). It is commonly associated with *Homalospermum firmum* and *Empodisma gracillimum* on peat and sand. Several large populations are known within the vicinity of Albany. In the Survey Area, one population with 1,018 individuals was recorded in the broad drainage channel on Link Rd (Plate 5).

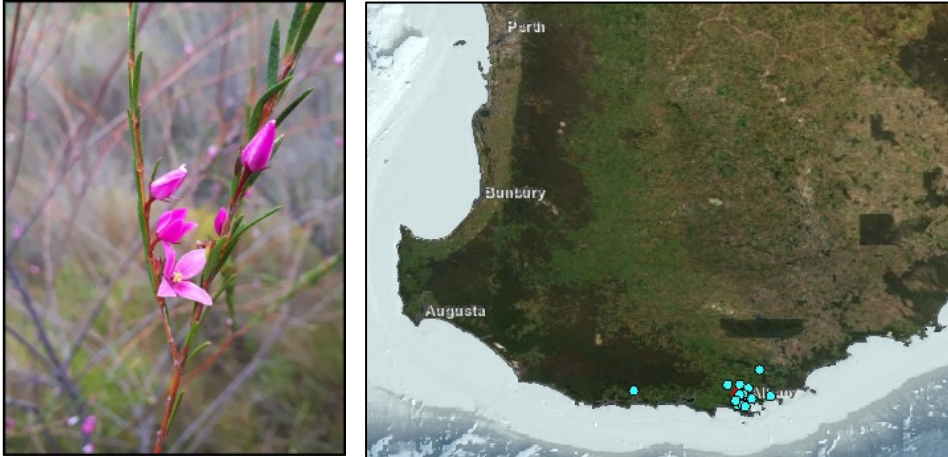


Plate 5 and 6. *Boronia crassipes* (P3) and regional distribution (DPaW 2019a).

***Andersonia* sp. Jamesii (J. Liddelow 84) (P4)**

Andersonia sp. Jamesii (J. Liddelow 84) is a Priority 4 taxon from the Ericaceae family, known from a relatively narrow range around Albany (Plate 8). It is commonly associated with poorly drained lateritic areas, often on hill crests in *Eucalyptus marginata*/*E. staeri* woodlands. In the Survey Area, a population of 22 individuals was recorded in the large City of Albany Reserve on George St and one individual was recorded on Albany Highway (Plate 7).

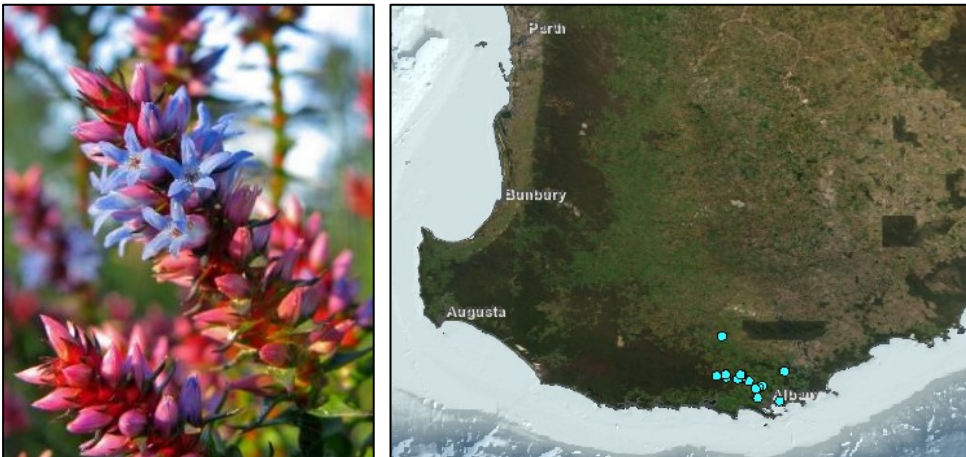


Plate 7 and 8. *Andersonia* sp. Jamesii (J. Liddelow 84) (P4) and regional distribution (DPaW 2019a).

***Thysanotus isantherus* (P4)**

Thysanotus isantherus is a Priority 4 taxon known from several coastal granite outcrops between Betty's Beach and Walpole and a disjunct occurrence near Cape Leeuwin (Plate 10). It is commonly associated with shallow soil herblands on the margin of granite sheets. It is inconspicuous due to its small size (<15 cm), its dull pink flowers and its leaves that wither to an underground tuber during dry periods. Two individuals were recorded on the western slopes of Mt Melville (Plate 9).



Plate 9 and 10. *Thysanotus isantherus* (P4) and regional distribution (DPaW 2019a).

4.2.5 Weeds

A total of sixty-one weeds were recorded from areas of remnant vegetation. Five significant weeds were recorded and mapped within the Survey Area (Appendix B): Blackberry (**Rubus* species complex, WoNS, Declared Pest) and Bridal Creeper (**Asparagus asparagoides*, WoNS, Declared Pest) were frequently observed in multiple habitats; Gorse (**Ulex europaeus*, WoNS, Declared Pest), Arum Lily (**Zantedeschia aethiopica*, Declared Pest) and Lantana (**Lantana camara*, WoNS, Declared Pest) were recorded as isolated occurrences. Other large woody weeds recorded widely in remnant vegetation, that are of concern to the City of Albany include **Acacia longifolia*, **Psoralea pinnata* and **Dipogon lignosus*. A variety of other agricultural weeds occurred under planted vegetation, or adjacent to pasture areas (see Appendix C). The survey of these agricultural areas was not extensive and it is possible more weeds occur in these areas.

5 FAUNA RESULTS

5.1 Desktop Assessment

The likelihood of occurrence assessment of conservation significant fauna identified for the Survey Area is included in Appendix E. Field assessments confirmed that habitats within the Survey Area are currently being utilised by five conservation significant fauna species; Carnaby's Cockatoo (*Calyptorhynchus latirostris*) (T-EN), Baudin's Cockatoo (*Calyptorhynchus baudinii*) (T-EN), Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) (T-VN), Western Ringtail Possum (*Pseudocheirus occidentalis*) (T-CR), and Southern Brown Bandicoot (*Isodon obesulus* subsp. *fusciventer*) (P4). One significant fauna species was considered likely to occur in the Survey Area - Water Rat (*Hydromys chrysogaster*) (P4), and seven conservation significant fauna species were considered to possibly occur in the Survey Area: - Carter's Freshwater Mussel (*Westralunio carteri*) (VU), South-western Brush-tailed Phascogale (*Phascogale tapoatafa wambenger*) (CD), Masked Owl (*Tyto novaehollandiae* subsp. *novaehollandiae*) (P3), Peregrine Falcon (*Falco peregrinus*) (OS), Fork-tailed Swift (*Apus pacificus*) (IA), Short-nosed Snake (*Elapognathus minor*) (P2) and the Woollybush bee (*Hylaeus globuliferus*) (P3).

5.2 Fauna Habitat

The vegetation types identified in Section 4.2 can be used to categorise general fauna habitats. The known or potential vegetation types associated with significant fauna in the Survey Area is presented in Table 10. There was a variety of fauna habitats identified within the Survey Area, from lowland wetlands to Eucalypt forest woodlands and shrublands on the western slopes of Mt. Melville. Planted Eucalypts also provide some habitat for fauna as do some highly altered vegetation with high percentages of weeds.

Some vegetation associations are mapped (Appendix B) that are not indicated as suitable habitat in Table 10. For example, *Evandra aristata* Sedgeland and *Hakea* spp. Shrubland/Woodland Complex are not considered suitable for Baudin's and Forest Red-tailed Black Cockatoos. However, in some instances have been mapped as habitat due to the presence of potentially suitable night roosting trees.

Some non-remnant vegetation, such as Bluegum and pine plantations, scattered trees over pasture grasses, or revegetation provide a habitat for some significant species. These are included in Table 10 and discussed further in the following sections.

Table 10. Conservation significant fauna and known (x) or potentially (?) associated vegetation within the Survey Area compared to the larger Albany Regional Vegetation Survey Area (Sandiford and Barrett 2010). Information is not sufficient to determine the habitat of the Recherche Cape Barren Goose (VU), Short-nosed Snake (P2) and Woollybush Bee (P3).

Fauna Habitat and associated Vegetation Associations (ARVS Unit no.)	Ha within Survey Area	Carnaby's Cockatoo (EN)	Baudin's Cockatoo (EN)	Forest Red-tailed Black-Cockatoo (VU)	Western Ringtail Possum (CR)	Quenda (P4)	Brush-tailed Phascogale (CD)	Masked Owl (P3)	Water Rat (P4)	Peregrine Falcon (OS)	Carters Freshwater Mussel (VU)
Eucalypt (Jarrah/Marri) Woodland/Forest											
Jarrah/Marri/Sheoak Laterite Forest (12)	33.71	x	x	x	x	x	?	?		?	
Jarrah/Sheoak/ <i>Eucalyptus staeri</i> Sandy Woodland (13)	4.24	x	x	x	x	x	?			?	
Marri/Jarrah Coastal Hills Forest (17)	2.13	x	x	x	x	x	?	?		?	
Marri/Jarrah Forest/Peppermint Woodland (10)	11.07	x	x	x	x	x	?			?	
Non-Eucalypt Woodland /Forest											
<i>Taxandria juniperina</i> Closed Forest (59)	8.86	x	x	x	x	x					
<i>Melaleuca preissiana</i> Low Woodland (49)	1.18				x	x					
Peppermint Low Forest (2)	1.42				x						
Shrubland/woodland											
<i>Hakea spp.</i> Shrubland/Woodland Complex (31)	4.71	x			x						
Mosaic <i>Taxandria marginata</i> / <i>Gastrolobium bilobum</i> Granite Shrubland/Yate Woodland (23/24)	2.57	x		x	x	x					
Shrubland											
Mosaic <i>Taxandria marginata</i> / <i>Leucopogon assimilis</i> Granite Shrubland (24/25)	0.98				x	x					
Wetland											
<i>Evandra aristata</i> Sedgeland (46)	0.64	x			x	x			?		
<i>Homalosperrum firmum</i> / <i>Callistemon glaucus</i> Peat Thicket (47)	10.53	x			x	x			?		?
Non-remnant vegetation											
Mature Planted Trees (Iron Barks, Blue Gum, Tuart, other Eucalypts and Peppermint generally > 10 years old)	75.26	x	x	x							
Woody Weeds (Victorian Tea Tree, Taylorina, Sydney Wattle, Kangaroo Acacia or Bamboo with isolated native plants)	7.14				x	x					
Other Weeds (<i>Watsonia</i> , Bracken Fern or Blackberry with isolated native plants)	2.16					x					
Revegetation (mixed shrubs and trees generally <10 years old)	5.58					?					
Isolated Plants (Pasture and herbaceous weeds with isolated native plants)	9.60										
Total extent (ha) in Survey Area (excluding non-remnant vegetation)	82.03	77.12	58.67	61.24	80.7	74.57	49.95	34.64	11.17	49.95	10.53
Extent in Survey Area as proportion (%) of the total potential habitat in the ARVS Survey Area (DPaW 2013b)		0.19	0.20	0.26	0.20	0.19	0.36	0.21	0.17	NA	NA

5.3 Targeted Conservation Significant Fauna

5.3.1 Western Ringtail Possum (*Pseudocheirus occidentalis*) (T-CR)

Preferred habitat for the WRP on the south coast of Western Australia is not well understood. The species has been recorded in coastal heath, Jarrah/Marri woodland and forest, Jarrah/Sheoak woodland, peppermint woodlands, myrtaceous heaths and shrublands, Bullich (*Eucalyptus megacarpa*) dominated riparian zones and Karri forest (*Eucalyptus diversifolia*). In the vegetation associations mapped in the Albany Region (35 km radius from Albany in Sandiford and Barrett (2010)), most ringtail records were from *Coastal limestone heath vegetation* unit 5b (DPaW 2014). Recent spotlight surveys have found high numbers in *Coastal Hills Forest*, *Jarrah Woodland* and *Marri/Jarrah Forest/Peppermint Woodland* on Mt Clarence/Adelaide and Mt Melville within the Albany town site (S. Gilfillan unpubl. data). Recent radio collaring of individuals determined home ranges of 0.88 ± 0.12 ha (mean \pm SE), and were commonly associated at night with Marri and Jarrah, suggesting a preference for these species as foraging trees. Daytime refuges included dreys, large trees, tree hollows (Marri only) and thick ground cover (Van Helden *et al.* 2017).

The field assessment determined that the Western Ringtail Possum occupied 113.2 ha (approximately 33%) of the Survey Area (Appendix B, Table 11). A wide range of vegetation types in various levels of condition were utilised (Jarrah, Marri and Sheoak woodlands, Jarrah/Marri Forest, *Taxandria juniperina* Woodland) that varied in condition from Degraded to Excellent.

Non-native vegetation was also utilised such as exotic Eucalypt species plantations, particularly where the weed species Sydney Golden Wattle (*Acacia longifolia*) and Victorian Tea Tree (*Leptospermum laevigatum*) provide patches of thick mid-storey (where dreys were frequently found). Western Ringtail Possum scats were also found at the base of many pine trees.

Table 11. Extent of Western Ringtail Possum habitat in the Survey Area

	Area (ha)
Core	10.2
Supporting	101.9
Core (Urban)	1.1
Supporting (Urban)	Not present
Total	113.2

5.3.1.1 Core habitat

A total of 11.3 ha of core habitat occurs within the Survey Area with 1.1 ha within urban areas. Core habitat was concentrated at the southern end of the Survey Area and is contiguous with core habitat on Mt Melville. No other core habitat exists within the Survey Area. In preliminary surveys (Rathbone and Gilfillan 2018) the City of Albany Reserve on the corner of George St and South Coast Hwy was considered core habitat. However, the updated data used to define core habitat (any area with an established density of <1 /ha) precludes this from being assigned core status with a density of only 0.14/ha (Biota 2018). Core habitat was only a small percentage of estimated core habitat within the 5 km buffer ($<0.5\%$) (Table 11).

5.3.1.2 Supporting habitat

A total of 101.9 ha of supporting habitat occurs within the Survey Area. Supporting habitat is distributed throughout the Survey Area, with the George St Reserve providing the largest native remnant of suitable supporting habitat. Mature planted trees in the east of the Survey Area also constituted supporting habitat. These were planted tree assemblages with a varying density of largely non-native mid-storey species (from very sparse to dense thickets of, particularly, Victorian Tea Tree and Sydney Golden Wattle). The two patches of *Homalospermum firmum/Callistemon glaucus* Peat Thicket (ARVS Unit 47) on Link Rd are considered supporting habitat. Very limited scat searches were performed here due the thick nature of the vegetation and no scats were observed. However, the presence of Western Ringtail Possums in the adjoining Eucalypt woodland to the north suggests this habitat is likely to be used, particularly due to the thick vegetation providing many opportunities for refuge. Supporting habitat within the Survey Area was fairly continuous along Lower Denmark Rd.

5.3.1.3 Linkages

Three linkage types were mapped within the Survey Area (Table 12). The number of linkages is a more useful measure than area as the number reflects the degree of opportunity for individuals to move through the landscape. A rectangle, for example, of linkage habitat will provide less distance for movement than the same area covering a narrow linear linkage.

Table 12. Western Ringtail Possum Linkages within the Survey Area.

Linkage Type	Survey Area	
	No. of Linkages	Area
Linkage	28	43.7
Linkage_likely	18	10.9
Linkage_possible	20	11.1

An important *Potential habitat linkage* occurs along the rail reserve, adjacent to both sides of Lower Denmark Rd, forming a partial link between the core habitats of the eastern edge of the Survey Area and the large area of supporting habitat in the George St Reserve. Small, narrow *Habitat linkages* also occur in patches of roadside vegetation, along Link Rd, south of Lancaster Rd and on George St.

5.3.1.4 Primary Corridors

There are three primary corridors within the South Coast Population:

- King River
- Kalgan River
- Coastal Corridor (from West Cape Howe NP to Cheyne's Beach – this may extend either east or west with new records)

On a regional scale, the southern section for the Survey Area covering the intersection of the Hanrahan Rd/Frenchman's Bay Road and Princess Royal Drive forms part of the Coastal Corridor within the South Coast Macro Corridor Network. This Corridor Network was developed as a strategic planning tool to

provide guidance at a regional level as to where protection and enhancement of major corridor linkages should be targeted (Wilkins *et al.* 2006). The Coastal Corridor (Forest to Two Peoples Bay Corridor) is a Priority 1 Corridor which is defined as one that links two or more *very high nature conservation value* areas (Forest Region and Two People Bay NR). On a local scale the Survey Area is within Strategic Zone B of the Coastal Corridor.

5.3.2 Black Cockatoo Species

Black Cockatoos (Carnaby's Cockatoo (*Calyptorhynchus latirostris*) (T-EN); Baudin's Cockatoo (*Calyptorhynchus baudinii*) (T-EN); and Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii* subsp. *naso*) (T-VU)

Carnaby's Cockatoo (*Calyptorhynchus latirostris*) (T-EN)

Habitats considered suitable for this species are uncleared or remnant native Eucalypt woodlands or forests containing Marri, Jarrah or Karri and shrublands or Kwongkan heathland dominated by *Hakea*, *Dryandra*, *Banksia* and *Grevillea* (DSEWPaC 2012). On the south coast they feed on Jarrah and Marri seeds and a wide variety of mainly proteaceous species. Breeding hollows occur in Jarrah and Marri and generally have an entrance diameter >200 mm and occur in trees that are 120–150 years old. Trees approaching 680 mm DBH are close to developing suitable hollows (Pittman *et al.* 2007, Whitford and William 2002, DPaW 2013a).

Communal night roosting occurs at different sites throughout the year. Groups of birds will roost in a suitable tree or group of tall trees, usually close to a water source (known to drink at dams and farm troughs) and within an area of quality foraging habitat. The cockatoos fly to feeding areas each day before returning to the night roost, however, use of a particular night roost site may vary from daily to weekly. Night roosts are generally located in the tallest trees in an area; on the south coast potential roost trees include Marri, Karri, Blackbutt, *Taxandria juniperina*, Tuart (planted), introduced Eucalypts (for example Blue Gum) and introduced pines (DSEWPaC 2012).

Baudin's Cockatoo (*Calyptorhynchus baudinii*) (T-EN)

Baudin's Cockatoo occurs in high-rainfall areas, usually at sites that are heavily forested and dominated by Marri, Jarrah and Karri. It also occurs in woodlands of Wandoo (*E. wandoo*), Blackbutt (*E. patens*), Flooded Gum (*E. rudis*), and Yate (*E. cornuta*) (DSEWPaC, 2012). Baudin's cockatoo feeds mainly on the seeds of Marri, but may also feed on the seed of *Banksia* spp., *Hakea* spp. and *Erodium botrys*. Additionally, Baudin's Cockatoo feeds on invertebrate larvae and on apple, pear and persimmon in domestic and commercial fruit orchards (Chapman 2008). There is very little breeding information and the breeding biology of this species remains poorly known (Johnstone and Kirkby 2008). Known breeding trees include Karri, Marri, Wandoo and Tuart. Hollows suitable for Baudin's Cockatoo are likely to be in trees 500 mm or greater DBH and suitable hollows usually have a diameter of 300-400 mm (Johnstone & Storr 1998; Higgins 1999; Saunders 1974, 1979).

Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii* subsp. *naso*) (T-VN)

Forest Red-tailed Black Cockatoo commonly occur in Jarrah, Karri and Marri forests and also in a range of other forest and woodland types, including Blackbutt, Wandoo and Tuart (*E. gomphocephala*), Albany Blackbutt, Yate and Flooded Gum (DSEWPaC, 2012). Ninety percent of the Forest Red-tailed Black Cockatoo total diet consists of Marri and Jarrah seeds (Johnstone & Kirkby 1999), and it depends on both feed trees during breeding periods (Johnstone *et al.* 2013). Other feed trees include Blackbutt, Albany Blackbutt, Forest Sheoak (*Allocasuarina torulosa*), Snottygobble (*Persoonia* spp.) and Karri.

Breeding occurs almost exclusively in Marri. Johnson *et al.* (2013) found by measuring 128 breeding trees that mean DBH was 2790 mm, mean estimated age was 222 years, and mean hollow entrance size was 300 mm x 340 mm. However, Whitford *et al.* (2015) state a more realistic minimum age for trees bearing suitable hollows is approximately 120–150 years (tree diameters of 500–600 mm) and most nest hollows occurred in intermediate-sized trees.

Black Cockatoo Breeding Habitat

The Survey Area occurs within the known distribution and predicted breeding range of Carnaby's Cockatoo and Baudin's Cockatoo. Forest Red-tailed Black Cockatoo are known to occur and may breed in suitable trees anywhere within their range of occurrence (DSEWPaC 2012). There are no confirmed breeding sites for any of the three Cockatoo species within 10 km of the Survey Area.

Potential breeding habitat for all three black Cockatoo species (Table 14) considered to be of high quality occurs in two large areas of Eucalypt Woodland/Forest on the southern slopes of Mt Melville and George St Reserve; several smaller patches are distributed throughout the Survey Area (total of 44.84 ha). Lower quality potential breeding habitat occurs in some of the narrow strips of roadside Eucalypt Woodland/Forest vegetation on Link Rd, George St (8.08 ha) and in areas of *Eucalyptus gomphocephala* (5.35 ha). *Eucalyptus gomphocephala* is restricted to the swan coastal plain and all occurrences within the Survey Area due to ornamental planting (approximately 70 years old). Many of the tree were ≥ 500 mm DBH, although none contained hollows at present.

No trees within the Survey Area contain hollows that were currently occupied or showed recent use by Cockatoo species. A total of 177 hollows with an entrance estimated to be greater than 100 mm were recorded within 122 alive and dead trees of *Corymbia calophylla* and *Eucalyptus marginata* (Table 13). Based on suitability of host species and current entrance size, 60 trees contained hollows potentially suitable for Carnaby's Cockatoo (*Eucalyptus marginata* or *Corymbia calophylla* with hollow entrance ≥ 200 mm), 18 trees contained hollows potentially suitable for Forest Red-tailed Black Cockatoo (*Corymbia calophylla* with hollow entrance ≥ 200 mm) and three trees contained hollows potentially suitable for Baudin's Cockatoo (*Corymbia calophylla* with hollow entrance ≥ 300 mm). Additional assessments using a drone (Biota 2019b) of all potential breeding trees within the disturbance envelope of the project were determined to be currently unsuitable for breeding.

In total, 754 potential breeding trees were recorded (DBH ≥ 500 mm, with or without hollows) comprising of the tree species *Corymbia calophylla* (332), *Eucalyptus marginata* (318), planted *Eucalyptus gomphocephala* (62), dead stags of *Eucalyptus marginata*/*Corymbia calophylla* (37) and *E. staeri* (5).

Table 13. Count of hollows with an entrance size greater than 100 mm in potential breeding trees for Black Cockatoo species.

Tree Species	Hollow entrance (mm)		
	100-199	200-299	≥ 300
<i>Corymbia calophylla</i>	20	16	3
<i>Eucalyptus marginata</i>	69	34	14
Dead Stag of <i>Eucalyptus marginata</i> or <i>Corymbia calophylla</i>	11	4	6

Black Cockatoo Breeding Feeding Habitat

Evidence of feeding was widely overserved for all three species across the Survey Area (mapped in Appendix B, Table 14). Diagnostic evidence of feeding on fruits of *Corymbia calophylla*, *Eucalyptus marginata* and *E. staeri* of all three Black Cockatoo species was observed and on planted Pine tree by Carnaby's Cockatoo.

High quality feeding habitat for all three species of Black Cockatoo was mapped in all the large Eucalypt Woodland and Forest remnants (44.84 ha). Lower quality potential feeding habitat occurred in some degraded Eucalypt remnants (8.08 ha) with *Allocasuarina* and *Hakea* in isolated patches and narrow roadside corridors (3.40 ha). Wetland areas that contained frequent *Callistemon glaucus* were also mapped as low-quality feeding habitat for Carnaby's Cockatoo (6.51 ha), which is considered a minor food source for this species (Johnston 2013).

Black Cockatoo Roosting Habitat

Confirmed roost sites for Carnaby's Cockatoo occur in Marri Jarrah Forest/Peppermint Woodland on Mt Melville, only 350 m from the eastern edge of the Survey Area and in tall *Taxandria juniperina* trees at Lake Seppings (4.8 km from the Survey Area). There are no confirmed roosting sites within 10 km for Baudin's Cockatoos or Forest Red-tailed Black Cockatoo. However, some Black cockatoo flocks around Albany are mixed flocks comprising both Carnaby's and Baudin's Cockatoos and thus the confirmed roosting sites for Carnaby's Cockatoos may contain some Baudin's individuals (Sarah Comer, South Coast Regional Ecologist, DCBA, *pers.com.*)

Potential roosting habitat for all three species of Black Cockatoo occurred throughout the Survey Area (Appendix B, Table 14). As there were numerous water sources within the Survey Area (including dams, man-made pools and farm water troughs) all areas with tall trees suitable for roost sites are considered potential roosting areas. They include native Eucalypt Woodland/Forests, *Taxandria juniperina* woodlands, exotic Eucalypt plantations and introduced pine trees (67.3 ha). Other areas of low-quality potential roosting habitat occur in Sedgeland with patches of **Leptospermum laevigatum*, **Acacia longifolia* and occasional **Eucalyptus globulus*.

Table 14. Summary of breeding, feeding and roosting habitat for three species of Black Cockatoo in the Survey Area.

Habitat Type	Description	Carnaby's Cockatoo	Baudin's Cockatoo	Forest Red-tailed Black Cockatoo	Total
High quality feeding and potential breeding and roosting	Eucalypt Woodland or Forest	+	+	+	44.84
Low quality feeding and potential breeding and roosting	Degraded Eucalypt Woodland with <i>Allocasuarina</i> and <i>Hakea</i> Shrubland	+	+	+	8.08
High quality potential roosting habitat	Mature Planted Trees and tall <i>Taxandria</i> Forest	+	+	+	67.30
Low quality potential roosting habitat	Sedgeland with <i>*Leptospermum laevigatum</i> , <i>*Acacia longifolia</i> and occasional <i>*Eucalyptus globulus</i>	+	+	+	9.08
Low quality feeding habitat	Degraded/isolated remnants Eucalypt Woodland or Forest with <i>Allocasuarina</i> and <i>Hakea</i> Shrubland	+	+	+	3.40
Low quality feeding habitat	Wetlands with <i>Callistemon glaucus</i>	+			6.51
Low quality potential breeding habitat	Planted <i>Eucalyptus gomphocephala</i>	+	+	+	5.35
				Total:	144.56

5.4 Other Conservation Significant Fauna

Quenda (*Isoodon obesulus* subsp. *fusciventer*) (P4)

The Quenda occurs in wet or dry sclerophyll forest through to open woodland and scrubby, dense vegetation on sandy soils. The species often feeds in adjacent forest and woodland that is burnt on a regular basis and in areas of pasture and cropland lying close to dense cover (Paull 2008).

Characteristic diggings of this species were observed throughout the Survey Area in all vegetation types from Degraded to Excellent condition. Diggings were also observed in some plantation areas and areas dominated by weeds (Appendix B). One roadkill was observed on the Old Denmark Rd, near the corner of George St and a skull and lower jaw bones were found in the small roadside remnant east on Albany Hwy.

Carter's Freshwater Mussel (*Westralunio carteri*) (VU)

The current distribution of the Carter's Freshwater Mussel is restricted to freshwater streams, rivers, reservoirs and lakes within 50-100 km of the coast with mean salinity <1.6 ppt. Patchy distribution occurs in sandy/muddy sediments with greatest densities associated with exposed submerged tree roots (*Eucalyptus rudis*, *Melaleuca* spp. and others), woody debris and overhanging riparian vegetation near stream banks and edges of lakes/dams. Precise habitat requirements and quantification of density within habitat types are in the early stages of study for this species; juveniles may require specific micro-habitats and are difficult to locate in the wild. The species is semi-parasitic, therefore requires presence of host fish species (SWCC date unknown).

Potentially suitable habitat exists within an artificial dam in the Link Road wetland. It is not known if this habitat provides specific requirements such as suitable micro-habitat for juveniles or presence of host fish species.

South-western Brush-tailed Phascogale, Wambenger (*Phascogale tapoatafa wambenger*) (CD)

The Brush-tailed Phascogale in south-west WA inhabits Eucalypt woodland and open forests, and is found less commonly in wetter forests. The species has an arboreal foraging habit and a preference for mature trees for nesting hollows, although sometimes smaller trees have the potential to provide these (Abbott and Whitford 2001). Rees *et al.* (2006) found that suitable hollows for this species in Victoria ranged in diameter at breast height (DBH) from 25 to 171 cm, with a mean DBH for the trees used by each individual phascogale of >80 cm. Hollow entrance sizes for Brush-tailed Phascogales are small, > 5 cm diameter, with large hollow chamber size. This species was not directly observed during the survey.

A confirmed record of the South-western Brush-tailed Phascogale in Mira Mar (an Albany suburb approximately 4 km from the Survey Area) in March 2017 indicates they possibly occur within the Albany area. This species was targeted in a community fauna survey of Mt. Melville Reserve (bounding the eastern edge of the Survey Area) in 2014/15 by the installation of nest boxes. After one year no Brush-tailed Phascogales were found to be using the nest boxes. Spotlighting was also carried out during the survey and no Brush-tailed Phascogale were observed (Gilfillan and Maciejewski 2015). However, targeted trapping for this species was not carried out. Potentially suitable habitat exists in the Marri and Jarrah woodland and forest vegetation types within the Survey Area (Table 10).

Fork-tailed Swift, Pacific Swift (*Apus pacificus*) (1A)

The Fork-tailed Swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above the ground. It does not breed in Australia, and therefore breeding habitat is not required. This species was

not observed during the survey. Habitats that provide a source of insects would most likely comprise all the vegetation types present within the Survey Area.

Short-nosed Snake (*Elapognathus minor*) (P2)

There are only a few records for this species on the South Coast and therefore its habitat is not well known. This species was not observed during the survey. As the habitat is not well known, it is possible that suitable habitat may exist within the Survey Area, however the vegetation types cannot be confirmed.

Masked Owl (southern subsp.) (*Tyto novaehollandiae* subsp. *novaehollandiae*) (P3)

The Masked Owl inhabits forests, woodlands, timbered waterways and open country on the fringe of these areas and require tall Eucalypts with suitable hollows for nesting and roosting and adjacent areas for foraging that support an abundance of principally terrestrial mammals, although arboreal mammals can also be taken. They may also use caves for nesting. Masked Owls are territorial, and pairs remain in or near the territory all year round (Garnett 2000).

This species was not observed during the survey. It possibly occurs as hollows suitable for nesting are present within the Eucalypt woodland/forest vegetation types and prey in the form of terrestrial mammals (Quenda, rabbits) are also present within the Survey Area.

Spotlighting during a fauna survey of Mt. Melville Reserve (bounding the eastern edge of the Survey Area) in 2014/15 (Gilfillan and Maciejewski 2015) did not observe and Masked Owls and none were heard, however no targeted playback for the species was carried out.

Woollybush Bee (*Hylaeus globuliferus*) (P3)

Hylaeus are typically small to medium-sized bees with black, relatively hairless bodies and most species have characteristic white, cream or yellow marks on the face and thorax. Vacated borer holes in tree trunks and dead branches, hollow pithy stems and the vacated burrows of other bees or wasps are commonly used (WAM 2018).

This species was not observed during the survey. Only the type specimen (1929) is known from the Albany area. Its habitat within the South Coast is not known, therefore the species may possibly occur. However, the vegetation types cannot be identified at this point in time.

Water-rat, Rakali (*Hydromys chrysogaster*) (P4)

Rivers, estuaries, swamps, lakes, dams/reservoirs, creeks, damplands, floodplains, sumpland, protected coastal beaches and islands (Olsen 2008). In Western Australia, Rakali are the only aquatic mammal in freshwater ecosystems. They require prey such as flat feeding sites such as logs, rocks or sheltered areas on the river bank to consume prey and a suitable substrate to dig burrows (Olsen 2008; Trocini *et al.* 2015). At Two Peoples Bay individuals preferentially utilised wetland habitats characterised by dense, low-lying vegetation (0–30 cm from ground), low-density canopy cover and shallow, narrow water bodies (Speldewinde *et al.* 2013). Evidence of rakali has been found at sites with relatively poor habitat and other studies in the eastern states have identified Rakali populations in less than optimal habitats, such as irrigation drainage channels and polluted urban water-bodies (Scott and Grant 1997)

No signs of this species were found; however, it is known to occur in Lake Powell which is connected to the natural broad drainage channel that intersects the Survey Area north of South Coast Highway that flows west into Five Mile Creek and eventually into Lake Powell. In addition, farm dams, and roadside drainage channels particularly along Lower Denmark Rd, may provide habitat for this species.

Peregrine Falcon (*Falco peregrinus*) (OS)

Peregrine Falcon occur in a variety of habitats from woodlands to open grasslands and coastal cliffs. Prey consists of other birds. It requires abundant prey and secure nest sites, and prefers coastal and inland cliffs or open woodlands near water. Suitable habitat exists for this species (all forest/woodland vegetation communities) however this species is not common and therefore may only be encountered occasionally.

5.5 Regional Significance of Fauna Habitats

Habitat for all significant fauna species known or potentially occurring within the Survey Area (for which data is available) is represented outside of the Survey Area (Table 10). All of the fauna species for which ranges are well known are wide ranging, and thus the Survey Area represents only a small area of their total range. It should be noted, however that the Western Ringtail Possum South Coast population may be an isolated sub-population and is considered a separate management unit (DPaW 2014). Thus, when considering range for this species, the South Coast range is the most appropriate scale.

Ranges of the Short-nosed snake and Woollybush Bee are not well known, therefore the regional context of their ranges cannot be discussed. In addition, the Survey Area is situated at the eastern edge of the range of the Brush-tailed Phascogale and Baudin's Cockatoo's predicted breeding range, and possibly the Short-nosed Snake (from current known records).

In terms of regional connectivity, the southern section of the Survey Area (in the area of the Hanrahan Rd and Frenchman's Bay Rd. intersection) serves as an important link between the central Albany area of Western Ringtail Possum core habitat and that to the south west (Robinson, Big Grove and the Torndirrup Peninsula).

6 CONCLUSIONS

Southern Ecology conducted primary flora and fauna assessments in the Survey Area in 2017 that were followed up with assessments in 2018, 2019 and 2020 to address changes in the project design and to consolidate the biological information. The surveys have included a Detailed and Targeted Flora Assessment (covering a range from July to November) and Level 1 Fauna, Black Cockatoo and Western Ringtail Possum Assessment and a regional Targeted Survey for *Prasophyllum paulinae* (P1).

A wide range of vegetation types were recorded from wetlands, granite outcrops and lateritic uplands and quartzitic sands that were primarily in Very Good or Excellent condition. The vegetation described constitutes 0.18% of the 35% remnant vegetation that remains within the region (Albany Regional Vegetation Area), which reflects the long history of European occupation in Albany and the utilisation of land suitable for agriculture. Of the thirteen associations described, six are recognised as locally rare (<1,500 ha in total), five are poorly represented in the conservation estate (<10% in IUCN reserves), four are considered wetland vegetation recognised under State acts.

A total of 343 taxa were recorded in 32 floristic quadrats with an average of 23.3 species per quadrat. The species assemblages were typical of the local region and the vegetation types encountered. However, overall species richness was reduced due to weed infestation of granite communities, the long unburnt condition of the wetlands and the impacts of *Phytophthora* Dieback in the upland lateritic areas. Four Priority-listed flora were recorded (*Synaphea incurva* (P3), *Boronia crassipes* (P3), *Andersonia* sp. Jamesii (J. Liddelow 84) (P4) and *Thysanotus isantherus* (P4)) and one previously known population of *Prasophyllum paulinae* (P1) is known from the Survey Area.

Targeted surveys for *Prasophyllum paulinae* within two wetland vegetation associations in the Survey Area (total of 19.25 ha) did not detect any individuals. However, the potential exists for it to emerge following fire within this habitat. Regional Targeted Surveys were conducted that targeted recently burnt areas of suitable habitat, which identified a new population estimated to comprise 50 plants outside the Survey Area.

Survey limitations did not generally affect the confidence of the survey results. However, the absence of fire or other disturbance may have impeded the detection of five conservation significant flora that generally occur in wetland areas or granite refuges.

Five significant fauna species were present within the Survey Area: - Carnaby's Cockatoo (*Calyptorhynchus latirostris*) (T-EN), Baudin's Cockatoo (*Calyptorhynchus baudinii*) (T-EN), Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) (T-VN), Western Ringtail Possum (*Pseudocheirus occidentalis*) (T-CR), and Southern Brown Bandicoot (*Isodon obesulus* subsp. *fusciventer*) (P4).

Western Ringtail Possums scats and dreys were observed widely across the Survey Area, in multiple native and non-native habitats of varying condition. Albany occurs in the centre of the south coast population of WRP, which has been poorly understood until recently. As part of this assessment the EPBC Act Significant Impact Guidelines categories were adapted south coast population and *core* and *supporting habitats* and *potential habitat linkages* were identified for the Survey Area.

Foraging and potential breeding habitat for three Black Cockatoo species occurred throughout the Survey Area, in all the Eucalypt Woodland/Forest habitats. Large areas of potential roosting sites were identified among both native and introduced tree species. No trees within the Survey Area contain hollows that were currently occupied or showed recent use by Cockatoo species. However, based on suitability of host species and current entrance size, up to 60 trees contained hollows potentially suitable for Black Cockatoo species.

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8 APPENDIX A - Conservation Status Definitions

Table A1. Acts relevant to environmental impact assessment.

<i>Environment Protection and Biodiversity Conservation [EPBC] Act 1999</i>	https://www.legislation.gov.au/Details/C2016C00777
<i>Environmental Protection [EP] Act 1986</i>	https://www.slp.wa.gov.au/legislation/statutes.nsf/law_a252.html
<i>Biodiversity Conservation [BC] Act 2016</i>	https://www.slp.wa.gov.au/legislation/statutes.nsf/law_a147120.html

Table A2. The categories for flora and fauna listed as Threatened or specially protected. Taxa can be recognised as Threatened (T) or Conservation Dependent under Commonwealth (EPBC) and / or State (BC) Acts.

Threat category	Definition
Threatened - Critically Endangered (T-CR)	Considered to be facing an extremely high risk of extinction in the wild
Threatened – Endangered (T-EN)	Considered to be facing a very high risk of extinction in the wild
Threatened – Vulnerable (T-VN)	Considered to be facing a high risk of extinction in the wild
Threatened - Presumed extinct (T-EX)	Species which have been adequately searched for and there is no reasonable doubt that the last individual has died.
Conservation dependant (CD)	Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened
Migratory birds protected under international agreement (IA)	Birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and the Bonn Convention, relating to the protection of migratory birds
Other specially protected fauna (OS)	Fauna otherwise in need of special protection to ensure their conservation

Table A3. Flora or fauna that are potentially threatened but do not meet the survey criteria or are otherwise data deficient are listed under Priority categories with the Department of Biodiversity, Conservation and Attractions.

Category	Description
Priority One (P1)	Known from few locations (generally <5), small populations and/or occurring on land with insecure tenure
Priority Two (P2)	Known from few locations (generally <5), small populations with some occurring on land with secure tenure
Priority Three (P3)	Known from several locations with habitat not under imminent threat
Priority Four (P4)	(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for Vulnerable, but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy

Table A4. Categories for ecological communities listed as Threatened (TEC). Communities can be recognised as Threatened under Commonwealth (EPBC) and / or State (BC) Acts.

Category	Description
Presumed totally destroyed (PU)	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.
Critically Endangered (CR)	Adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future.
Endangered (EN)	Adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future.
Vulnerable (VU)	Adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium (within approximately 50 years) to long-term future.

Table A5. The categories for ecological communities listed as Priority (PEC) with the Department of Biodiversity, Conservation and Attractions.

Category	Description
Priority One (P1)	Known from very few occurrences with a very restricted distribution (generally ≤ 5 occurrences or a total area of ≤ 100 ha) and are currently under threat
Priority Two (P2)	Known from few occurrences with a restricted distribution (generally ≤ 10 occurrences or a total area of ≤ 200 ha). At least some occurrences are not believed to be under immediate threat (within approximately 10 years)
Priority Three (P3)	Known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or: (ii) 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 (within approximately 10 years), or; (iii) 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, inappropriate fire regimes, clearing, hydrological change etc
Priority Four (P4)	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
Priority Five (P5)	Conservation dependant ecological communities. Not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years

Table A6. Species that are 'introduced' or 'weeds' can potentially be listed under the state Biosecurity Management Act (DPIRD 2019) or under the commonwealth Weeds of National Significance (WoNS) (DotEE 2019b).

Category	Description
Declared Pest, Prohibited - s12	Prohibited organism and may only be imported and kept subject to permits. Permit conditions applicable to some species may only be appropriate or available to research organisations or similarly secure institutions
Permitted - s11	Permitted organisms must satisfy any applicable import requirements when imported. They may be subject to an import permit if they are potential carriers of high-risk organisms
Declared Pest - s22(2)	Declared pests must satisfy any applicable import requirements when imported, and may be subject to an import permit if they are potential carriers of high-risk organisms. They may also be subject to control and keeping requirements once within Western Australia
Permitted, Requires Permit - r73	Regulation 73 permitted organisms may only be imported subject to an import permit. These organisms may be subject to restriction under legislation other than the Biosecurity and Agriculture Management Act 2007. Permit conditions applicable to some species may only be appropriate or available to research organisations or similarly secure institutions
WoNS	Weeds of National Significance – this is nationally recognised list of weeds agreed by Australian governments based on an assessment process that prioritised weeds based on their invasiveness, potential for spread and environmental, social and economic impacts. Consideration was also given to their ability to be successfully managed.

9 APPENDIX B – Map Series 1-8 A-B (see attached)

CONTENTS:

Overview and Index Map

Map 1-8A - Vegetation Type and Conservation Significant Flora

Map 1-8B - Vegetation Condition and Weeds

Map 1-8C - Black Cockatoo Species Habitat and Significant Fauna Habitat Trees

Map 1-8D - Western Ringtail Possum Habitat and Fauna Observations

Map 1-8E - Survey Effort (derived from GPS track log)

10 APPENDIX C - Plant Taxa Inventory

Table C1: Vascular plant taxa recorded opportunistically in the Survey Area. Nomenclature and status according WAH (1998-), DotEE (2017b) and DPIRD (2018). *denotes weed taxon.

Family	Taxon (Status)	Family	Taxon (Status)
Anarthriaceae	<i>Anarthria gracilis</i>		<i>Isolepis cernua</i>
	<i>Anarthria laevis</i>		<i>Lepidosperma angustatum</i>
	<i>Anarthria prolifera</i>		<i>Lepidosperma drummondii</i>
	<i>Anarthria scabra</i>		<i>Lepidosperma gladiatum</i>
	<i>Lyginia barbata</i>		<i>Lepidosperma hopperi</i>
Apiaceae	* <i>Foeniculum vulgare</i>		<i>Lepidosperma striatum</i>
	<i>Actinotus omnifertilis</i>		<i>Lepidosperma tenue</i>
	<i>Centella asiatica</i>		<i>Mesomelaena graciliceps</i>
	<i>Daucus glochidiatus</i>		<i>Mesomelaena tetragona</i>
	<i>Xanthosia huegelii</i>		<i>Schoenus acuminatus</i>
	<i>Xanthosia rotundifolia</i>		<i>Schoenus caespititius</i>
	<i>Xanthosia singuliflora</i>		<i>Schoenus cruentus</i>
Araceae	* <i>Zantedeschia aethiopica</i> (Declared Pest)		<i>Schoenus multiglumis</i>
Asparagaceae	* <i>Asparagus asparagoides</i> (WONS)		<i>Schoenus obtusifolius</i>
	* <i>Asparagus declinatus</i>		<i>Schoenus</i> sp. infertile
	<i>Chamaescilla corymbosa</i>		<i>Schoenus</i> sp. striate
	<i>Lomandra micrantha</i>		<i>Tetralix octandra</i>
	<i>Lomandra pauciflora</i>		<i>Tetralix</i> sp. Jarrah Forest (R. Davis 7391)
	<i>Lomandra purpurea</i>		<i>Tricostularia neesii</i>
	<i>Lomandra sericea</i>	Dasygogonaceae	<i>Dasygogon bromeliifolius</i>
	<i>Thysanotus gracilis</i>		<i>Kingia australis</i>
	<i>Thysanotus isantherus</i> (P4)	Dennstaedtiaceae	<i>Histiopteris incisa</i>
	<i>Thysanotus multiflorus</i>		<i>Pteridium esculentum</i>
	<i>Thysanotus sparteus</i>	Dilleniaceae	<i>Hibbertia cuneiformis</i>
	<i>Thysanotus thyrsoides</i>		<i>Hibbertia cunninghamii</i>
Asteraceae	* <i>Conyza bonariensis</i>		<i>Hibbertia diamesogenos</i>
	* <i>Senecio angulatus</i>		<i>Hibbertia furfuracea</i>
	* <i>Sonchus oleraceus</i>		<i>Hibbertia microphylla</i>
	* <i>Taraxacum khatoonae</i>	Droseraceae	<i>Drosera erythrorhiza</i>
	<i>Lagenophora huegelii</i>		<i>Drosera glanduligera</i>
	<i>Millotia tenuifolia</i>		<i>Drosera menziesii</i>
	<i>Senecio minimus</i>		<i>Drosera pallida</i>
Boryaceae	<i>Borya sphaerocephala</i>		<i>Drosera pulchella</i>
Campanulaceae	<i>Lobelia anceps</i>		<i>Drosera stolonifera</i>
	<i>Lobelia heterophylla</i>	Elaeocarpaceae	<i>Tetralix affinis</i>
Caryophyllaceae	* <i>Petrorhagia dubia</i>		<i>Tremandra diffusa</i>
	* <i>Sagina maritima</i>		<i>Tremandra stelligera</i>
Casuarinaceae	<i>Allocasuarina fraseriana</i>	Ericaceae	<i>Andersonia</i> sp. Jamesii (J. Liddelow 84) (P4)
	<i>Allocasuarina humilis</i>		<i>Andersonia sprengelioides</i>
Centrolepidaceae	<i>Aphelia brizula</i>		<i>Astroloma pallidum</i>
Cephalotaceae	<i>Cephalotus follicularis</i>		<i>Brachyloma baxteri</i>
Chenopodiaceae	<i>Rhagodia preissii</i>		<i>Cosmelia rubra</i>
Cyatheaaceae	* <i>Cyathea cooperi</i>		<i>Leucopogon assimilis</i>
Cyperaceae	<i>Baumea acuta</i>		<i>Leucopogon australis</i>
	<i>Baumea arthropphylla</i>		<i>Leucopogon glabellus</i>
	<i>Baumea juncea</i>		<i>Leucopogon obovatus</i> subsp. <i>obovatus</i>
	<i>Baumea rubiginosa</i>		<i>Leucopogon obovatus</i> subsp. <i>revolutus</i>
	<i>Cyathochaeta avenacea</i>		<i>Leucopogon pendulus</i>
	<i>Cyathochaeta equitans</i>		<i>Leucopogon verticillatus</i>
	<i>Evandra aristata</i>		<i>Sphenotoma capitata</i>
	<i>Gymnoschoenus anceps</i>		<i>Sphenotoma squarrosa</i>

Family	Taxon (Status)
Euphorbiaceae	* <i>Ricinus communis</i>
Fabaceae	* <i>Acacia baileyana</i>
	* <i>Acacia longifolia</i>
	* <i>Acacia melanoxylon</i>
	* <i>Acacia paradoxa</i>
	* <i>Chamaecytisus palmensis</i>
	* <i>Dipogon lignosus</i>
	* <i>Ornithopus compressus</i>
	* <i>Psoralea pinnata</i>
	* <i>Trifolium angustifolium</i>
	* <i>Trifolium arvense</i>
	* <i>Ulex europaeus</i> (WONS)
	<i>Acacia alata</i>
	<i>Acacia browniana</i> var. <i>browniana</i>
	<i>Acacia crassiuscula</i>
	<i>Acacia divergens</i>
	<i>Acacia drummondii</i>
	<i>Acacia myrtifolia</i>
	<i>Acacia pentadenia</i>
	<i>Bossiaea dentata</i>
	<i>Bossiaea linophylla</i>
	<i>Callistachys lanceolata</i>
	<i>Callistachys</i> sp. south-coast variant (M. Carter 180)
	<i>Chorizema reticulatum</i>
	<i>Gastrolobium bilobum</i>
	<i>Gastrolobium sericeum</i>
	<i>Gompholobium knightianum</i>
	<i>Gompholobium polymorphum</i>
	<i>Hardenbergia comptoniana</i>
	<i>Hovea elliptica</i>
	<i>Hovea trisperma</i>
	<i>Isotropis cuneifolia</i>
	<i>Jacksonia horrida</i>
	<i>Paraserianthes lophantha</i>
	<i>Pultenaea verruculosa</i>
	<i>Sphaerolobium grandiflorum</i>
	<i>Sphaerolobium hygrophilum</i>
	<i>Sphaerolobium medium</i>
	<i>Sphaerolobium vimineum</i>
Gentianaceae	* <i>Centaurium erythraea</i>
Geraniaceae	* <i>Pelargonium capitatum</i>
Goodeniaceae	<i>Dampiera leptoclada</i>
	<i>Dampiera linearis</i>
	<i>Dampiera loranthifolia</i>
	<i>Dampiera pedunculata</i>
	<i>Diaspasis filifolia</i>
	<i>Goodenia coerulea</i>
	<i>Scaevola striata</i>
Haemodoraceae	<i>Anigozanthos flavidus</i>
	<i>Conostylis setigera</i>
	<i>Haemodorum laxum</i>
	<i>Haemodorum spicatum</i>
Haloragaceae	<i>Gonocarpus diffusus</i>

Family	Taxon (Status)
	<i>Trihaloragis hexandra</i> subsp. <i>hexandra</i>
Hemerocallidaceae	<i>Agrostocrinum hirsutum</i>
	<i>Caesia micrantha</i>
	<i>Dianella revoluta</i>
	<i>Johnsonia lupulina</i>
	<i>Stypandra glauca</i>
	<i>Tricoryne elatior</i>
	<i>Tricoryne humilis</i>
Hydrocharitaceae	<i>Ottelia ovalifolia</i>
Iridaceae	* <i>Freesia alba</i> x <i>leichtlinii</i>
	* <i>Gladiolus undulatus</i>
	* <i>Moraea setifolia</i>
	* <i>Romulea rosea</i>
	* <i>Watsonia meriana</i> var. <i>bulbillifera</i>
	<i>Patersonia limbata</i>
	<i>Patersonia occidentalis</i>
	<i>Patersonia umbrosa</i> var. <i>umbrosa</i>
Juncaceae	* <i>Juncus articulatus</i>
	* <i>Juncus capitatus</i>
	<i>Juncus caespiticus</i>
	<i>Juncus pallidus</i>
	<i>Juncus planifolius</i>
	<i>Luzula meridionalis</i>
Lauraceae	<i>Cassytha racemosa</i>
Lentibulariaceae	<i>Utricularia multifida</i>
Lindsaeaceae	<i>Lindsaea linearis</i>
Loganiaceae	<i>Orianthera serpyllifolia</i> subsp. <i>serpyllifolia</i>
Loranthaceae	<i>Nuytsia floribunda</i>
Lythraceae	* <i>Lythrum hyssopifolia</i>
Malvaceae	<i>Thomasia angustifolia</i>
	<i>Thomasia purpurea</i>
Myrtaceae	* <i>Eucalyptus botryoides</i>
	* <i>Eucalyptus cladocalyx</i>
	* <i>Eucalyptus globulus</i>
	* <i>Eucalyptus robusta</i>
	* <i>Leptospermum laevigatum</i>
	<i>Agonis flexuosa</i>
	<i>Agonis theiformis</i>
	<i>Astartea comiculata</i>
	<i>Astartea glomerulosa</i>
	<i>Astartea scoparia</i>
	<i>Astartea</i> sp.
	<i>Beaufortia decussata</i>
	<i>Beaufortia sparsa</i>
	<i>Callistemon glaucus</i>
	<i>Corymbia calophylla</i>
	<i>Corymbia ficifolia</i> (planted)
	<i>Darwinia oederoides</i>
	<i>Eucalyptus conferruminata</i> (planted)
	<i>Eucalyptus cornuta</i>
	<i>Eucalyptus gomphocephala</i> (planted)
	<i>Eucalyptus marginata</i>
	<i>Eucalyptus megacarpa</i>
	<i>Eucalyptus patens</i>

Family	Taxon (Status)	Family	Taxon (Status)
	<i>Eucalyptus salubris</i> (planted)		* <i>Lolium perenne</i>
	<i>Eucalyptus staeri</i>		<i>Amphipogon amphipogonoides</i>
	<i>Eucalyptus marginata</i> x <i>staeri</i>		<i>Amphipogon laguroides</i>
	<i>Homalospermum firmum</i>		<i>Austrostipa mollis</i>
	<i>Hypocalymma cordifolium</i>		<i>Microlaena stipoides</i>
	<i>Hypocalymma scariosum</i>		<i>Neurachne alopecuroidea</i>
	<i>Kunzea baxteri</i> (planted)		<i>Poa porphyroclados</i>
	<i>Melaleuca diosmifolia</i> (planted)		<i>Rytidosperma setaceum</i>
	<i>Melaleuca preissiana</i>		<i>Tetrarrhena laevis</i>
	<i>Melaleuca raphiophylla</i>	Polygalaceae	<i>Comesperma confertum</i>
	<i>Melaleuca thymoides</i>		<i>Comesperma virgatum</i>
	<i>Pericalymma spongiocaulum</i>	Proteaceae	<i>Adenanthos obovatus</i>
	<i>Taxandria juniperina</i>		<i>Banksia grandis</i>
	<i>Taxandria linearifolia</i>		<i>Conospermum caeruleum</i>
	<i>Taxandria marginata</i>		<i>Grevillea occidentalis</i>
	<i>Taxandria parviceps</i>		<i>Grevillea pilulifera</i>
	<i>Verticordia plumosa</i>		<i>Grevillea pulchella</i>
Olacaceae	<i>Olax benthamiana</i>		<i>Hakea amplexicaulis</i>
Orchidaceae	* <i>Disa bracteata</i>		<i>Hakea ceratophylla</i>
	<i>Caladenia flava</i>		<i>Hakea drupacea</i>
	<i>Cryptostylis ovata</i>		<i>Hakea elliptica</i>
	<i>Diuris</i> sp.		<i>Hakea ferruginea</i>
	<i>Elythranthera brunonis</i>		<i>Hakea florida</i>
	<i>Lyperanthus serratus</i>		<i>Hakea lasiantha</i>
	<i>Microtis media</i>		<i>Hakea linearis</i>
	<i>Prasophyllum brownii</i>		<i>Hakea oleifolia</i>
	<i>Prasophyllum macrostachyum</i>		<i>Hakea ruscifolia</i>
	<i>Pterostylis vittata</i>		<i>Hakea trifurcata</i>
	<i>Thelymitra canaliculata</i>		<i>Persoonia elliptica</i>
	<i>Thelymitra crinita</i>		<i>Persoonia graminea</i>
	<i>Thelymitra granitora</i>		<i>Persoonia longifolia</i>
	<i>Thelymitra macrophylla</i>		<i>Petrophile divaricata</i>
	<i>Thelymitra spiralis</i>		<i>Petrophile diversifolia</i>
Orobanchaceae	* <i>Parentucellia latifolia</i>		<i>Petrophile squamata</i>
Oxalidaceae	* <i>Oxalis incarnata</i>		<i>Stirlingia tenuifolia</i>
	* <i>Oxalis purpurea</i>		<i>Synaphea gracillima</i>
	* <i>Oxalis violacea</i>		<i>Synaphea incurva</i> (P3)
Phytolaccaceae	* <i>Phytolacca octandra</i>	Ranunculaceae	<i>Clematis pubescens</i>
Pinaceae	* <i>Pinus pinaster</i>	Restionaceae	<i>Chordifex isomorphus</i>
	* <i>Pinus radiata</i>		<i>Chordifex laxus</i>
Pittosporaceae	* <i>Pittosporum undulatum</i>		<i>Desmocladius fasciculatus</i>
	<i>Billardiera fusiformis</i>		<i>Desmocladius flexuosus</i>
	<i>Billardiera heterophylla</i>		<i>Empodisma gracillimum</i>
	<i>Billardiera variifolia</i>		<i>Hypolaena fastigiata</i>
Plantaginaceae	* <i>Plantago lanceolata</i>		<i>Leptocarpus denmarkica</i>
	<i>Veronica plebeia</i>		<i>Leptocarpus scariosus</i>
Poaceae	* <i>Aira caryophyllea</i>		<i>Leptocarpus tenax</i>
	* <i>Anthoxanthum odoratum</i>		<i>Leptocarpus tephrius</i>
	* <i>Avena barbata</i>		<i>Lepyrodia hermaphrodita</i>
	* <i>Briza maxima</i>		<i>Loxocarya cinerea</i>
	* <i>Briza minor</i>		<i>Tremulina tremula</i>
	* <i>Cenchrus clandestinus</i>	Rhamnaceae	<i>Spyridium globulosum</i>
	* <i>Cortaderia seloana</i>		<i>Trymalium odoratissimum</i>
	* <i>Holcus lanatus</i>	Rosaceae	* <i>Cotoneaster glaucophyllus</i>

Family	Taxon (Status)
	* <i>Rubus species complex</i> (WONS)
Rubiaceae	* <i>Coprosma repens</i> <i>Opercularia hispidula</i>
Rutaceae	<i>Boronia crassipes</i> (P3) <i>Boronia crenulata</i> <i>Boronia juncea</i> subsp. <i>laniflora</i> <i>Boronia spathulata</i> <i>Rhadinothamnus anceps</i>
Sapindaceae	<i>Dodonaea ceratocarpa</i> <i>Dodonaea viscosa</i>
Schizaeaceae	<i>Schizaea fistulosa</i>
Solanaceae	* <i>Solanum laciniatum</i> <i>Anthocercis viscosa</i>
Stylidiaceae	<i>Levenhookia dubia</i> <i>Stylidium despectum</i> <i>Stylidium imbricatum</i> <i>Stylidium luteum</i> <i>Stylidium plantagineum</i> <i>Stylidium pygmaeum</i> <i>Stylidium spathulatum</i>
Thymelaeaceae	<i>Pimelea rosea</i> subsp. <i>rosea</i>
Typhaceae	<i>Typha orientalis</i>
Verbenaceae	* <i>Lantana camara</i> (WONS)
Xanthorrhoeaceae	<i>Xanthorrhoea platyphylla</i>
Xyridaceae	<i>Xyris lacera</i> <i>Xyris lanata</i>

11 APPENDIX D - Floristic Quadrat Data

Quadrat: 1

Date: 22/11/2017

Description: Hill crest with laterite gravel and white sand

Mapping Unit: *Hakea* spp. Shrubland/Woodland Complex

Vegetation Condition: Very Good

Location: 574224mE 6126834mN

Photo:



Floristics:

Upper (<10m, 30-70%): *Eucalyptus staeri*.

Middle 1 (2-4m, 30-70%): **Acacia longifolia*, **Leptospermum laevigatum*, **Psoralea pinnata*, *Hakea ferruginea*, *Hakea lasiantha*.

Middle 2 (<2m, 10-30%): *Acacia browniana* var. *browniana*, *Acacia myrtifolia*, *Agonis theiformis*, *Grevillea pilulifera*, *Xanthorrhoea platyphylla*, *Leucopogon obovatus* subsp. *obovatus*, *Leucopogon verticillatus*, *Petrophile squamata*, *Taxandria parviceps*.

Ground (<1m, 10-30%): *Dasyopogon bromeliifolius*, *Desmocladius fasciculatus*, *Anarthria prolifera*, *Anarthria scabra*, *Agrostocrinum hirsutum*, *Amphipogon amphipogonoides*, *Anarthria gracilis*, *Billardiera heterophylla*, *Billardiera variifolia*, *Chordifex laxus*, *Conostylis setigera*, *Cyathochaeta avenacea*, *Dampiera pedunculata*, *Drosera menziesii*, *Hibbertia microphylla*, *Hovea trisperma*, *Lepyrodia hermaphrodita*, *Levenhookia dubia*, *Lomandra micrantha* subsp. *teretifolia*, *Lomandra sericea*, *Mesomelaena tetragona*, *Schoenus acuminatus*, *Sphenotoma capitata*, *Synaphea gracillima*, *Tetraria octandra*, *Tricoryne humilis*, *Xanthosia huegelii*, **Anthoxanthum odoratum*, **Gladiolus undulatus*.

Quadrat: 2

Date: 22/11/2017

Description: Hill crest with white sand with laterite gravel

Mapping Unit: *Hakea* spp. Shrubland/Woodland Complex

Vegetation Condition: Excellent

Location: 574145mE, 6126849mN

Photo:



Floristics:

Upper (<10m, 10-30%) *Eucalyptus marginata* x *staeri*.

Middle (1-2m, 10-30%) *Acacia myrtifolia*, *Agonis theiformis*, *Allocasuarina humilis*, *Beaufortia decussata*, *Petrophile diversifolia*, *Xanthorrhoea platyphylla*, *Leucopogon obovatus* subsp. *obovatus*, *Hakea ceratophylla*, *Hakea ferruginea*, **Leptospermum laevigatum*.

Ground: (1m, 30-70%) *Acacia browniana* var. *browniana*, *Acacia drummondii*, *Amphipogon amphipogonoides*, *Anarthria gracilis*, *Anarthria prolifera*, *Andersonia* sp. Jamesii (J. Liddelow 84), *Billardiera variifolia*, *Boronia spathulata*, *Cassytha racemosa*, *Chordifex laxus*, *Chorizema reticulatum*, *Conostylis setigera*, *Cyathochaeta avenacea*, *Dampiera loranthifolia*, *Dasyopogon bromeliifolius*, *Desmocladius fasciculatus*, *Goodenia coerulea*, *Grevillea pilulifera*, *Haemodorum laxum*, *Hibbertia microphylla*, *Hovea trisperma*, *Lepidosperma angustatum*, *Lepidosperma drummondii*, *Lepyrodia hermaphrodita*, *Lindsaea linearis*, *Lomandra sericea*, *Mesomelaena tetragona*, *Pericalymma spongiocaulum*, *Pultenaea verruculosa*, *Schoenus acuminatus*, *Schoenus* sp. *striate*, *Sphaerolobium grandiflorum*, *Sphenotoma capitata*, *Stirlingia tenuifolia*, *Taxandria parviceps*, *Tetraria octandra*, *Thelymitra crinita*, *Tremulina tremula*, *Xanthosia huegelii*, *Xanthosia singuliflora*.

Quadrat: 3**Date:** 22/11/2017**Description:** Small perched wetland (potentially artificial due to gravel extraction) peat over sand**Mapping Unit:** Mapped within *Hakea* spp Shrubland/Woodland Complex**Vegetation Condition:** Very Good**Location:** 574095mE, 6126841mN**Photo:****Floristics:**

Upper: (2-4m, >70%) *Taxandria linearifolia*, *Taxandria parviceps*, *Acacia myrtifolia*, *Allocasuarina fraseriana*, *Callistemon glaucus*, *Hakea ferruginea*, *Homalospermum firmum*, *Leucopogon obovatus* subsp. *revolutus*.

Ground: (<1m, 10-30%) *Billardiera heterophylla*, *Dampiera leptoclada*, *Drosera pulchella*, *Gymnoschoenus anceps*, *Lepidosperma angustatum*, *Lepidosperma striatum*, *Lomandra sericea*, *Mesomelaena tetragona*, *Thysanotus sparteus*, *Xanthosia huegelii*, **Acacia longifolia*, **Gladiolus undulatus*.

Quadrat: 4**Date:** 22/11/2017**Description:** Hill crest with grey sand**Mapping Unit:** Jarrah/Marri/Sheoak Laterite Forest**Vegetation Condition:** Excellent**Location:** 574185mE 6126657mN**Photo:****Floristics:**

Upper: (>10m, 10-30%) *Eucalyptus marginata*

Middle: (2m, 10-30%) *Beaufortia decussata*, *Leucopogon obovatus* subsp. *obovatus*, *Leucopogon verticillatus*, *Acacia browniana* var. *browniana*, *Agonis theiformis*, *Allocasuarina fraseriana*.

Ground: (<1m, 30-70%) *Anarthria scabra*, *Cyathochaeta avenacea*, *Dampiera leptoclada*, *Dasyopogon bromeliifolius*, *Desmocladus fasciculatus*, *Drosera pallida*, *Hibbertia cunninghamii*, *Lindsaea linearis*, *Logania serpyllifolia* subsp. *serpyllifolia*, *Lomandra pauciflora*, *Lomandra sericea*, *Patersonia umbrosa* var. *umbrosa*, *Synaphea gracillima*, *Tetralia octandra*, *Thelymitra macrophylla*, *Xanthorrhoea platyphylla*, **Acacia longifolia*.

Quadrat: 5**Date:** 22/11/2017**Description:** Upper hill slope with grey sand**Mapping Unit:** Jarrah/Marri/Sheoak Laterite Forest**Vegetation Condition:** Very Good**Location:** 573739mE 6126842mN**Photo:****Floristics:****Upper:** (>10m, 30-70%) *Eucalyptus marginata*, *Corymbia calophylla*, *Allocasuarina fraseriana*.**Middle:** (2m, 10-30%) *Agonis theiformis*, *Acacia browniana* var. *browniana*, *Petrophile diversifolia*, *Beaufortia decussata*, *Leucopogon obovatus* subsp. *obovatus*, *Leucopogon verticillatus*, *Xanthorrhoea platyphylla*.**Ground:** (<1m, 30-70%) *Agrostocrinum hirsutum*, *Anarthria scabra*, *Billardiera variifolia*, *Bossiaea linophylla*, *Conostylis setigera*, *Cyathochaeta avenacea*, *Dasyopogon bromeliifolius*, *Desmocladius fasciculatus*, *Gompholobium knightianum*, *Hakea amplexicaulis*, *Logania serpyllifolia*, *Lomandra sericea*, *Patersonia umbrosa* var. *umbrosa*, *Stylidium plantagineum*, *Tetraria octandra*, *Tetraria* sp. Jarrah Forest (R. Davis 7391).

Quadrat: 6**Date:** 22/11/2017**Description:** Middle hill-slope with grey sand**Mapping Unit:** Jarrah/Marri/Sheoak Laterite Forest**Vegetation Condition:** Very Good/Excellent**Location:** 573757mE 6126236mN**Photo:****Floristics:****Upper:** (>10m, 30-70%) *Eucalyptus marginata*, *Allocasuarina fraseriana*.**Middle:** (>2m, 10-30%) *Banksia grandis*, *Bossiaea linophylla*, *Acacia myrtifolia*, *Agonis theiformis*, *Leucopogon obovatus*, *Leucopogon verticillatus*, *Melaleuca thymoides*, *Taxandria parviceps*, *Kingia australis*.**Ground:** (<1m, 30-70%) *Anarthria scabra*, *Anarthria prolifera*, *Billardiera heterophylla*, *Conospermum caeruleum*, *Cyathochaeta equitans*, *Dasyopogon bromeliifolius*, *Johnsonia lupulina*, *Lepidosperma angustatum*, *Opercularia hispidula*, *Patersonia umbrosa* var. *umbrosa*, *Persoonia longifolia*, *Schoenus multiglumis*, *Xanthosia rotundifolia*, **Holcus lanatus*.

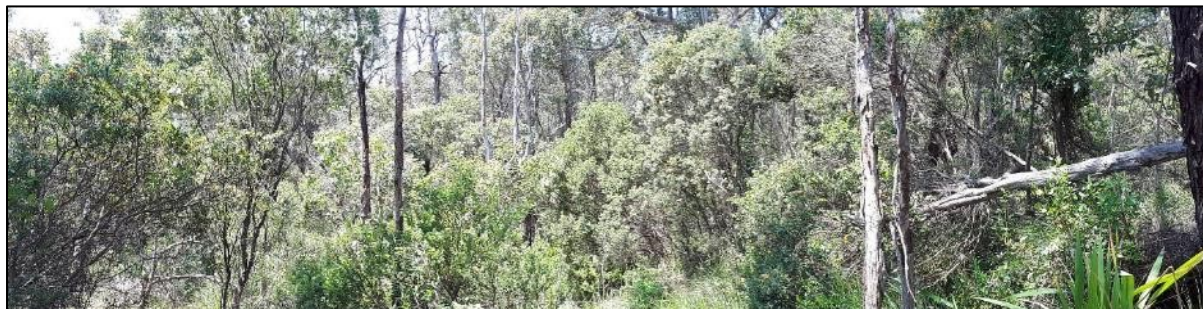
Quadrat: 7**Date:** 22/11/2017**Description:** Middle hill-slope with grey sand**Mapping Unit:** Jarrah/Marri/Sheoak Laterite Forest**Vegetation Condition:** Very Good/Excellent**Location:** 573942mE 6126424mN**Photo:****Floristics:****Upper:** (<10m, 30-70%) *Eucalyptus marginata*, *Allocasuarina fraseriana*, *Agonis flexuosa*.**Middle:** (2m, 10-30%) *Bossiaea linophylla*, *Beaufortia decussata*, *Leucopogon obovatus*.**Ground:** (<1m, 30-70%) *Amphipogon amphipogonoides*, *Anarthria prolifera*, *Anigozanthos flavidus*, *Billardiera variifolia*, *Caesia micrantha*, *Cyathochaeta avenacea*, *Dasyopogon bromeliifolius*, *Hibbertia cunninghamii*, *Lepidosperma angustatum*, *Lepidosperma angustatum*, *Lindsaea linearis*, *Lomandra pauciflora*, *Lomandra sericea*, *Opercularia hispidula*, *Patersonia umbrosa* var. *umbrosa*, *Scaevola striata*, *Schoenus multiglumis*, *Xanthosia rotundifolia*.

Quadrat: 8**Date:** 22/11/2017**Description:** Middle hill-slope with grey sand**Mapping Unit:** Jarrah/Sheoak/*E. staeri* Sandy Woodland**Vegetation Condition:** Very Good/Excellent**Location:** 574188mE 6126436mN**Photo:****Floristics:****Upper:** (<10m, 30-70%) *Eucalyptus marginata*, *Allocasuarina fraseriana*.**Middle:** (2m, 10-30%) *Beaufortia decussata*, *Acacia browniana* var. *browniana*, *Agonis theiformis*, *Leucopogon obovatus*, *Xanthorrhoea platyphylla*, *Persoonia longifolia*.**Ground:** (<1m, 30-70%) *Anarthria scabra*, *Cyathochaeta avenacea*, *Dasyopogon bromeliifolius*, *Drosera menziesii*, *Lepidosperma angustatum*, *Opercularia hispidula*, *Patersonia umbrosa* var. *umbrosa*, *Tetraria octandra*, *Thelymitra crinita*, *Xanthosia rotundifolia*.

Quadrat: 9**Date:** 23/11/2017**Description:** Middle hill-slope. Outcropping granite boulders**Mapping Unit:** Marri/Jarrah Forest/Peppermint Woodland**Vegetation Condition:** Very Good**Location:** 578825mE 6124018mN**Photo:****Floristics:****Upper:** (>10m, 30-70%) *Corymbia calophylla*, *Eucalyptus marginata*, *Agonis flexuosa*.**Middle:** (2m, 10-30%) *Acacia alata*, *Agonis theiformis*, *Bossiaea linophylla*, *Hovea elliptica*, *Leucopogon obovatus*, *Xanthorrhoea platyphylla*, **Pittosporum undulatum*.**Ground:** (<1m, 30-70%) *Billardiera variifolia*, *Lepidosperma tenue*, *Loxocarya cinerea*, *Opercularia hispidula*, *Tetrarrhena laevis*, *Tremandra stelligera*, *Xanthosia rotundifolia*, **Anthoxanthum odoratum*, **Asparagus asparagoides*, **Briza maxima*, **Holcus lanatus*, **Lythrum hyssopifolia*, **Sonchus oleraceus*, **Taraxacum khatoonae*.

Quadrat: 10**Date:** 23/11/2017**Description:** Granite outcrop**Mapping Unit:** *Taxandria marginata* Granite Shrubland**Vegetation Condition:** Very Good**Location:** 578848mE 6124117mN**Photo:****Floristics:****Upper:** (2-3m, 10-30%) *Taxandria marginata*, *Acacia crassiuscula*, *Anthocercis viscosa*.**Ground:** (<1m, 10-30%) *Lepidosperma hopperi*, *Lepidosperma tenue*, *Patersonia limbata*, *Stypantra glauca*, *Diuris* sp., *Drosera stolonifera*, *Juncus pallidus*, **Aira caryophyllea*, **Anthoxanthum odoratum*, **Briza maxima*, **Briza minor*, **Ornithopus compressus*, **Psoralea pinnata*, **Watsonia meriana* var. *bulbillifera*.

Quadrat: 11**Date:** 23/11/2017**Description:** Granite boulders, brown loamy sand**Mapping Unit:** Marri/Jarrah Coastal Hills Forest**Vegetation Condition:** Very Good/Excellent**Location:** 578868mE 6124198mN**Photo:****Floristics:****Upper:** (>10m, 10-30%) *Corymbia calophylla*, *Eucalyptus cornuta*, *Agonis flexuosa*.**Middle:** (2-4m, 10-30%) *Bossiaea linophylla*, *Clematis pubescens*, *Gastrobium bilobum*, *Leucopogon obovatus* subsp. *obovatus*, *Hovea elliptica*.**Ground:** (<1m, 30-70%) *Hibbertia cunninghamii*, *Lepidosperma tenue*, *Loxocarya cinerea*, *Microlaena stipoides*, *Opercularia hispidula*, *Poa porphyroclados*, *Styandra glauca*, *Tetrarrhena laevis*, *Thomasia angustifolia*, *Tremandra stelligera*, *Xanthorrhoea platyphylla*, **Anthoxanthum odoratum*, **Asparagus asparagoides*, **Avena barbata*, **Briza maxima*, **Lythrum hyssopifolia*.

Quadrat: 12**Date:** 23/11/2017**Description:** Granite boulders, dark brown loamy sand**Mapping Unit:** Marri/Jarrah Coastal Hills Forest**Vegetation Condition:** Very Good**Location:** 578863mE 6124350mN**Photo:****Floristics:****Upper:** (>10m, 10-30%) *Corymbia calophylla*, *Eucalyptus cornuta*.**Middle:** (2m, 10-30%) *Acacia myrtifolia*, *Gastrobium bilobum*, *Hibbertia cuneiformis*, *Hibbertia furfuracea*, *Hovea elliptica*, *Rhagodia preissii*, *Leucopogon obovatus* subsp. *obovatus*.**Ground:** (<1m, 10-30%) *Billardiera heterophylla*, *Clematis pubescens*, *Daucus glochidiatus*, *Lepidosperma tenue*, *Loxocarya cinerea*, *Microlaena stipoides*, *Opercularia hispidula*, *Poa porphyroclados*, *Tetraria octandra*, *Tremandra stelligera*, **Anthoxanthum odoratum*, **Asparagus asparagoides*, **Watsonia meriana* var. *bulbillifera*.

Quadrat: 13

Date: 23/11/2017

Description: Granite outcrop, brown loamy sand.

Mapping Unit: *Leucopogon assimilis* Granite Shrubland

Vegetation Condition: Very Good/Excellent

Location: 578796mE 6124359mN

Photo:



Floristics:

Upper: (2m, 30-70%) *Dodonaea ceratocarpa*, *Eucalyptus cornuta*, *Gastrolobium bilobum*, *Leucopogon obovatus* subsp. *obovatus*, *Leucopogon pendulus*, *Leucopogon Verticordia plumosa*, *assimilis*.

Ground: (<1m, 30-70%) *Andersonia sprengelioides*, *Austrostipa mollis*, *Billardiera heterophylla*, *Borya sphaerocephala*, *Hibbertia diamesogenos*, *Lepidosperma tenue*, *Luzula meridionalis*, *Microlaena stipoides*, *Neurachne alopecuroidea*, *Schoenus sp. infertile*, *Stypandra glauca*, **Acacia longifolia*, **Anthoxanthum odoratum*, **Briza maxima*, **Briza minor*, **Centaurium erythraea*, **Ornithopus compressus*, **Parentucellia latifolia*, **Romulea rosea*, **Trifolium arvense*.

Quadrat: 14

Date: 23/11/2017

Description: Granite outcrop margin, brown loamy sand

Mapping Unit: *Taxandria marginata*/ *Gastrolobium bilobum* Granite Shrubland

Vegetation Condition: Very Good/Excellent

Location: 578781mE 6124287mN

Photo:

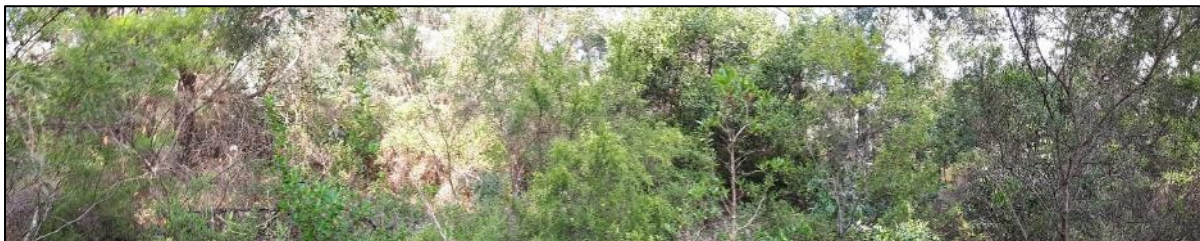


Floristics:

Upper: (>10m, <10%) *Eucalyptus cornuta*.

Middle: (2m, 10-30%) *Dodonaea ceratocarpa*, *Gastrolobium bilobum*, *Hibbertia furfuracea*, *Leucopogon obovatus* subsp. *obovatus*, *Pimelea rosea* subsp. *rosea*, *Rhagodia preissii*.

Ground: (<1m, 30-70%) *Billardiera heterophylla*, *Lepidosperma tenue*, *Loxocarya cinerea*, *Stypandra glauca*, **Acacia longifolia*, **Anthoxanthum odoratum*, **Briza maxima*, **Briza minor*, **Parentucellia latifolia*, **Plantago lanceolata*, **Trifolium angustifolium*, **Trifolium arvense*, **Watsonia meriana* var. *bulbillifera*.

Quadrat: 15**Date:** 23/11/2017**Description:** Hill slope with light grey sand**Mapping Unit:** Marri/Jarrah Forest/Peppermint Woodland**Vegetation Condition:** Very Good**Location:** 578746mE 6124229mN**Photo:****Floristics:****Upper:** (>10m, 30-70%) *Corymbia calophylla*, *Eucalyptus cornuta*.**Middle:** (2m, 30-70%) *Leucopogon obovatus* subsp. *obovatus*, *Agonis theiformis*, *Bossiaea linophylla*, **Acacia longifolia*, **Psoralea pinnata*.**Ground:** (<1m, 10-30%) *Anigozanthos flavidus*, *Hibbertia cuneiformis*, *Hibbertia furfuracea*, *Lepidosperma gladiatum*, *Loxocarya cinerea*, *Opercularia hispidula*, *Pteridium esculentum*, *Tetraria octandra*, **Anthoxanthum odoratum*, **Asparagus asparagoides*, **Cenchrus clandestinus*, **Cenchrus clandestinus*, **Gladiolus undulatus*, **Holcus lanatus*, **Pelargonium capitatum*, **Taraxacum khatoonae*.

Quadrat: 16**Date:** 23/11/2017**Description:** Wetland, peat over sand**Vegetation Condition:** Very Good**Mapping Unit:** *Homalospermum firmum*/*Callistemon glaucus* Peat Thicket**Location:** 575182mE 6125118mN**Photo:****Floristics:****Upper:** (4m, >70%) *Eucalyptus marginata*, *Homalospermum firmum*, *Beaufortia sparsa*, *Adenanthos obovatus*, *Astartea scoparia.*, *Bossiaea linophylla*, *Leucopogon australis*, **Acacia longifolia*.**Ground:** (<1m, 10-30%) *Gastrolobium sericeum*, *Anarthria prolifera*, *Anarthria scabra*, *Anigozanthos flavidus*, *Austrostipa mollis*, *Billardiera heterophylla*, *Cyathochaeta avenacea*, *Hypolaena fastigiata*, *Johnsonia lupulina*, *Lomandra pauciflora*, *Meeboldina scariosa*, *Tricoryne elatior*, *Tricoryne elatior*, *Xyris lanata*, **Watsonia meriana* var. *bulbillifera*.

Quadrat: 17**Date:** 23/11/2017**Description:** Wetland, peat over sand**Mapping Unit:** *Homalospermum firmum*/*Callistemon glaucus* Peat Thicket**Vegetation Condition:** Very Good**Location:** 574417mE 6125317mN**Photo:****Floristics:****Upper:** (4m, >70%) *Homalospermum firmum*, *Beaufortia sparsa*, *Callistachys lanceolata*, *Astartea* sp., *Taxandria juniperina*, *Taxandria linearifolia*, **Eucalyptus globulus*.**Ground:** (<1m, 30-70%) *Empodisma gracillimum*, *Acacia divergens*, *Hypocalymma cordifolium*, *Lepidosperma striatum*, *Lobelia heterophylla*, *Meeboldina scariosa*, *Opercularia hispidula*, *Patersonia occidentalis*, *Patersonia umbrosa* var. *umbrosa*, *Anarthria prolifera*, *Pteridium esculentum*, **Watsonia meriana* var. *bulbillifera*.

Quadrat: 18**Date:** 23/11/2017**Description:** Wetland, grey sand**Mapping Unit:** *Evandra aristata* Sedgeland**Vegetation Condition:** Very Good**Location:** 574971mE 6125166mN**Photo:****Floristics:****Upper:** (4m, <10%) *Nuytsia floribunda*.**Middle:** () *Beaufortia sparsa*, *Evandra aristata*.**Ground:** () *Amphipogon laguroides*, *Anarthria laevis*, *Anarthria prolifera*, *Anarthria scabra*, *Acacia myrtifolia*, *Adenanthos obovatus*, *Agonis flexuosa*, *Billardiera heterophylla*, *Boronia crenulata*, *Boronia spathulata*, *Dampiera linearis*, *Dasyopogon bromeliifolius*, *Gymnoschoenus anceps*, *Homalospermum firmum*, *Hypocalymma strictum*, *Hypolaena fastigiata*, *Jacksonia horrida*, *Lyginia barbata*, *Melaleuca thymoides*, *Opercularia hispidula*, *Patersonia limbata*, *Schoenus cruentus*, *Sphenotoma capitata*, *Taxandria parviceps*, *Xyris lanata*, **Leptospermum laevigatum*.

Quadrat: 19**Date:** 23/11/2017**Description:** Granite outcrop, brown loamy sand.**Mapping Unit:** *Taxandria marginata* Granite Shrubland**Vegetation Condition:** Degraded/Good**Location:** 576814mE 6124669mN**Photo:****Floristics:****Upper:** (<10m, 10-30%) *Corymbia calophylla*, *Agonis flexuosa*.**Middle:** (2m, 10-30%) *Agonis theiformis*, *Bossiaea linophylla*, *Dodonaea ceratocarpa*, *Hibbertia furfuracea*, *Lomandra pauciflora*, *Loxocarya cinerea*, *Microlaena stipoides*, *Stypandra glauca*, *Tetralia octandra*, *Tremandra stelligera*.**Ground:** (<1m, 10-30%) **Anthoxanthum odoratum*, **Asparagus asparagoides*, **Avena barbata*, **Briza maxima*, **Freesia alba x leichtlinii*, **Gladiolus undulatus*, **Lythrum hyssopifolia*, **Watsonia meriana* var. *bulbillifera*, *Astroloma pallidum*, *Austrostipa mollis*, *Billardiera variifolia*, *Cyathochaeta avenacea*, *Desmodocladus fasciculatus*, *Dianella revoluta*, *Lepidosperma tenue*, *Leucopogon obovatus* subsp. *obovatus*, *Xanthorrhoea platyphylla*.

Quadrat: 20**Date:** 23/11/2017**Description:** Swale adjacent to granite outcrop, brown loam**Mapping Unit:** Marri/Jarrah Forest/Peppermint Woodland**Vegetation Condition:** Very Good**Location:** 576759mE 6124635mN**Photo:****Floristics:****Upper:** (<10m, 30-70%) *Corymbia calophylla*, *Eucalyptus marginata*, *Agonis flexuosa*.**Middle:** (2m, 30-70%) *Agonis theiformis*, *Bossiaea linophylla*, *Hibbertia cuneiformis*, *Leucopogon obovatus* subsp. *obovatus*, *Leucopogon verticillatus*.**Ground:** (<1m, 30-70%) *Anarthria scabra*, *Billardiera heterophylla*, *Dasyogon bromeliifolius*, *Hardenbergia comptoniana*, *Hypolaena fastigiata*, *Lomandra purpurea*, *Loxocarya cinerea*, *Patersonia umbrosa* var. *umbrosa*, *Pteridium esculentum*, *Schoenus multiglumis*, *Tremandra diffusa*, **Anthoxanthum odoratum*, **Asparagus asparagoides*, **Oxalis purpurea*, **Oxalis violacea*, **Pelargonium capitatum*, **Taraxacum khatoonae*, **Watsonia meriana* var. *bulbillifera*.

Quadrat: 21**Date:** 24/11/2017**Description:** Middle hill-slope, grey sand**Mapping Unit:** Jarrah/Sheoak/E.staeri Sandy Woodland**Vegetation Condition:** Excellent**Location:** 574326mE 6127589mN**Photo:****Floristics:****Upper:** (<10m, 30-70%) *Eucalyptus marginata*, *Corymbia calophylla*.**Middle:** (2m, 30-70%) *Agonis theiformis*, *Banksia grandis*, *Beaufortia decussata*, *Persoonia elliptica*, *Xanthorrhoea platyphylla*, *Acacia browniana* var. *browniana*, *Bossiaea linophylla*, *Hakea florida*, *Kingia australis*, *Leucopogon obovatus* subsp. *obovatus*, *Leucopogon verticillatus*.**Ground:** (<1m, 30-70%) *Anarthria prolifera*, *Billardiera variifolia*, *Desmocladus fasciculatus*, *Gompholobium polymorphum*, *Hibbertia cunninghamii*, *Johnsonia lupulina*, *Lepidosperma angustatum*, *Lomandra pauciflora*, *Lomandra sericea*, *Opercularia hispidula*, *Patersonia umbrosa* var. *umbrosa*, *Tetraria octandra*, *Tetraria* sp. Jarrah Forest (R. Davis 7391), *Xanthosia rotundifolia*.

Quadrat: 22**Date:** 24/11/2017**Description:** Wetland, peat over sand**Mapping Unit:** *Homalospermum firmum*/*Callistemon glaucus* Peat Thicket**Vegetation Condition:** Excellent**Location:** 574397mE 6127513mN**Photo:****Floristics:****Upper:** (>2m, 30-70%) *Callistemon glaucus*, *Beaufortia sparsa*, *Taxandria parviceps*.**Ground:** (<1m, 30-70%) *Anarthria scabra*, *Baumea rubiginosa*, *Cephalotus follicularis*, *Drosera pulchella*, *Empodisma gracillimum*, *Gymnoschoenus anceps*, *Histiopteris incisa*, *Homalospermum firmum*, *Leptocarpus tenax*, *Schizaea fistulosa*, *Schoenus multiglumis*, *Sphaerolobium vimineum*, *Xanthosia rotundifolia*, *Xyris lanata*, **Rubus anglocandicans*, *Eucalyptus marginata*.

Quadrat: 23**Date:** 24/11/2017**Description:** 5 x 20 m dimensions. Wetland around artificial dam**Mapping Unit:** *Homalospermum firmum*/*Callistemon glaucus* Peat Thicket**Vegetation Condition:** Excellent**Location:** 574400mE 6127491mN**Photo:****Floristics:****Upper:** (2m, 10-30%) *Callistemon glaucus*, *Hakea florida*, *Taxandria linearifolia*.**Ground:** (<1m, 10-30%) *Baumea rubiginosa*, *Cassytha racemosa*, *Diaspasis filifolia*, *Drosera pallida*, *Drosera pulchella*, *Empodisma gracillimum*, *Gymnoschoenus anceps*, *Lepidosperma striatum*, *Leptocarpus tenax*, *Meeboldina scariosa*, *Sphaerolobium vimineum*, *Stylidium pygmaeum*, *Thelymitra canaliculata*, *Xyris lanata*, **Anthoxanthum odoratum*, **Cortaderia selloana*.

Quadrat: 24**Date:** 24/11/2017**Description:** Wetland. Peat over sand**Mapping Unit:** *Homalospermum firmum*/*Callistemon glaucus* Peat Thicket**Vegetation Condition:** Excellent**Location:** 574452mE 6127424mN**Photo:****Floristics:****Upper:** (2m, 10-30%) *Callistemon glaucus*, *Homalospermum firmum*, *Boronia crassipes*, *Taxandria linearifolia*.**Ground:** (>1m, >70%) *Acacia divergens*, *Dampiera leptoclada*, *Diaspasis filifolia*, *Drosera menziesii*, *Empodisma gracillimum*, *Lepidosperma striatum*, *Leptocarpus tenax*, *Meeboldina tephрина* ms, *Schoenus multiglumis*, *Sphaerolobium vimineum*, **Holcus lanatus*.

Quadrat: 25**Date:** 24/11/2017**Description:** Lower hill-slope, grey sand**Mapping Unit:** Jarrah/Sheoak/*E. staeri* Sandy Woodland**Vegetation Condition:** Very Good/Excellent**Location:** 574300mE 6127524mN**Photo:****Floristics:****Upper:** (<10m, 30-70%) *Corymbia calophylla*, *Eucalyptus marginata*.**Middle:** (2m, 30-70%) *Agonis theiformis*, *Banksia grandis*, *Beaufortia decussata*, *Bossiaea linophylla*, *Hakea ruscifolia*, *Hibbertia cuneiformis*, *Leucopogon obovatus* subsp. *obovatus*, *Leucopogon verticillatus*, *Persoonia longifolia*, *Xanthorrhoea platyphylla*.**Ground:** (<1m, 30-70%) *Amphipogon amphipogonoides*, *Anarthria prolifera*, *Desmocladius fasciculatus*, *Drosera pallida*, *Haemodorum spicatum*, *Lepidosperma angustatum*, *Mesomelaena graciliceps*, *Opercularia hispidula*, *Patersonia umbrosa* var. *umbrosa*, *Scaevola striata*, *Tetraria octandra*, *Tricostularia neesii*, *Xanthosia rotundifolia*.

Quadrat: 26**Date:** 27/11/2017**Description:** Wetland, peat over sand**Mapping Unit:** *Homalospermum firmum*/*Callistemon glaucus* Peat Thicket**Vegetation Condition:** Excellent**Location:** 574270mE 6127433mN**Photo:****Floristics:****Upper:** (4m, 30-70%) *Callistemon glaucus*, *Hakea linearis*, *Taxandria juniperina*, *Taxandria linearifolia*, **Psoralea pinnata*.**Ground:** (<1m, >70%) *Baumea acuta*, *Baumea rubiginosa*, *Diaspasis filifolia*, *Drosera menziesii*, *Empodisma gracillimum*, *Gymnoschoenus anceps*, *Leptocarpus tenax*, *Schoenus multiglumis*, *Sphaerolobium vimineum*, *Thysanotus sparteus*, *Xyris lanata*, **Holcus lanatus*, **Rubus anglocandicans*.

Quadrat: 27

Date: 27/11/2017

Description: Wetland, peat over sand

Mapping Unit: *Homalospermum firmum*/*Callistemon glaucus* Peat Thicket

Vegetation Condition: Excellent

Location: 574254mE 6127408mN

Photo:



Floristics:

Upper: (3m, 30-70%) *Callistemon glaucus*, *Homalospermum firmum*, *Boronia crassipes*.

Ground: (1m, >70%) *Acacia divergens*, *Baumea rubiginosa*, *Dampiera leptoclada*, *Empodisma gracillimum*, *Gymnoschoenus anceps*, *Leptocarpus tenax*, *Schoenus multiglumis*, *Xyris lanata*.

Quadrat: 28

Date: 27/11/2017

Description: Wetland peat over sand. ex.

Mapping Unit: *Homalospermum firmum*/*Callistemon glaucus* Peat Thicket

Vegetation Condition: Excellent

Location: 574566mE 6127504mN

Photo:



Floristics:

Upper: (3m, 30-70%) *Callistemon glaucus*, *Homalospermum firmum*, *Cosmelia rubra*, *Taxandria linearifolia*.

Ground: (1m, >70%) *Acacia divergens*, *Astartea corniculata*, *Baumea acuta*, *Baumea rubiginosa*, *Dampiera leptoclada*, *Drosera menziesii*, *Empodisma gracillimum*, *Gymnoschoenus anceps*, *Leptocarpus tenax*, *Schoenus multiglumis*, *Xyris lanata*, **Rubus anglocandicans*.

Quadrat: 29

Date: 27/11/2017

Description: Wetland, peat over sand

Mapping Unit: *Homalospermum firmum*/*Callistemon glaucus* Peat Thicket

Vegetation Condition: Excellent

Location: 574307mE 6127407mN

Photo:



Floristics:

Upper: (2m, 30-70%) *Callistemon glaucus*, *Homalospermum firmum*, *Taxandria linearifolia*, *Boronia crassipes*.

Ground: (1m, >70%) *Acacia divergens*, *Baumea rubiginosa*, *Empodisma gracillimum*, *Gymnoschoenus anceps*, *Leptocarpus tenax*, *Schoenus multiglumis*, *Sphaerolobium vimineum*.

Quadrat: 30

Date: 28/11/2017

Description: Wetland, peat over sand

Mapping Unit: *Taxandria juniperina* Closed Forest

Vegetation Condition: Very Good

Location: 574485mE 6125533mN

Photo:



Floristics:

Upper: (10m, >70%) *Taxandria juniperina*, *Homalospermum firmum*.

Ground: (<1m, <10%) *Acacia divergens*, *Baumea acuta*, *Lepidosperma striatum*, *Leptocarpus scariosus*, *Tetrarrhena laevis*, **Acacia melanoxylon*, **Anthoxanthum odoratum*.

Quadrat: 31**Date:** 28/11/2017**Description:** Wetland, peat over sand. Firebreak**Mapping Unit:** *Taxandria juniperina* Closed Forest**Vegetation Condition:** Very Good**Location:** 574591mE 6125459mN**Photo:****Floristics:****Upper:** (10m, 30-70%) *Taxandria juniperina*, *Rhadinothamnus anceps*,**Ground:** (<1m, <10%) *Aphelia brizula*, *Baumea acuta*, *Chamaescilla corymbosa*, *Drosera pulchella*, *Isolepis cernua*, *Lobelia heterophylla*, *Microtis media*, *Prasophyllum macrostachyum*, *Thelymitra* sp., *Utricularia bifida*, **Acacia longifolia*, **Anthoxanthum odoratum*, **Briza maxima*, **Briza minor*, **Gladiolus undulatus*.

Quadrat: 32**Date:** 28/11/2017**Description:** Middle hill-slope, grey sand with laterite gravel**Mapping Unit:** *Hakea* spp Shrubland/Woodland Complex**Vegetation Condition:** Very Good/Excellent**Location:** 573977mE 6126876mN**Photo:****Floristics:****Upper:** (<10m, 10-30%) *Eucalyptus marginata*, *Allocasuarina fraseriana*.**Middle:** (2m, 10-30%) *Hakea ferruginea*, *Taxandria parviceps*, *Agonis theiformis*, *Acacia browniana* var. *browniana*, *Acacia myrtifolia*, *Grevillea pilulifera*, *Xanthorrhoea platyphylla*.**Ground:** (<1m, 30-70%) *Anarthria gracilis*, *Anarthria prolifera*, *Anarthria scabra*, *Billardiera heterophylla*, *Boronia spathulata*, *Cyathochaeta avenacea*, *Dampiera loranthifolia*, *Dasyogon bromeliifolius*, *Desmocladus fasciculatus*, *Haemodorum laxum*, *Hibbertia microphylla*, *Hovea trisperma*, *Lepidosperma drummondii*, *Lomandra sericea*, *Mesomelaena tetragona*, *Patersonia umbrosa* var. *umbrosa*, *Sphaerolobium medium*, *Tetraria octandra*, *Tetraria* sp. Jarrah Forest (R. Davis 7391), *Thysanotus sparteus*, *Xanthosia rotundifolia*.

12 APPENDIX E - Likelihood of Occurrence Analysis

A post-survey likelihood of occurrence of all conservation significant species (flora and fauna) was assessed based on the presence of suitable habitat and survey effectiveness (see section 3.3).

Table E1. Likelihood of occurrence of conservation significant flora recorded in the vicinity of the Survey Area (<10 km). NM = Naturemap, PMST = Protected Matters Search Tool, WAHERB = Western Australia Herbarium Database, TPFL = Threatened and Priority Flora Database.

Status, Taxon [FAMILY]	Data source	Description, Habitat & Distribution	Habitat Suitability in the Survey Area	Post -Survey Likelihood of Occurrence and Survey Effectiveness
T (Previously considered extinct) <i>Acacia prismifolia</i> [Fabaceae]	NM, WAHERB	Shrub, 0.15-0.5 m high. Rocky slopes. Laterite gravel pit in road verge.	Habitat preferences poorly understood for this taxon recently rediscovered near Cranbrook. Generally, habitats in Survey Area are not considered suitable.	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.
T <i>Banksia brownii</i> [Proteaceae]	NM, PMST, WAHERB, TPFL	Bushy, non-lignotuberous shrub or tree (small), 1-6 m high. Flowers cream & brown/orange-red, Mar to Jul. Sand over laterite, gravel, loam over granite. In gullies.	Potential habitat around Mt Melville, however highly impacted by Phytophthora and weeds.	Unlikely. Very conspicuous shrub and no survey limitations would have prevented detection if present in the Survey Area.
T <i>Banksia goodii</i> [Proteaceae]	NM, PMST, WAHERB, TPFL	Lignotuberous, prostrate shrub, ca 0.2 m high. Flowers orange-brown-red, May or Nov. White or grey sand over laterite.	Potential habitat in Unit 13, however highly impacted by Phytophthora and weeds.	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.
T <i>Banksia verticillata</i> [Proteaceae]	NM, PMST, WAHERB, TPFL	Non-lignotuberous shrub or tree (rarely), 1.3-6 m high. Flowers yellow-orange, Jan to Apr. Sandy loam. On or beside granite outcrops.	Potential habitat around Mt Melville, however highly impacted by Phytophthora and weeds.	Unlikely. Very conspicuous shrub and no survey limitations would have prevented detection if present in the Survey Area.
T <i>Caladenia harringtoniae</i> [Orchidaceae]	NM, PMST, WAHERB, TPFL	Tuberous, perennial, herb, 0.2-0.4 m high. Flowers pink, Oct to Nov. Sandy loam. Winter-wet flats, margins of lakes, creeklines, granite outcrops. Generally, more abundant after fire.	Potential habitat around Mt Melville, however is long unburnt and highly impacted by weeds.	Possible. Survey was appropriately timed, however may emerge after fire.
T <i>Caladenia granitora</i> [Orchidaceae]	PMST	Tuberous, perennial, herb, 0.2-0.35 m high. Fl. cream & white & red, Oct to Nov. Shallow soil crevices on granite. Coastal areas.	Potential habitat around granites on Mt Melville, however no actual records in the Study Area.	Unlikely. Known from coastal granites east of the Study Area. Survey was appropriately timed to detect if present.
T <i>Chordifex abortivus</i> [Restionaceae]	NM, PMST, WAHERB	Rhizomatous, erect perennial, herb, to 0.5 m high. Flowers brown, Sep to Oct. Sand. Low rises & undulating areas.	Has the potential to occur in a wide range of habitats.	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.
T <i>Conostylis misera</i> [Haemodoraceae]	NM, PMST, WAHERB	Rhizomatous, tufted perennial, grass-like or herb, 0.05-0.18 m high. Flowers yellow, Oct to Nov. White or grey sand, sandy loam. Winter-wet flats.	Generally known from wet habitat further inland than Survey Area.	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.
T <i>Diuris drummondii</i> [Orchidaceae]	PMST	Tuberous, perennial, herb, 0.5-1.05 m high. Fl. yellow, Nov to Dec or Jan. Low-lying depressions, swamps. Generally, more abundant after fire.	Known from black sand over granite (Torndirrup NP). Habitat in Survey Area is degraded and impacted by weeds.	Unlikely. Limited suitable habitat in Survey Area, however may emerge after fire.
T <i>Drakaea micrantha</i> [Orchidaceae]	NM, PMST, WAHERB, TPFL	Tuberous, perennial, herb, 0.15-0.3 m high. Flowers red & yellow, Sep to Oct. White-grey sand.	Potential habitat in in moist areas in Unit 13 and in Taxandria thickets, however generally occurs further inland and west of the Survey Area.	Unlikely. Survey was appropriately timed to detect if present, however may emerge after fire.
T <i>Isopogon uncinatus</i> [Proteaceae]	NM, PMST, WAHERB, TPFL	Tufted spreading or prostrate, non-lignotuberous shrub, 0.05-0.4 m high. Flowers yellow/cream, Oct to Nov. Loam or sand on granite, peaty sand. Swampy depressions, hillslopes.	Potential habitat around Mt Melville, however highly impacted by Phytophthora and weeds.	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.

Status, Taxon [FAMILY]	Data source	Description, Habitat & Distribution	Habitat Suitability in the Survey Area	Post-Survey Likelihood of Occurrence and Survey Effectiveness
T <i>Kennedia glabrata</i> [Fabaceae]	PMST	Prostrate shrub, 0.05-0.5 m high, to 5 m wide. Fl. red, Aug to Nov. Soil pockets, sandy soils. Granite outcrops.	Potential habitat around granites on Mt Melville, however no actual records in the Study Area.	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.
T <i>Sphenotoma drummondii</i> [Ericaceae]	PMST	Tufted shrub, 0.15-0.5 m high. Fl. white, Sep to Dec. Stony or shallow soils over granite or quartzite. Steep rocky slopes, crevices of rocks.	Potential habitat around granites on Mt Melville, however no actual records in the Study Area.	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.
T <i>Verticordia fimbriolepis</i> subsp. <i>australis</i> [Malvaceae]	NM, PMST, TPFL	Slender shrub, 0.2-0.4 m high. Flowers pink, Oct to Dec. Shallow sand, clay loam. Granite outcrops.	Potential habitat around Mt Melville, however highly impacted by Phytophthora and weeds.	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.
P1 <i>Caladenia evanescens</i> [Orchidaceae]	NM, WAHERB	Tuberous, perennial, herb, 0.15-0.2 m high. Flowers green-cream-yellow, Nov. Sand. Consolidated sand dunes.	No suitable habitat (calcareous sand) present in the Survey Area.	Unlikely. No suitable habitat present.
P1 <i>Coleanthera coelophylla</i> [Ericaceae]	WAHERB	Erect shrub, 0.3-0.6 m high. Flowers pink/white, Sep to Nov. Gravelly sandy soils.	Known to occur further inland. Record in Study Area has low geo-accuracy.	Unlikely. Survey Area is considered outside the range of this taxon. Survey was appropriately timed to detect if present.
P1 <i>Drosera paleacea</i> [Droseraceae]	NM	Fibrous-rooted, rosetted perennial, herb, to 0.03 m high, to 0.015 m wide. Fl. white-cream, Sep to Dec or Jan. White sand, sandy clay.	Recently recorded from Banksia littoralis swamp in the Torndirrup area.	Possible. Other wetlands in Survey Area may be suitable. Survey was appropriately timed to detect if present, however may be more abundant after disturbance such as fire or slashing.
P1 <i>Prasophyllum paulinae</i> [Orchidaceae]	NM, WAHERB	Tuberous, perennial, herb, 0.15-0.4 m high. Fl. green-purple-red, Sep to Nov. Black, peaty soils. Swamps.	Recorded from <i>Taxandria/Homalospermum</i> swamp in Survey Area.	Known habitat present. Survey was appropriately timed to detect; however, it requires fire to germinate.
P1 <i>Thomasia multiflora</i> [Malvaceae]	NM, WAHERB	Spreading shrub, 0.3-1 m high, to 2 m wide. Flowers pink-purple, Sep to Oct. Black sand. Seasonally wet areas, granite outcrops.	Potential habitat around Mt Melville, however highly impacted by weeds.	Unlikely. <i>Thomasia purpurea</i> (common congener) was present in suitable habitat within Survey Area.
P1 <i>Thomasia purpurea</i> x <i>solanacea</i> [Malvaceae]	NM, WAHERB, TPFL	Shrub, 0.5-0.8 m high. Flowers pink-purple, Nov to Dec or Jan. Grey sand over limestone. Creek sides.	No suitable habitat (calcareous sand) present in the Survey Area.	Unlikely. No suitable habitat present.
P2 <i>Agrostocrinum scabrum</i> subsp. <i>littorale</i> [Hemerocallidaceae]	NM, WAHERB	Rhizomatous, perennial, herb, to 0.15 m high. Flowers blue, Oct to Nov. Shallow granite loams. Coastal slopes.	Potential habitat around Mt Melville, however highly impacted by weeds.	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.
P2 <i>Astartea transversa</i> [Myrtaceae]	NM, WAHERB	Spreading shrub to 0.5 m. Flowers pink to white in April-May. Grey sand, wetlands/winter wet.	Suitable habitat in Unit 47.	Unlikely. Survey conducted outside flowering time (autumn), however is a distinctive shrub likely to be detected if present.
P2 <i>Conospermum quadripetalum</i> [Proteaceae]	NM, WAHERB, TPFL	Diffuse, straggly shrub, 0.3-1 m high. Fl. blue/white, Sep to Nov. Sandy clay, grey sand. Flats behind coastal hills.	No suitable habitat (calcareous sand) present in the Survey Area.	Unlikely. No suitable habitat present.
P2 <i>Conospermum spectabile</i> [Proteaceae]	NM, WAHERB	Erect, compact shrub, 0.5-0.8 m high. Flowers white & blue, Oct to Nov. Sandy soils.	Generally, occurs further inland.	Unlikely. Survey appropriately timed and is a distinctive shrub likely to be detected if present.
P2 <i>Gyrostemon thesioides</i> [Gyrostemonaceae]	NM, WAHERB, TPFL	Straggling, decumbent shrub, to 0.7 m high. Flowers red-orange-yellow/yellow-green, Nov. Sand over limestone. Consolidated coastal dunes.	No suitable habitat (calcareous sand) present in the Survey Area.	Unlikely. No suitable habitat present.
P2 <i>Isopogon buxifolius</i> var. <i>buxifolius</i> [Proteaceae]	NM, WAHERB	Upright shrub, 0.45-1 m high. Flowers pink-cream, Jul to Dec. Grey sand. Swampy areas.	Suitable habitat in Unit 47.	Unlikely. Survey appropriately timed and is a distinctive shrub likely to be detected if present.
P2 <i>Leucopogon bracteolaris</i> [Ericaceae]	NM, WAHERB	Shrub, 0.25-1 m high. Flowers white, Feb or May or Jul or Oct. Stony sand, gravelly loam.	Generally known from the Stirling Range. Record in Study Area is a geospatial error.	Unlikely. Survey Area is considered outside the range of this taxon.
P2 <i>Leucopogon cymbiformis</i> [Ericaceae]	NM, WAHERB	Dense, erect or spreading shrub, 0.1-0.6(-0.8) m high. Flowers white, Jul to Nov or Feb to Mar.	Wide range of suitable habitats	Unlikely. Survey appropriately timed and is a distinctive shrub likely to be detected if present.

Status, Taxon [FAMILY]	Data source	Description, Habitat & Distribution	Habitat Suitability in the Survey Area	Post-Survey Likelihood of Occurrence and Survey Effectiveness
		White/grey or yellow sand, lateritic gravelly soils. Sandplains, wet flats, foothills.		
P2 <i>Schoenus</i> sp. Grassy (E. Gude & J. Harvey 250) [Cyperaceae]	NM, WAHERB	Rhizomatous, perennial, grass-like or herb (sedge), to 0.7 m high. Fl. yellow. Black silt. Swamps.	Potentially suitable habitat in Unit 47, 49 or 59.	Possible. Not detected in wetlands in Survey Area, however may be difficult to detect if present in low numbers.
P2 <i>Stenanthemum sublineare</i> [Rhamnaceae]	NM,	Erect shrub, to 0.1 m high. Fl. green, Oct to Dec. Littered white sand. Coastal plain.	Potential habitat in Eucalypt woodlands (12, 13, 10).	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.
P2 <i>Styliidium articulatum</i> [Styliidiaceae]	NM, WAHERB	Rosetted perennial, herb, 0.15-0.25 m high, Leaves erect to spreading, oblanceolate, 3-8 cm long, 5-14 mm wide, apex subacute to acute, glabrous. Scape glandular in upper half. Inflorescence paniculate. Flowers pink, Nov to Dec. Sandy loam, granite. Hills, coastal heath.	Potential habitat around Mt Melville, however highly impacted by weeds.	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.
P2 <i>Styliidium falcatum</i> [Styliidiaceae]	NM, WAHERB, TPFL	Perennial, herb, 0.15-0.35(-0.6) m high. Flowers white, Oct to Nov. Sand, gravelly clay loam. Plains, lateritic ridges.	Potential habitat around Mt Melville, however highly impacted by weeds.	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.
P2 <i>Thelymitra variegata</i> [Orchidaceae]	NM, WAHERB	Tuberous, perennial, herb, 0.1-0.35 m high. Flowers orange & red & purple & pink, Jun to Sep. Sandy clay, sand, laterite.	Potential habitat in sandy Eucalypt woodlands (Unit 13).	Unlikely. Habitat not highly suitable, survey appropriately timed to be detected if present.
P3 <i>Acacia ataxiphylla</i> subsp. <i>ataxiphylla</i> [Fabaceae]	NM, WAHERB	Prostrate, sprawling shrub, 0.15-0.5 m high, to 1 m wide. Flowers yellow, Nov to Dec or Jan. Gravelly clay loam, white/grey sand. Flats, roadsides.	Wide range of suitable habitats	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.
P3 <i>Andersonia auriculata</i> [Ericaceae]	NM, WAHERB, TPFL	Erect or spreading shrub, 0.1-0.3(-0.5) m high. Flowers white & blue, Apr to Oct. Grey or peaty sand, often over laterite. Swampy areas, granite outcrops.	Potential habitat around Mt Melville, however highly impacted by weeds.	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.
P3 <i>Andersonia setifolia</i> [Ericaceae]	NM, WAHERB	Decumbent to erect, cushion-forming shrub, 0.05-0.15 m high. Flowers red/white, Jun to Oct. Sandy & gravelly soils. Hillslopes & breakaways.	Potential habitat around Mt Melville, however highly impacted by weeds.	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.
P3 <i>Andersonia</i> sp. Mitchell River [Ericaceae]	NM	Low, spreading, cushion-like shrub, 0.05-0.4 m high. Fl. blue/blue-white-pink, Jun to Sep. Grey sand over laterite or granite.	Potential habitat around Mt Melville, however highly impacted by weeds.	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.
P3 <i>Austrostipa mundula</i> [Poaceae]	NM, WAHERB	Perennial caespitose grass to 0.5m. Grey sand.	No suitable habitat (calcareous sand) present in the Survey Area.	Unlikely. No suitable habitat present.
P3 <i>Boronia crassipes</i> [Rutaceae]	NM, WAHERB	Erect, spindly shrub, 0.5-2 m high. Flowers red-pink, Aug to Sep. Sand, peaty sand. Winter-wet swamps, creeklines.		Present (See section 4.2.4)
P3 <i>Caustis</i> sp. Boyanup [Cyperaceae]	WAHERB	Rhizomatous, clumped perennial, grass-like or herb (sedge), 0.7-1 m high. White or grey sand.	Mike Hislop (Western Australian Herbarium) has indicated the taxonomy of this entity is poorly supported.	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.
P3 <i>Chorizema carinatum</i> [Fabaceae]	NM, WAHERB	Erect or spreading shrub, 0.1-0.6 m high. Flowers yellow, Oct to Dec. Sand, sandy clay.	Potential habitat in laterite woodlands (12, 31)	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.
P3 <i>Corybas abditus</i> [Orchidaceae]	NM, WAHERB	Tuberous, perennial, dwarf herb, 0.01-0.02 m high. Fl. red-purple, Oct to Nov. Black peaty soils. Winter-wet swamps.	Potentially suitable habitat in wetland Units 47, 49 or 59.	Unlikely. Survey appropriately timed to be detected if present.

Status, Taxon [FAMILY]	Data source	Description, Habitat & Distribution	Habitat Suitability in the Survey Area	Post-Survey Likelihood of Occurrence and Survey Effectiveness
P3 <i>Juncus meianthus</i> [Juncaceae]	NM, TPFL	Tufted perennial, herb, 0.05-0.2 m high, to 0.4 m wide. Flowers brown, Nov to Dec or Jan. Black sand, sandy clay. Creeks, seepage areas.	Wide range of suitable habitats.	Unlikely. Survey appropriately timed, however may be difficult to detect if in low numbers.
P3 <i>Lachnagrostis billardierei</i> subsp. <i>billardierei</i> [Poaceae]	NM, WAHERB	Annual, herb. Fl. purple/green, Dec. Sand over granite. Hilltops. <i>Melaleuca cuticularis</i> .	No suitable habitat in the Survey Area.	Unlikely. No suitable habitat present.
P3 <i>Leucopogon altissimus</i> [Ericaceae]	NM, WAHERB	Erect shrub to 2 m high. Inflorescence pendulous, flowers creamy - white. Grey or brown sandy loam over granite.	Generally, occurs east of the Survey Area.	Unlikely. Survey Area outside taxon's range.
P3 <i>Melaleuca ringens</i> [Myrtaceae]	WAHERB	Bushy shrub, 0.4-2.5 m high. Fl. cream-yellow, Sep to Oct. Sand. Limestone ridges & cliff-tops.	No suitable habitat (calcareous sand) present in the Survey Area.	Unlikely. No suitable habitat present.
P3 <i>Poa billardierei</i> [Poaceae]	NM, WAHERB, TPFL	Tussock grass to 0.5 m. Foredunes, drift sands.	No suitable habitat (calcareous sand) present in the Survey Area.	Unlikely. No suitable habitat present.
P3 <i>Synaphea incurva</i> [Proteaceae]	NM, WAHERB, TPFL	Clumped, spreading shrub. Flowers yellow, Sep to Nov. Gravelly loam, sandy soils. Slopes.		Present (See section 4.2.4)
P3 <i>Synaphea preissii</i> [Proteaceae]	NM, WAHERB	Erect, low shrub, 0.15-0.4 m high. Flowers yellow, Jul to Nov. Sand, gravelly loam.	Suitable habitat in lateritic soils (Unit 12, 31)	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.
P3 <i>Verticordia endlicheriana</i> var. <i>angustifolia</i> [Myrtaceae]	NM, WAHERB	Erect shrub, 0.3-0.5 m high. Flowers yellow, Oct to Nov. Sandy clay. Granite outcrops.	Potential habitat around Mt Melville, however highly impacted by weeds.	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.
P4 <i>Adenanthos x cunninghamii</i> [Proteaceae]	NM, WAHERB, TPFL	Erect open shrub, 1-3 m high. Flowers red/pink-red, Mar or Sep to Oct. Grey sand. Coastal dunes & sandplains.	No suitable habitat (calcareous sand) present in the Survey Area.	Unlikely. No suitable habitat present.
P4 <i>Andersonia</i> sp. Jamesii (J. Liddelow 84) [Ericaceae]	NM, WAHERB, TPFL	Shrub, 0.5 m high x 0.1 m wide. Perennial, erect, open. Flowers pink / blue. Sandy clay, laterite.		Present (See section 4.2.4)
P4 <i>Banksia seneciifolia</i> [Proteaceae]	NM, WAHERB	Columnar, non-lignotuberous shrub, 0.6-1 m high. Fl. cream-yellow-brown, Jun or Aug. Sandy loam, sand. Rocky hillslopes.	Suitable habitat in lateritic soils (Unit 12, 31)	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.
P4 <i>Banksia serra</i> [Proteaceae]	NM, WAHERB	Erect, slender, non-lignotuberous shrub, 1-4(-7) m high. Flowers yellow/cream-green, Jul to Sep. Gravel, sand or clay loam over laterite. Hillslopes.	Suitable habitat in lateritic soils (Unit 12, 31)	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.
P4 <i>Corybas limpidus</i> [Orchidaceae]	NM, WAHERB	Tuberous, perennial, dwarf herb, 0.01 m high. Flowers red & green, Aug to Sep. Sand. Coastal dunes.	No suitable habitat (calcareous sand) present in the Survey Area.	Unlikely. No suitable habitat present.
P4 <i>Drosera fimbriata</i> [Droseraceae]	NM, WAHERB, TPFL	Erect tuberous, perennial, herb, 0.05-0.15 m high. Flowers white, Sep to Oct. Deep white sand (often in <i>Banksia</i> shrublands), granite.	No suitable habitat (white sand) present in the Survey Area.	Unlikely. No suitable habitat present.
P4 <i>Gahnia sclerioides</i> [Cyperaceae]	NM, WAHERB, TPFL	Lax, slender rhizomatous, perennial, grass-like or herb (sedge), 0.3-0.9 m high. Loam, sandy soils. Moist shaded situations.	Potential habitat around Mt Melville, however highly impacted by weeds.	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.
P4 <i>Gonocarpus pusillus</i> [Haloragaceae]	NM, WAHERB	Prostrate annual, herb, 0.05-1.2 m high. Flowers green/yellow-red, Nov to Dec. Grey sandy clay. Winter-wet swamps.	Potentially suitable habitat in Unit 46, 47.	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.
P4 <i>Gonocarpus simplex</i> [Haloragaceae]	NM, WAHERB, TPFL	Tufted perennial, herb, 0.2-0.6 m high. Fl. green/red-brown, Nov to Dec. Peaty sand. Swamps,	Potentially suitable habitat in Unit 46, 47.	Possible. Suitable habitat present, however none are recently burnt.

Status, Taxon [FAMILY]	Data source	Description, Habitat & Distribution	Habitat Suitability in the Survey Area	Post -Survey Likelihood of Occurrence and Survey Effectiveness
		seasonally inundated areas. Prolific after fire.		
P4 <i>Kunzea pauciflora</i> [Myrtaceae]	NM	Erect, compact shrub, (0.35-)0.5-1.2(-1.5) m high. Fl. pink, Aug to Nov.	Record in Survey Area is a geospatial error.	Unlikely. Survey Area is outside the taxon's range.
P4 <i>Laxmannia jamesii</i> [Asparagaceae]	WAHERB, TPFL	Tufted, stilt-rooted perennial, herb, 0.05-0.2 m high. Flowers red & white, May to Jul. Grey sand. Winter-wet locations.	Potential habitat in moist sandy soils (13, 46).	Possible. Not detected in wetlands in Survey Area, however may be difficult to detect if present in low numbers and not surveyed in peak flowering time.
P4 <i>Lepidium pseudotasmanicum</i> [Brassicaceae]	NM, WAHERB	Erect annual or biennial, herb, 0.2-0.4(-1) m high. Flowers white-green, Feb or Dec. Loam, sand.	Wide range of suitable habitats	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.
P4 <i>Lysinema lasianthum</i> [Ericaceae]	NM, WAHERB, TPFL	Spindly shrub, 0.25-0.7 m high. Flowers white-cream, Jul to Nov. Swamps, seasonally wet areas.	Potential habitat in moist sandy soils (13, 46).	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.
P4 <i>Microtis pulchella</i> [Orchidaceae]	NM, WAHERB	Tuberous, perennial, herb, 0.12-0.25 m high. Flowers white, Nov to Dec or Jan. Peaty sand. Winter-wet swamps. Prolific after fire.	Potential habitat in wetlands (46, 47).	Possible. The absence of recent fire may have affected detection.
P4 <i>Microtis quadrata</i> [Orchidaceae]	NM, WAHERB	Erect herb with tuber, 0.4 m high. Greenish flowers. Grey sandy clay. Wet areas. Prolific after fire.	Potential habitat in wetlands (46, 47).	Possible. The absence of recent fire may have affected detection.
P4 <i>Myosotis australis</i> [Boraginaceae]	WAHERB	Erect or procumbent annual, herb, up to 0.3 m high. Fl. white/blue, Aug to Nov. Grey sand over limestone.	No suitable habitat (calcareous sand) present in the Survey Area.	Unlikely. No suitable habitat present.
P4 <i>Spyridium spadiceum</i> [Rhamnaceae]	NM, WAHERB	Erect slender or weak semi-prostrate shrub, 0.15-3 m high. Flowers white, Aug to Dec or Jan to Feb or Apr. Sand or gravelly loam. Granitic hills.	Potential habitat around Mt Melville, however highly impacted by weeds.	Unlikely. No survey limitations would have prevented detection if present in the Survey Area.
P4 <i>Thomasia quercifolia</i> [Malvaceae]	NM, WAHERB, TPFL	Shrub to 1 m high. Pink purple flowers born in Apr, Aug, Oct, Nov or Dec. Karri loam or grey coastal sand.	No suitable habitat (calcareous sand) present in the Survey Area.	Unlikely. No suitable habitat present.
P4 <i>Thomasia solanacea</i> [Malvaceae]	NM, WAHERB	Erect shrub, 0.5-3 m high. Flowers blue-purple-pink, Sep to Dec. Alluvium, sand over limestone, rocky loam. Coastal areas.	No suitable habitat (calcareous sand) present in the Survey Area.	Unlikely. No suitable habitat present.
P4 <i>Thysanotus isantherus</i> [Asparagaceae]	NM, WAHERB	Caespitose perennial, herb (with tuberous roots), to 0.15 m high. Flowers purple, Nov to Dec. Granite.		Present (See section 4.2.4)

Table E2. Likelihood of occurrence of conservation significant fauna recorded in the vicinity of the Survey Area (<10 km).

Taxon	Habitat	Likelihood of Occurrence
Mammals		
Bilby, Dalgyte (<i>Macrotis lagotis</i>) (T-VU)	Bilbies are now mostly restricted to the drier and least fertile parts of their former range with the exception of populations in the north of the NT and WA. Remaining populations occupy three major vegetation types, namely: open tussock grassland on uplands and hills, mulga woodland/shrubland growing on ridges and rises, and hummock grassland in plains and alluvial areas (Pavey 2006)	Highly Unlikely. Not within current known range. One uncertain record from 1969.
Chuditch, Western Quoll (<i>Dasyurus geoffroyi</i>) (T-VU)	Eucalypt forest (especially Jarrah, <i>Eucalyptus marginata</i>), dry woodland and mallee shrublands (Van Dyke & Strahan, 2008). In Jarrah forest, Chuditch populations occur in both moist, densely vegetated, steeply sloping forest and drier, open, gently sloping forest. The Chuditch occurs at low densities, even in quality habitats of coastal areas. In Jarrah forest they shelter during the day in horizontal, hollow logs or earth burrows (DotEE 2016).	Unlikely. Suitable habitat is present, however the lack of secure, baited reserves Chuditch range widely and occur in very low densities. May use this survey area intermittently or as movement corridor.
Dibbler (<i>Parantechinus apicalis</i>) (T-EN)	Dibblers have been recorded over an extensive area and it is likely that they can occupy a diverse range of habitats (Friend, 2004). However, the species seem to prefer vegetation with a dense canopy greater than 1 m high which has been unburnt for at least 10 years or more (Baczocha & Start 1996). Mainland habitat is characterised by the presence of long-unburnt heathland, typified by sandy substrates and occasionally lateritic soils (Baczocha & Start 1996; Barrett 1998). This generalisation applies to records from Cheyne Beach, Torndirrup National Park and most records from Fitzgerald River National Park (Friend 2004)	Highly unlikely. No suitable habitat exists within the Survey Area
Quokka (<i>Setonix brachyurus</i>) (T-VU)	A range of vegetation types including dense forests and thickets, streamside vegetation, heaths and shrublands, <i>Taxandria linearifolia</i> dominated swamps in the Jarrah (<i>Eucalyptus marginata</i>) forest. On the south coast swamps, riparian areas, incised gullies and dense coastal heath (de Tores et al. 2007). Specifically, in the Two Peoples Bay area habitat critical to survival is known to comprise of coastal heath and thickets (<i>Eucalyptus staeri</i> , <i>Allocasuarina fraseriana</i> , <i>Hakea elliptica</i> with <i>Melaleuca striatum</i> , <i>Anarthria scabrum</i>); swamps (<i>Taxandria juniperina</i> , <i>T. linearifolia</i> , <i>Melaleuca lanceolata</i> with <i>Hakea nitida</i> , <i>Beaufortia sparsa</i> and <i>Gahnia trifida</i>); and riparian systems (<i>Eucalyptus megacarpa</i> , <i>Banksia littoralis</i> , <i>Lepidosperma</i> spp.) (DotEE 2016b)	Highly unlikely. No suitable habitat exists within the Survey Area
South-western brush-tailed phascogale, wambenger (<i>Phascogale tapoatafa wambenger</i>) (CD)	Woodland and open forests, and less commonly in wetter forests, tree species... The species has an arboreal foraging habit and a preference for mature trees for nesting hollows, although sometimes smaller trees have the potential to provide nesting hollows (Abbott and Whitford (2002). Rees et al. (2006) found that suitable hollows for this species in Victoria ranged in diameter at breast height (DBH) from 25 to 171 cm, with a mean DBH for the trees used by each individual phascogale of >80 cm. Hollow entrance sizes for Brush-tailed phascogales are small, > 5cm diameter (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10613)	Possible. A confirmed record of South-western brush-tailed phascogale in Mira Mar (an Albany suburb) from March 2017 indicates they possibly occur within the Albany area. Suitable habitat exists within Marri and Jarrah Woodland and Forest within the Survey Area. Trees with potential hollows with entrance sizes suitable for this species were recorded. This species is difficult to detect by signs.
Western Ringtail Possum, ngwayir (<i>Pseudocheirus occidentalis</i>) (T-CR)	See main text	Present. See main text
Woylie, Brush-tailed Bettong (<i>Bettongia penicillata</i> subsp. <i>ogilbyi</i>) (T-CR)	Current habitat includes tall eucalypt forest and woodland, dense myrtaceous shrubland, Kwongan (proteaceous) or mallee heath (Yeatman and Groom 2012 and references therein). Thickets and other suitable habitat types such as heath, provide refuges for woylies against predators.	Highly Unlikely. Suitable habitat exists, however the lack of secure, baited reserves in the Survey Area reduces the likelihood of this species being present.
Quenda, Southern Brown Bandicoot (<i>Isoodon obesulus</i> subsp. <i>fusciventer</i>) (P4)	See main text.	Present. See main text
Western Brush Wallaby (<i>Macropus irma</i>) (P4)	Habitat includes open forest or woodland, particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets. It is also found in some areas of mallee and heathland, and is uncommon in karri forest.	Unlikely. Potentially suitable habitat occurs, but no scats were observed during the survey.
Water-rat, Rakali (<i>Hydromys chrysogaster</i>) (P4)	See main text	Likely. See discussion in main text

Taxon	Habitat	Likelihood of Occurrence
Birds		
Australasian Bittern (<i>Botaurus poiciloptilus</i>) T (EN)	Densely vegetated freshwater wetlands and, rarely, in estuaries or tidal wetlands. In the southwest of Western Australia, the Bittern is found in beds of tall rush mixed with or near short fine sedge or open pools. It also occurs around swamps, lakes, pools, rivers and channels fringed with lignum <i>Muehlenbeckia</i> , cane grass <i>Eragrostis</i> or other dense vegetation (Marchant & Higgins 1990). It occasionally ventures into areas of open water or onto banks. Brackish water is tolerated in estuaries and tidal wetlands; sea coasts are avoided (Pickering 2013)	Highly Unlikely. No suitable habitat exists within the Study Area.
Baudin's Cockatoo, Long-billed black-cockatoo (<i>Calyptorhynchus baudinii</i>) T (EN)	See main text.	Present. See main text
Blue-billed Duck (<i>Oxyura australis</i>) (P4)	Prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. The species is completely aquatic, swimming low in the water along the edge of dense cover. Feeds by day far from the shore, particularly if dense cover is available in the central parts of the wetland. They feed on the bottom of swamps eating seeds, buds, stems, leaves, fruit and small aquatic insects such as the larvae of midges, caddisflies and dragonflies. Blue-billed Ducks are partly migratory, with short-distance movements between breeding swamps and overwintering lakes with some long-distance dispersal to breed during spring and early summer.	Highly Unlikely. No large permanent wetlands with open water are present.
Carnaby's Cockatoo, Short-billed black-cockatoo (<i>Calyptorhynchus latirostris</i>) T (EN)	See main text.	Present. See main text.
Eastern Curlew (<i>Numenius madagascariensis</i>) T (CR) & IA	Open mossy or transitional bogs, moss-lichen bogs and wet meadows, and on the swampy shores of small lakes; in the non-breeding season it is essentially coastal, occurring at estuaries, mangrove swamps, saltmarshes and intertidal flats, particularly those with extensive seagrass (<i>Zosteraceae</i>) meadows. BirdLife Australia http://www.birdlife.org.au/bird-profile/eastern-curlew	Highly Unlikely. No suitable habitat exists within the Survey Area.
Forest Red-tailed Black-Cockatoo (<i>Calyptorhynchus banksii subsp. naso</i>) T (VU)	See main text	Present. See main text.
Noisy Scrub-bird, Tjamiluk (<i>Atrichornis clamosus</i>) T (EN)	The Noisy Scrub-bird inhabits ecological communities that support a dense understorey or lower stratum of sedges and shrubs, a dense accumulation of leaf litter and an abundant population of litter-dwelling invertebrates. In the area between Oyster Harbour and Cheyne Beach, the core areas of male Noisy Scrub-bird territories are found in dense, long-unburnt vegetation characterised as low forest (5-15 m high), scrub/thicket and (rarely) heath. These vegetation formations occur in the gullies and drainage lines of hills and granite mountains and, in lowland areas, in overgrown swamps, lake margins and beside streams (Danks <i>et al.</i> 1996).	Highly Unlikely. No suitable habitat exists within the Survey Area.
Osprey, Eastern Osprey (<i>Pandion cristatus</i>) (AI)	Require extensive areas of open fresh, brackish or saline water for foraging. Frequent a variety of wetland habitats including inshore waters, reefs, bays, coastal cliffs, beaches, estuaries, mangrove swamps, broad rivers, reservoirs and large lakes and waterholes (DotE 2019)	Highly Unlikely. No suitable habitat exists within the Survey Area.
Recherche Cape Barren Goose (<i>Cereopsis novaehollandiae</i>) T (VU)	There is little published information available on the habitat of the Cape Barren Goose (south-western). It occurs on offshore islands and rocks, and at adjacent sites on the mainland. It inhabits grasslands and low fields of succulent herbs (comprised of <i>Carpobrotus</i> sp.), and occasionally occurs in open areas in taller and denser vegetation (although islands that are covered by woodlands or thickets support few birds) (Halse <i>et al.</i> 1995; Johnstone & Storr 1998). The bird has also been recorded on and near lakes and freshwater 'soaks', on the mainland (Halse <i>et al.</i> 1995).	It is only an occasional visitor to Albany area. It was recorded in 2003 within 10 km of the Survey Area but no signs were observed during the survey. It is considered unlikely given the nature, scale and location of the Survey Area.

Taxon	Habitat	Likelihood of Occurrence
Western Bristlebird (<i>Dasyornis longirostris</i>) T (EN)	The Western Bristlebird is restricted to floristically diverse low dense coastal heathland. The distribution of the Western Bristlebird is fragmented, with populations in Fitzgerald National Park separated from those in the Hassell Beach/Waychincup National Park/Two Peoples Bay Nature Reserve area. Within this distribution, the species occurs in heathland that is 0.5–1.5 m tall, comprising a diverse variety of shrubs such as banksias, paperbarks, hakeas, sheoaks and <i>Leptospermum</i> sp. The Western Bristlebird occurs in similar areas to the Western Whipbird (<i>Psophodes nigrogularis nigrogularis</i>), Noisy Scrub-bird (<i>Atrichornis clamosus</i>) and the western subspecies of the Ground Parrot (<i>Pezoporus wallicus flaviventris</i>).	Highly Unlikely. No suitable habitat exists within the Survey Area.
Western Ground Parrot (<i>Pezoporus flaviventris</i>) T (CR)	The vegetation types used by Ground Parrots can be broadly characterised as sedgeland, temperate shrub heaths, temperate graminoid heaths or sub-tropical graminoid heaths (Burbidge <i>et al.</i> 1997). There is only one population remaining of the western subspecies of the Ground Parrot, in coastal heath east of Albany in southwest Western Australia. There are only two remaining areas of refuge, Arid and Fitzgerald River National Parks, with about 110 individuals still thought to live in the wild.	Highly Unlikely. No suitable habitat exists within the Survey Area.
Western Whipbird (western heath) [<i>Psophodes nigrogularis subsp. nigrogularis</i>] T (EN)	The western heath subspecies of the Western Whipbird is known only to occur in one small population in south Western Australia, in the Two-Peoples Bay- Mt Manypeaks region. The population at Two Peoples Bay-Mt Manypeaks region is estimated as less than 100 pairs and occurs in dense coastal heath (Simpson and Day, 2004, Smith, 1991). The preferred habitat is thicket, a two to three-metre-high formation of varied floristic composition. Other vegetation associations are used infrequently, although all nests are usually found in dense heath adjacent to areas of thicket (Smith, 1991). Restricted to a small coastal strip east of Albany from Two Peoples Bay and Mount Gardner in the south west to about Cape Riche Road in the north east, with the South Coast Highway as an approximate inland boundary. In this area it occurs in heath-like thicket associations on coastal dunes and in low, dense mallee woodland or shrubland with understorey of dense, stunted shrubs	Unlikely. The western heath subspecies of the Western Whipbird is restricted to the dense coastal heath in the Two-Peoples Bay- Mt Manypeaks region, east of the Survey Area. Given this species very specific habitat it is unlikely to occur in the Survey Area.
Malleefowl (<i>Leipoa ocellata</i>) T (VU)	Malleefowl are large and distinctive ground-dwelling birds. They occur in shrublands and low woodlands that are dominated by mallee vegetation throughout the wheatbelt and Jarrah forests, and coastal areas east of Waychincup.	Highly unlikely. No suitable habitat present. Out of current known range.
Fork-tailed Swift, Pacific Swift (<i>Apus pacificus</i>) (IA)	The Fork-tailed Swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. Does not breed in Australia.	Possible, but does not use on-ground habitat.
Glossy ibis (<i>Plegadis falcinellus</i>) (IA)	Non-breeding visitor to the south-west of Western Australia. Requires shallow water and mudflats, so is found in well-vegetated wetlands, floodplains (http://www.birdlife.org.au/bird-profile/glossy-ibis)	Highly unlikely. No suitable habitat present.
Masked Owl (southern subsp) (<i>Tyto novaehollandiae subsp. Novaehollandiae</i>) (P3)	Inhabits forests, woodlands, timbered waterways and open country on the fringe of these areas. The main requirements are tall Eucalypts with suitable hollows for nesting and roosting and adjacent areas for foraging that support an abundance of principally terrestrial mammals, although arboreal mammals can also be taken. Also use caves for nesting. Masked Owls are territorial, and pairs remain in or near the territory all year round (Garnett 2000).	Possible. Hollows suitable for nesting are present and abundant terrestrial mammals (Quenda) as prey also present.
Peregrine Falcon (<i>Falco peregrinus</i>) (OS)	A variety of habitats from woodlands to open grasslands and coastal cliffs. Prey consists of other birds. It requires abundant prey and secure nest sites, and prefers coastal and inland cliffs or open woodlands near water. http://www.birdlife.org.au/bird-profile/peregrine-falcon	Possible. Suitable habitat exists (all forest/woodland vegetation communities) however this species is not common.
Migratory Shorebirds		
Lesser Sand Plover (<i>Charadrius mongolus</i>) T (EN) & IA	Shorebirds are a group of wading birds that can be found feeding on swamps, tidal mudflats, beaches and open country.	Highly Unlikely. No suitable habitat exists within the Survey Area.
Great Knot (<i>Calidris tenuirostris</i>) T (CR) & IA	All those listed are migratory and do not breed in Australia, except for the Hooded Plover which breeds on sandy beaches, and also occurs on inland salt lakes in the South West of WA.	
Curlew Sandpiper (<i>Calidris ferruginea</i>) T (CR) & IA		

Taxon	Habitat	Likelihood of Occurrence
Ruddy Turnstone (<i>Arenaria interpres</i>) IA		
Sharp-tailed Sandpiper (<i>Calidris acuminata</i>)		
Sanderling (<i>Calidris alba</i>) IA		
Red-necked Stint (<i>Calidris ruficollis</i>) IA		
Greater Sand Plover (<i>Charadrius leschenaultii</i>) IA		
Bar-tailed Godwit (<i>Limosa lapponica</i>) IA		
Black-tailed Godwit (<i>Limosa limosa</i>) IA		
Whimbrel (<i>Numenius phaeopus</i>) IA		
Pacific Golden Plover (<i>Pluvialis fulva</i>)		
Grey Plover (<i>Pluvialis squatarola</i>) IA		
Grey-tailed Tattler (<i>Tringa brevipes</i>) IA		
Wood Sandpiper (<i>Tringa glareola</i>) IA		
Ruff Reeve (<i>Philomachus pugnax</i>) IA		
Hooded Plover (<i>Thinornis rubricollis</i>) IA		
Common Greenshank, greenshank (<i>Tringa nebularia</i>) IA		
Marsh Sandpiper, little greenshank (<i>Tringa stagnatilis</i>) IA		
Terek Sandpiper (<i>Xenus cinereus</i>) IA		
Reptiles		
Short-nosed Snake (<i>Elapognathus minor</i>) (P2)	See main text	Possible. See discussion in main text
Fish		
Balston's Pygmy Perch (<i>Nannatherina balstoni</i>) T (VU)	Inhabits acidic, tannin-stained freshwater pools, streams and lakes in peat flats within 30 km of the coast Margaret River and Two People's Bay. Typically found in freshwater with a pH range of 3.0–6.5 and seasonally fluctuating temperatures of 11–30 °C. It is typically found amongst inundated riparian vegetation where it is thought to feed and spawn, though adults are also found in open water. Larvae tend to be confined to shallow water < 10 cm deep amongst the flooded riparian vegetation, and as the larvae increase in size they gradually move to deeper waters (Morgan <i>et al.</i> 1995).	Highly Unlikely. No suitable habitat exists within the Survey Area.
Mud Minnow, Western Dwarf Galaxias (<i>Galaxiella munda</i>) T (EN)	Occurs in swift flowing streams within karri forests and is typically found near submerged vegetation, occasionally in the still water of ponds, swamps and roadside drains, and often inhabiting darkly tannin-stained and acidic water	Highly Unlikely. No suitable habitat exists within the Survey Area.
Pouched Lamprey (<i>Geotria australis</i>) (P3)	Adults spawn in the headwaters of freshwater rivers and streams, and when the larvae or ammocoetes hatch, they drift downstream and burrow into soft muddy sediments. They spend the next few years filter-feeding on micro-organisms from the water above. After metamorphosis, young adults migrate downstream to estuaries and coastal waters, where they feed parasitically by rasping flesh from other fishes with their toothy tongues. They eventually cease feeding and migrate back to freshwater to breed (Bray and Gomon 2011)	Highly Unlikely. No suitable habitat exists within the Survey Area.
Black-stripe Minnow, Black-striped Dwarf Galaxias (<i>Galaxiella nigrostriata</i>) T (EN)	Found only in coastal wetlands of south-west Western Australia. During summer when ephemeral pools dry out, they burrow into the moist soil below and aestivate until the rains return in autumn (Bray and Gomon 2011)	Highly Unlikely. No suitable habitat exists within the Survey Area.

Taxon	Habitat	Likelihood of Occurrence
Salamanderfish (<i>Lepidogalaxias salamandroides</i>) T (EN)	Live in small semi-permanent (ephemeral) pools and shallow streams and drains in generally acidic water around pH 4. Feeds mainly on aquatic insect larvae and small crustaceans. Are uniquely adapted to survive the desiccation of their habitat. When pools dry out, they burrow into the damp bottom sand which remains moistened by ground water (Allen et al 2002; Bray 2017)	Highly Unlikely. The species was recorded Lake Powel in 1976, but has since been found to be endemic to temperate freshwaters of south-west Western Australia, and known only from heathland peat flats between the Blackwood and Kent Rivers (Bray 2017)
Invertebrates		
Carter's Freshwater Mussel (<i>Westralunio carteri</i>) T (VU)	See main text	Possible. See discussion in main text
Banksia brownii plant-louse (<i>Trioza barrettae</i>) T (EN)	Current records from the Stirling Range NP and the Vancouver Peninsula (Taylor and Moir 2014). It is closely associated with its only known host plant <i>Banksia brownii</i> .	Highly Unlikely. No <i>Banksia brownii</i> populations are present.
Western Archaeid Spider (<i>Zephyrarchaea mainae</i>) T (VU)	Associated with Gondwanan refugial habitats. Requires long unburnt low coastal peppermint (<i>Agonis flexuosa</i>) woodland with a coastal heath understorey and leaf litter accumulating on top of the understorey sedges (<i>Lepidosperma</i> and Restionaceae) that remain most throughout the year (Rix and Harvey 2009). Specimens have been collected by beating and sifting sedges and low shrubs in dense coastal or near-coastal groves of Peppermint (<i>Agonis</i> sp.), with several outlying populations also known from wet Karri (<i>Eucalyptus diversicolor</i>) forest (Rix and Harvey 2012).	Highly unlikely, no suitable habitat exists within the Survey Area
Woolybush bee (<i>Hylaeus globuliferus</i>) (P3)	See main text	Possible. See discussion in main text
Helicarionid land snail (<i>Helicarion castanea</i>) (EX)	Unknown.	Highly Unlikely. Habitat unknown. Presumed Extinct

13 APPENDIX F - Significant Flora, Weed and Tree Locations

F1. Conservation Significant flora locations.

Taxon	Count	Easting	Northing	Zone	Cons_Code	SurveyDate
<i>Andersonia</i> sp. Jamesii (J. Liddelow 84)	2	574146	6126842	50	P4	22/11/2017
<i>Andersonia</i> sp. Jamesii (J. Liddelow 84)	4	574144	6126841	50	P4	22/11/2017
<i>Andersonia</i> sp. Jamesii (J. Liddelow 84)	2	574166	6126838	50	P4	28/11/2017
<i>Andersonia</i> sp. Jamesii (J. Liddelow 84)	4	574152	6126812	50	P4	28/11/2017
<i>Andersonia</i> sp. Jamesii (J. Liddelow 84)	1	574164	6126832	50	P4	28/11/2017
<i>Andersonia</i> sp. Jamesii (J. Liddelow 84)	1	574166	6126843	50	P4	28/11/2017
<i>Andersonia</i> sp. Jamesii (J. Liddelow 84)	1	574158	6126809	50	P4	28/11/2017
<i>Andersonia</i> sp. Jamesii (J. Liddelow 84)	1	574157	6126809	50	P4	28/11/2017
<i>Andersonia</i> sp. Jamesii (J. Liddelow 84)	1	574155	6126810	50	P4	28/11/2017
<i>Andersonia</i> sp. Jamesii (J. Liddelow 84)	1	574168	6126829	50	P4	28/11/2017
<i>Andersonia</i> sp. Jamesii (J. Liddelow 84)	1	574149	6126806	50	P4	28/11/2017
<i>Andersonia</i> sp. Jamesii (J. Liddelow 84)	1	574124	6126804	50	P4	28/11/2017
<i>Andersonia</i> sp. Jamesii (J. Liddelow 84)	1	574148	6126823	50	P4	28/11/2017
<i>Andersonia</i> sp. Jamesii (J. Liddelow 84)	1	575014	6130503	50	P3	20/02/2018
<i>Andersonia</i> sp. Jamesii (J. Liddelow 84)	1	575065	6130455	50	P4	8/08/2019
<i>Boronia crassipes</i>	10	574428	6127437	50	P3	26/11/2017
<i>Boronia crassipes</i>	5	574410	6127430	50	P3	26/11/2017
<i>Boronia crassipes</i>	20	574401	6127426	50	P3	26/11/2017
<i>Boronia crassipes</i>	6	574388	6127422	50	P3	26/11/2017
<i>Boronia crassipes</i>	5	574374	6127418	50	P3	26/11/2017
<i>Boronia crassipes</i>	5	574452	6127424	50	P3	26/11/2017
<i>Boronia crassipes</i>	100	574316	6127403	50	P3	26/11/2017
<i>Boronia crassipes</i>	15	574275	6127405	50	P3	26/11/2017
<i>Boronia crassipes</i>	100	574253	6127405	50	P3	26/11/2017
<i>Boronia crassipes</i>	750	574500	6127451	50	P3	26/11/2017
<i>Boronia crassipes</i>	1	574266	6127408	50	P3	27/11/2017
<i>Boronia crassipes</i>	1	574274	6127391	50	P3	27/11/2017
<i>Synaphea incurva</i>	1	574217	6126580	50	P1	22/11/2017
<i>Synaphea incurva</i>	4	574298	6127572	50	P1	22/11/2017
<i>Synaphea incurva</i>	3	574217	6126562	50	P1	22/11/2017
<i>Thysanotus isantherus</i>	1	578872	6124100	50	P4	7/11/2017
<i>Thysanotus isantherus</i>	1	578964	6124166	50	P4	7/11/2017

F2. Significant weed locations.

Taxon	Status	Easting	Northing	SurveyDate
<i>Asparagus asparagoides</i>	WONS	573748	6126781	22/11/2017
<i>Asparagus asparagoides</i>	WONS	578591	6124174	23/11/2017
<i>Lantana camara</i>	WONS	578768	6124375	23/11/2017
<i>Rubus fruticosus aggregate</i>	WONS	573750	6126779	22/11/2017
<i>Rubus fruticosus aggregate</i>	WONS	578816	6124060	23/11/2017
<i>Rubus fruticosus aggregate</i>	WONS	578770	6124240	23/11/2017
<i>Rubus fruticosus aggregate</i>	WONS	578774	6124125	23/11/2017
<i>Rubus fruticosus aggregate</i>	WONS	578767	6124106	23/11/2017
<i>Rubus fruticosus aggregate</i>	WONS	576754	6124737	23/11/2017
<i>Rubus fruticosus aggregate</i>	WONS	574435	6127389	24/11/2017
<i>Rubus fruticosus aggregate</i>	WONS	574277	6127385	27/11/2017
<i>Rubus fruticosus aggregate</i>	WONS	574269	6127376	27/11/2017
<i>Rubus fruticosus aggregate</i>	WONS	574210	6127373	27/11/2017
<i>Rubus fruticosus aggregate</i>	WONS	574599	6127487	27/11/2017
<i>Rubus fruticosus aggregate</i>	WONS	575023	6130503	30/11/2017
<i>Rubus fruticosus aggregate</i>	WONS	574989	6130535	30/11/2017
<i>Rubus fruticosus aggregate</i>	WONS	576189	6124831	30/11/2017
<i>Ulex europaeus</i>	WONS	573763	6126758	22/11/2017
<i>Ulex europaeus</i>	WONS	573818	6126574	22/11/2017
<i>Ulex europaeus</i>	WONS	578812	6124053	23/11/2017

Taxon	Status	Easting	Northing	SurveyDate
<i>Ulex europaeus</i>	WONS	578811	6124064	23/11/2017
<i>Zantedeschia aethiopica</i>	Declared Pest	578624	6124155	23/11/2017
<i>Zantedeschia aethiopica</i>	Declared Pest	574405	6127547	24/11/2017

F3. Potential Black Cockatoo breeding tree locations.

Flora_sp	Easting	Northing	DBH_mm_	Zone	Hollow	Hollow_Sz
<i>Corymbia calophylla</i>	574249	6125823	500	50	0	
<i>Corymbia calophylla</i>	574246	6125835	500	50	0	
<i>Corymbia calophylla</i>	574245	6125905	500	50	0	
<i>Corymbia calophylla</i>	573667	6126346	500	50	0	
<i>Corymbia calophylla</i>	574205	6126477	500	50	0	
<i>Corymbia calophylla</i>	578343	6124336	500	50	0	
<i>Corymbia calophylla</i>	578652	6124298	500	50	0	
<i>Corymbia calophylla</i>	578619	6124378	500	50	0	
<i>Corymbia calophylla</i>	578629	6124426	500	50	0	
<i>Corymbia calophylla</i>	578845	6123969	500	50	0	
<i>Corymbia calophylla</i>	576775	6124631	500	50	0	
<i>Corymbia calophylla</i>	574302	6127653	500	50	0	
<i>Corymbia calophylla</i>	574368	6129128	500	50	0	
<i>Corymbia calophylla</i>	578790	6124034	505	50	0	
<i>Corymbia calophylla</i>	574365	6125864	510	50	0	
<i>Corymbia calophylla</i>	574243	6125826	510	50	0	
<i>Corymbia calophylla</i>	574252	6125903	510	50	0	
<i>Corymbia calophylla</i>	573738	6126920	510	50	0	
<i>Corymbia calophylla</i>	573726	6126402	510	50	0	
<i>Corymbia calophylla</i>	578663	6124278	510	50	0	
<i>Corymbia calophylla</i>	574227	6125552	510	50	0	
<i>Corymbia calophylla</i>	574364	6125759	510	50	0	
<i>Corymbia calophylla</i>	578763	6124178	515	50	0	
<i>Corymbia calophylla</i>	578780	6124162	515	50	0	
<i>Corymbia calophylla</i>	578631	6124305	520	50	0	
<i>Corymbia calophylla</i>	576785	6124720	520	50	0	
<i>Corymbia calophylla</i>	574422	6125821	520	50	0	
<i>Corymbia calophylla</i>	574360	6125847	520	50	0	
<i>Corymbia calophylla</i>	578774	6124119	520	50	0	
<i>Corymbia calophylla</i>	574233	6125920	520	50	0	
<i>Corymbia calophylla</i>	573630	6126927	520	50	0	
<i>Corymbia calophylla</i>	573816	6126871	520	50	0	
<i>Corymbia calophylla</i>	574205	6126519	520	50	0	
<i>Corymbia calophylla</i>	578877	6124385	520	50	0	
<i>Corymbia calophylla</i>	578622	6124367	520	50	0	
<i>Corymbia calophylla</i>	576762	6124696	520	50	0	
<i>Corymbia calophylla</i>	574350	6129139	520	50	0	
<i>Corymbia calophylla</i>	574399	6125795	520	50	0	
<i>Corymbia calophylla</i>	578843	6124027	525	50	0	
<i>Corymbia calophylla</i>	573801	6126738	530	50	0	
<i>Corymbia calophylla</i>	578662	6124304	530	50	0	

Flora_sp	Easting	Northing	DBH_mm_	Zone	Hollow	Hollow_Sz
<i>Corymbia calophylla</i>	578683	6124398	530	50	0	
<i>Corymbia calophylla</i>	578666	6124387	530	50	0	
<i>Corymbia calophylla</i>	578653	6124394	530	50	0	
<i>Corymbia calophylla</i>	576756	6124647	530	50	0	
<i>Corymbia calophylla</i>	576826	6124694	535	50	0	
<i>Corymbia calophylla</i>	574439	6125820	540	50	0	
<i>Corymbia calophylla</i>	578623	6124424	540	50	0	
<i>Corymbia calophylla</i>	578779	6123986	540	50	0	
<i>Corymbia calophylla</i>	578792	6124040	540	50	0	
<i>Corymbia calophylla</i>	578842	6124018	540	50	0	
<i>Corymbia calophylla</i>	574319	6129083	540	50	0	
<i>Corymbia calophylla</i>	574322	6129121	540	50	0	
<i>Corymbia calophylla</i>	574326	6127624	540	50	0	
<i>Corymbia calophylla</i>	578682	6124225	545	50	0	
<i>Corymbia calophylla</i>	578858	6124195	545	50	0	
<i>Corymbia calophylla</i>	574326	6125885	550	50	0	
<i>Corymbia calophylla</i>	574250	6125913	550	50	0	
<i>Corymbia calophylla</i>	574061	6126412	550	50	0	
<i>Corymbia calophylla</i>	573763	6126590	550	50	0	
<i>Corymbia calophylla</i>	578457	6124573	550	50	0	
<i>Corymbia calophylla</i>	578840	6124232	550	50	0	
<i>Corymbia calophylla</i>	578760	6124400	550	50	0	
<i>Corymbia calophylla</i>	578614	6124379	550	50	0	
<i>Corymbia calophylla</i>	578587	6124408	550	50	0	
<i>Corymbia calophylla</i>	574315	6129064	550	50	0	
<i>Corymbia calophylla</i>	576739	6124686	550	50	0	
<i>Corymbia calophylla</i>	574329	6129069	550	50	0	
<i>Corymbia calophylla</i>	574302	6125875	560	50	0	
<i>Corymbia calophylla</i>	574234	6125961	560	50	0	
<i>Corymbia calophylla</i>	573669	6126273	560	50	0	
<i>Corymbia calophylla</i>	578886	6124254	560	50	0	
<i>Corymbia calophylla</i>	576795	6124622	560	50	0	
<i>Corymbia calophylla</i>	578686	6124214	565	50	0	
<i>Corymbia calophylla</i>	578841	6124242	565	50	0	
<i>Corymbia calophylla</i>	578791	6124041	570	50	0	
<i>Corymbia calophylla</i>	574228	6125881	570	50	0	
<i>Corymbia calophylla</i>	574086	6126449	570	50	0	
<i>Corymbia calophylla</i>	573732	6126402	570	50	0	
<i>Corymbia calophylla</i>	578592	6124428	570	50	0	
<i>Corymbia calophylla</i>	578608	6124437	570	50	0	
<i>Corymbia calophylla</i>	574366	6125763	570	50	0	
<i>Corymbia calophylla</i>	574381	6125889	580	50	0	
<i>Corymbia calophylla</i>	574263	6125916	580	50	0	
<i>Corymbia calophylla</i>	573674	6126831	580	50	0	
<i>Corymbia calophylla</i>	573667	6126302	580	50	0	
<i>Corymbia calophylla</i>	578606	6124411	580	50	0	
<i>Corymbia calophylla</i>	576794	6124626	580	50	0	

Flora_sp	Easting	Northing	DBH_mm_	Zone	Hollow	Hollow_Sz
<i>Corymbia calophylla</i>	574229	6125703	580	50	0	
<i>Corymbia calophylla</i>	574391	6125758	590	50	0	
<i>Corymbia calophylla</i>	574425	6125790	590	50	0	
<i>Corymbia calophylla</i>	573673	6126266	590	50	0	
<i>Corymbia calophylla</i>	573668	6126228	590	50	0	
<i>Corymbia calophylla</i>	578649	6124361	590	50	0	
<i>Corymbia calophylla</i>	576781	6124663	590	50	0	
<i>Corymbia calophylla</i>	576762	6124635	590	50	0	
<i>Corymbia calophylla</i>	574227	6125620	590	50	0	
<i>Corymbia calophylla</i>	578857	6124231	595	50	0	
<i>Corymbia calophylla</i>	578721	6124227	595	50	0	
<i>Corymbia calophylla</i>	578850	6124044	600	50	0	
<i>Corymbia calophylla</i>	578795	6124035	600	50	0	
<i>Corymbia calophylla</i>	574233	6125845	600	50	0	
<i>Corymbia calophylla</i>	574065	6126343	600	50	0	
<i>Corymbia calophylla</i>	573824	6126895	600	50	0	
<i>Corymbia calophylla</i>	578880	6124361	600	50	0	
<i>Corymbia calophylla</i>	578661	6124341	600	50	0	
<i>Corymbia calophylla</i>	578602	6124349	600	50	0	
<i>Corymbia calophylla</i>	578633	6124364	600	50	0	
<i>Corymbia calophylla</i>	578567	6124242	600	50	0	
<i>Corymbia calophylla</i>	578833	6124035	600	50	0	
<i>Corymbia calophylla</i>	574334	6127623	600	50	0	
<i>Corymbia calophylla</i>	574325	6127622	600	50	0	
<i>Corymbia calophylla</i>	574436	6125798	600	50	0	
<i>Corymbia calophylla</i>	578781	6124124	605	50	0	
<i>Corymbia calophylla</i>	574307	6127651	610	50	0	
<i>Corymbia calophylla</i>	578695	6124335	610	50	0	
<i>Corymbia calophylla</i>	574354	6125830	610	50	0	
<i>Corymbia calophylla</i>	578838	6123999	610	50	0	
<i>Corymbia calophylla</i>	574371	6127581	610	50	0	
<i>Corymbia calophylla</i>	574427	6125823	620	50	0	
<i>Corymbia calophylla</i>	578671	6124365	620	50	0	
<i>Corymbia calophylla</i>	578772	6123990	620	50	0	
<i>Corymbia calophylla</i>	576856	6124644	630	50	0	
<i>Corymbia calophylla</i>	574366	6125900	630	50	0	
<i>Corymbia calophylla</i>	574248	6125835	630	50	0	
<i>Corymbia calophylla</i>	578870	6124022	630	50	0	
<i>Corymbia calophylla</i>	574398	6125832	630	50	0	
<i>Corymbia calophylla</i>	574367	6125839	630	50	0	
<i>Corymbia calophylla</i>	574161	6126416	630	50	0	
<i>Corymbia calophylla</i>	573808	6126864	630	50	0	
<i>Corymbia calophylla</i>	578795	6124038	630	50	0	
<i>Corymbia calophylla</i>	576781	6124646	630	50	0	
<i>Corymbia calophylla</i>	576721	6124696	630	50	0	
<i>Corymbia calophylla</i>	574255	6125828	640	50	0	
<i>Corymbia calophylla</i>	578839	6124034	640	50	0	

Flora_sp	Easting	Northing	DBH_mm_	Zone	Hollow	Hollow_Sz
<i>Corymbia calophylla</i>	573727	6126241	640	50	0	
<i>Corymbia calophylla</i>	578664	6124285	640	50	0	
<i>Corymbia calophylla</i>	576763	6124729	640	50	0	
<i>Corymbia calophylla</i>	574346	6127605	640	50	0	
<i>Corymbia calophylla</i>	578835	6124031	650	50	0	
<i>Corymbia calophylla</i>	574320	6125882	650	50	0	
<i>Corymbia calophylla</i>	576860	6124678	650	50	0	
<i>Corymbia calophylla</i>	578433	6124578	650	50	0	
<i>Corymbia calophylla</i>	574316	6129137	650	50	0	
<i>Corymbia calophylla</i>	578764	6124170	655	50	0	
<i>Corymbia calophylla</i>	578819	6124046	655	50	0	
<i>Corymbia calophylla</i>	576832	6124696	655	50	0	
<i>Corymbia calophylla</i>	574278	6125874	660	50	0	
<i>Corymbia calophylla</i>	574320	6125895	660	50	0	
<i>Corymbia calophylla</i>	574277	6125885	660	50	0	
<i>Corymbia calophylla</i>	574365	6125878	660	50	0	
<i>Corymbia calophylla</i>	574338	6127622	660	50	0	
<i>Corymbia calophylla</i>	574225	6125598	660	50	0	
<i>Corymbia calophylla</i>	578800	6124246	670	50	0	
<i>Corymbia calophylla</i>	578645	6124342	670	50	0	
<i>Corymbia calophylla</i>	578613	6124411	670	50	0	
<i>Corymbia calophylla</i>	574319	6127621	670	50	0	
<i>Corymbia calophylla</i>	578611	6124241	680	50	0	
<i>Corymbia calophylla</i>	574229	6125934	680	50	0	
<i>Corymbia calophylla</i>	576784	6124653	680	50	0	
<i>Corymbia calophylla</i>	574226	6125558	690	50	0	
<i>Corymbia calophylla</i>	574233	6125887	690	50	0	
<i>Corymbia calophylla</i>	574086	6126340	690	50	0	
<i>Corymbia calophylla</i>	574023	6126349	690	50	0	
<i>Corymbia calophylla</i>	573700	6126254	690	50	0	
<i>Corymbia calophylla</i>	574230	6125873	690	50	0	
<i>Corymbia calophylla</i>	578659	6124278	690	50	0	
<i>Corymbia calophylla</i>	578652	6124243	690	50	0	
<i>Corymbia calophylla</i>	578605	6124425	690	50	0	
<i>Corymbia calophylla</i>	574287	6125756	690	50	0	
<i>Corymbia calophylla</i>	574407	6125804	690	50	0	
<i>Corymbia calophylla</i>	578822	6124226	695	50	0	
<i>Corymbia calophylla</i>	578698	6124260	700	50	0	
<i>Corymbia calophylla</i>	574232	6125789	700	50	0	
<i>Corymbia calophylla</i>	574234	6126544	700	50	0	
<i>Corymbia calophylla</i>	574027	6126307	700	50	0	
<i>Corymbia calophylla</i>	573665	6126213	700	50	0	
<i>Corymbia calophylla</i>	578671	6124359	700	50	0	
<i>Corymbia calophylla</i>	574333	6128180	700	50	0	
<i>Corymbia calophylla</i>	574318	6129131	700	50	0	
<i>Corymbia calophylla</i>	574228	6125588	700	50	0	
<i>Corymbia calophylla</i>	574376	6125798	700	50	0	

Flora_sp	Easting	Northing	DBH_mm_	Zone	Hollow	Hollow_Sz
<i>Corymbia calophylla</i>	578761	6124143	710	50	0	
<i>Corymbia calophylla</i>	574247	6125869	710	50	0	
<i>Corymbia calophylla</i>	574348	6125884	710	50	0	
<i>Corymbia calophylla</i>	574323	6129069	710	50	0	
<i>Corymbia calophylla</i>	574419	6125799	710	50	0	
<i>Corymbia calophylla</i>	578830	6124224	715	50	0	
<i>Corymbia calophylla</i>	574224	6125420	720	50	0	
<i>Corymbia calophylla</i>	574380	6125885	720	50	0	
<i>Corymbia calophylla</i>	574280	6125905	720	50	0	
<i>Corymbia calophylla</i>	578615	6124395	720	50	0	
<i>Corymbia calophylla</i>	576770	6124724	720	50	0	
<i>Corymbia calophylla</i>	578737	6124255	725	50	0	
<i>Corymbia calophylla</i>	574300	6127650	730	50	0	
<i>Corymbia calophylla</i>	574256	6126513	740	50	0	
<i>Corymbia calophylla</i>	573732	6126390	740	50	0	
<i>Corymbia calophylla</i>	578627	6124395	740	50	0	
<i>Corymbia calophylla</i>	574250	6125855	750	50	0	
<i>Corymbia calophylla</i>	578825	6124225	750	50	0	
<i>Corymbia calophylla</i>	574226	6125926	760	50	0	
<i>Corymbia calophylla</i>	574343	6129082	760	50	0	
<i>Corymbia calophylla</i>	574376	6125933	770	50	0	
<i>Corymbia calophylla</i>	573728	6126278	770	50	0	
<i>Corymbia calophylla</i>	574377	6127575	770	50	0	
<i>Corymbia calophylla</i>	574226	6125699	770	50	0	
<i>Corymbia calophylla</i>	574065	6126334	780	50	0	
<i>Corymbia calophylla</i>	576732	6124686	780	50	0	
<i>Corymbia calophylla</i>	574254	6125820	790	50	0	
<i>Corymbia calophylla</i>	578606	6124239	790	50	0	
<i>Corymbia calophylla</i>	574227	6125430	790	50	0	
<i>Corymbia calophylla</i>	578647	6124382	800	50	0	
<i>Corymbia calophylla</i>	578863	6124020	800	50	0	
<i>Corymbia calophylla</i>	574285	6125886	800	50	0	
<i>Corymbia calophylla</i>	574346	6125888	800	50	0	
<i>Corymbia calophylla</i>	573683	6126252	810	50	0	
<i>Corymbia calophylla</i>	574360	6125916	810	50	0	
<i>Corymbia calophylla</i>	574342	6129114	820	50	0	
<i>Corymbia calophylla</i>	576849	6124651	830	50	0	
<i>Corymbia calophylla</i>	578710	6124310	845	50	0	
<i>Corymbia calophylla</i>	574230	6125901	850	50	0	
<i>Corymbia calophylla</i>	578644	6124424	850	50	0	
<i>Corymbia calophylla</i>	578807	6124146	860	50	0	
<i>Corymbia calophylla</i>	578692	6124232	860	50	0	
<i>Corymbia calophylla</i>	578687	6124234	860	50	0	
<i>Corymbia calophylla</i>	578816	6124217	865	50	0	
<i>Corymbia calophylla</i>	574360	6125807	870	50	0	
<i>Corymbia calophylla</i>	574381	6127577	870	50	0	
<i>Corymbia calophylla</i>	578848	6124048	875	50	0	

Flora_sp	Easting	Northing	DBH_mm_	Zone	Hollow	Hollow_Sz
<i>Corymbia calophylla</i>	578627	6124322	880	50	0	
<i>Corymbia calophylla</i>	574296	6125763	880	50	0	
<i>Corymbia calophylla</i>	576774	6124663	890	50	0	
<i>Corymbia calophylla</i>	578821	6124045	890	50	0	
<i>Corymbia calophylla</i>	578809	6123954	900	50	0	
<i>Corymbia calophylla</i>	574240	6125819	910	50	0	
<i>Corymbia calophylla</i>	574056	6126413	920	50	0	
<i>Corymbia calophylla</i>	578697	6124408	920	50	0	
<i>Corymbia calophylla</i>	574023	6126316	940	50	0	
<i>Corymbia calophylla</i>	578674	6124316	940	50	0	
<i>Corymbia calophylla</i>	578686	6124414	970	50	0	
<i>Corymbia calophylla</i>	574144	6126587	980	50	0	
<i>Corymbia calophylla</i>	578812	6124009	980	50	0	
<i>Corymbia calophylla</i>	578700	6124242	985	50	0	
<i>Corymbia calophylla</i>	573676	6126911	990	50	0	
<i>Corymbia calophylla</i>	574288	6128495	1000	50	0	
<i>Corymbia calophylla</i>	574359	6125796	1000	50	0	
<i>Corymbia calophylla</i>	574269	6125874	1010	50	0	
<i>Corymbia calophylla</i>	574405	6125926	1030	50	0	
<i>Corymbia calophylla</i>	576788	6124626	1040	50	0	
<i>Corymbia calophylla</i>	574232	6125841	1070	50	0	
<i>Corymbia calophylla</i>	578802	6124253	1080	50	0	
<i>Corymbia calophylla</i>	574314	6125877	1080	50	0	
<i>Corymbia calophylla</i>	576783	6124628	1140	50	0	
<i>Corymbia calophylla</i>	574387	6125755	1150	50	0	
<i>Corymbia calophylla</i>	578749	6123993	1230	50	0	
<i>Corymbia calophylla</i>	574292	6127645	1300	50	0	
<i>Corymbia calophylla</i>	578399	6124601	550	50	0	
<i>Corymbia calophylla</i>	576761	6124672	550	50	1	100
<i>Corymbia calophylla</i>	576792	6124651	620	50	1	100
<i>Corymbia calophylla</i>	574323	6129121	730	50	1	100
<i>Corymbia calophylla</i>	576838	6124675	835	50	1	100
<i>Corymbia calophylla</i>	574365	6125885	660	50	2	100,100
<i>Corymbia calophylla</i>	573677	6126294	770	50	2	100,200
<i>Corymbia calophylla</i>	578790	6124037	510	50	1	150
<i>Corymbia calophylla</i>	578876	6124351	510	50	1	150
<i>Corymbia calophylla</i>	574227	6125564	540	50	1	150
<i>Corymbia calophylla</i>	578705	6124400	710	50	1	150
<i>Corymbia calophylla</i>	576774	6124673	950	50	1	150
<i>Corymbia calophylla</i>	578661	6124416	860	50	2	150,150
<i>Corymbia calophylla</i>	574314	6127600	690	50	3	150,150,150
<i>Corymbia calophylla</i>	578882	6124340	730	50	2	150,200
<i>Corymbia calophylla</i>	574341	6127608	520	50	1	200
<i>Corymbia calophylla</i>	578866	6124391	560	50	1	200
<i>Corymbia calophylla</i>	574285	6125875	570	50	1	200
<i>Corymbia calophylla</i>	573772	6126314	590	50	1	200
<i>Corymbia calophylla</i>	574440	6125815	620	50	1	200

Flora_sp	Easting	Northing	DBH_mm_	Zone	Hollow	Hollow_Sz
<i>Corymbia calophylla</i>	573672	6126288	630	50	1	200
<i>Corymbia calophylla</i>	578665	6124417	650	50	1	200
<i>Corymbia calophylla</i>	573696	6126255	670	50	1	200
<i>Corymbia calophylla</i>	573777	6126326	690	50	1	200
<i>Corymbia calophylla</i>	574422	6125869	760	50	1	200
<i>Corymbia calophylla</i>	578604	6124399	810	50	1	200
<i>Corymbia calophylla</i>	574363	6125826	940	50	1	200
<i>Corymbia calophylla</i>	574384	6125785	1060	50	1	200
<i>Corymbia calophylla</i>	573715	6126294	850	50	2	200,300
<i>Corymbia calophylla</i>	574407	6125804	690	50	1	300
<i>Corymbia calophylla</i>	578789	6124196	920	50	1	340
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	578802	6124152	500	50	0	
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	574130	6126445	500	50	0	
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	578696	6124401	510	50	0	
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	578824	6124226	520	50	0	
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	578767	6124019	590	50	0	
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	578803	6124042	595	50	0	
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	578785	6124210	600	50	0	
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	578884	6124185	635	50	0	
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	573980	6126497	640	50	0	
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	578803	6124249	660	50	0	
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	578788	6124167	670	50	0	
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	578798	6124234	670	50	0	
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	578820	6124228	770	50	0	
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	578801	6124254	820	50	0	
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	573718	6127025	1650	50	0	
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	574343	6128064	900	50	1	100
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	574318	6128030	730	50	1	100
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	573975	6126522	730	50	5	100,100,100,200,300
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	574370	6129121	530	50	1	150
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	578793	6124279	540	50	1	150
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	578785	6124299	560	50	1	150

Flora_sp	Easting	Northing	DBH_mm_	Zone	Hollow	Hollow_Sz
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	574228	6125608	620	50	1	150
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	574434	6125878	570	50	2	150,150
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	574385	6128520	820	50	1	200
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	578847	6124195	615	50	1	300
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	578873	6124367	1370	50	3	300,200,200
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	578799	6124239	690	50	1	400
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	578824	6124229	810	50	1	400
<i>Dead Stag of Eucalyptus marginata or Corymbia calophylla</i>	578786	6124174	985	50	1	400
<i>Eucalyptus gomphocephala</i>	574317	6129742	500	50	0	
<i>Eucalyptus gomphocephala</i>	574317	6129704	500	50	0	
<i>Eucalyptus gomphocephala</i>	574318	6129710	500	50	0	
<i>Eucalyptus gomphocephala</i>	578607	6124107	510	50	0	
<i>Eucalyptus gomphocephala</i>	578556	6124138	510	50	0	
<i>Eucalyptus gomphocephala</i>	578558	6124199	520	50	0	
<i>Eucalyptus gomphocephala</i>	578596	6124189	530	50	0	
<i>Eucalyptus gomphocephala</i>	578665	6124414	550	50	0	
<i>Eucalyptus gomphocephala</i>	578574	6124238	560	50	0	
<i>Eucalyptus gomphocephala</i>	578593	6124127	560	50	0	
<i>Eucalyptus gomphocephala</i>	578562	6124172	560	50	0	
<i>Eucalyptus gomphocephala</i>	578600	6124284	590	50	0	
<i>Eucalyptus gomphocephala</i>	578515	6124330	600	50	0	
<i>Eucalyptus gomphocephala</i>	578587	6124133	610	50	0	
<i>Eucalyptus gomphocephala</i>	578620	6124101	620	50	0	
<i>Eucalyptus gomphocephala</i>	578619	6124107	620	50	0	
<i>Eucalyptus gomphocephala</i>	574262	6126608	630	50	0	
<i>Eucalyptus gomphocephala</i>	578651	6124094	630	50	0	
<i>Eucalyptus gomphocephala</i>	578509	6124378	630	50	0	
<i>Eucalyptus gomphocephala</i>	578642	6124094	640	50	0	
<i>Eucalyptus gomphocephala</i>	578675	6124095	650	50	0	
<i>Eucalyptus gomphocephala</i>	578555	6124195	650	50	0	
<i>Eucalyptus gomphocephala</i>	578649	6124091	660	50	0	
<i>Eucalyptus gomphocephala</i>	578678	6124086	670	50	0	
<i>Eucalyptus gomphocephala</i>	578561	6124133	670	50	0	
<i>Eucalyptus gomphocephala</i>	578638	6124091	690	50	0	
<i>Eucalyptus gomphocephala</i>	578557	6124233	690	50	0	
<i>Eucalyptus gomphocephala</i>	578654	6124149	730	50	0	
<i>Eucalyptus gomphocephala</i>	578576	6124231	760	50	0	
<i>Eucalyptus gomphocephala</i>	578608	6124153	770	50	0	
<i>Eucalyptus gomphocephala</i>	578649	6124114	780	50	0	
<i>Eucalyptus gomphocephala</i>	578635	6124102	800	50	0	
<i>Eucalyptus gomphocephala</i>	578569	6124220	820	50	0	

Flora_sp	Easting	Northing	DBH_mm_	Zone	Hollow	Hollow_Sz
<i>Eucalyptus gomphocephala</i>	578566	6124226	820	50	0	
<i>Eucalyptus gomphocephala</i>	578587	6124163	830	50	0	
<i>Eucalyptus gomphocephala</i>	578514	6124308	830	50	0	
<i>Eucalyptus gomphocephala</i>	578579	6124228	860	50	0	
<i>Eucalyptus gomphocephala</i>	578512	6124348	870	50	0	
<i>Eucalyptus gomphocephala</i>	578587	6124300	880	50	0	
<i>Eucalyptus gomphocephala</i>	574322	6130081	880	50	0	
<i>Eucalyptus gomphocephala</i>	578595	6124176	890	50	0	
<i>Eucalyptus gomphocephala</i>	578605	6124041	900	50	0	
<i>Eucalyptus gomphocephala</i>	578714	6124153	910	50	0	
<i>Eucalyptus gomphocephala</i>	578604	6124108	920	50	0	
<i>Eucalyptus gomphocephala</i>	578599	6124125	920	50	0	
<i>Eucalyptus gomphocephala</i>	578533	6124219	950	50	0	
<i>Eucalyptus gomphocephala</i>	578508	6124375	990	50	0	
<i>Eucalyptus gomphocephala</i>	578633	6124071	1010	50	0	
<i>Eucalyptus gomphocephala</i>	578573	6124146	1020	50	0	
<i>Eucalyptus gomphocephala</i>	578674	6124132	1050	50	0	
<i>Eucalyptus gomphocephala</i>	578680	6124137	1070	50	0	
<i>Eucalyptus gomphocephala</i>	578596	6124075	1090	50	0	
<i>Eucalyptus gomphocephala</i>	578587	6124170	1140	50	0	
<i>Eucalyptus gomphocephala</i>	578605	6124232	1150	50	0	
<i>Eucalyptus gomphocephala</i>	578553	6124183	1220	50	0	
<i>Eucalyptus gomphocephala</i>	578644	6124156	1230	50	0	
<i>Eucalyptus gomphocephala</i>	578635	6124138	1250	50	0	
<i>Eucalyptus gomphocephala</i>	578651	6124165	1370	50	0	
<i>Eucalyptus gomphocephala</i>	578596	6124083	1559	50	0	
<i>Eucalyptus gomphocephala</i>	578478	6124299	1201	50	0	
<i>Eucalyptus gomphocephala</i>	578477	6124258	1100	50	0	
<i>Eucalyptus gomphocephala</i>	578343	6124290	950	50	0	
<i>Eucalyptus marginata</i>	574131	6126449	500	50	0	
<i>Eucalyptus marginata</i>	574113	6126443	500	50	0	
<i>Eucalyptus marginata</i>	574023	6126480	500	50	0	
<i>Eucalyptus marginata</i>	574040	6126450	500	50	0	
<i>Eucalyptus marginata</i>	573969	6126436	500	50	0	
<i>Eucalyptus marginata</i>	573996	6126531	500	50	0	
<i>Eucalyptus marginata</i>	573911	6126368	500	50	0	
<i>Eucalyptus marginata</i>	573829	6126336	500	50	0	
<i>Eucalyptus marginata</i>	573960	6126507	500	50	0	
<i>Eucalyptus marginata</i>	573819	6126433	500	50	0	
<i>Eucalyptus marginata</i>	573851	6126409	500	50	0	
<i>Eucalyptus marginata</i>	573832	6126377	500	50	0	
<i>Eucalyptus marginata</i>	574332	6128176	500	50	0	
<i>Eucalyptus marginata</i>	574317	6129017	500	50	0	
<i>Eucalyptus marginata</i>	574337	6128626	500	50	0	
<i>Eucalyptus marginata</i>	574236	6126685	510	50	0	
<i>Eucalyptus marginata</i>	574079	6126454	510	50	0	
<i>Eucalyptus marginata</i>	574047	6126461	510	50	0	

Flora_sp	Easting	Northing	DBH_mm_	Zone	Hollow	Hollow_Sz
<i>Eucalyptus marginata</i>	574038	6126430	510	50	0	
<i>Eucalyptus marginata</i>	574018	6126351	510	50	0	
<i>Eucalyptus marginata</i>	574001	6126484	510	50	0	
<i>Eucalyptus marginata</i>	573936	6126432	510	50	0	
<i>Eucalyptus marginata</i>	573914	6126422	510	50	0	
<i>Eucalyptus marginata</i>	573769	6126214	510	50	0	
<i>Eucalyptus marginata</i>	573827	6126363	510	50	0	
<i>Eucalyptus marginata</i>	574341	6128089	520	50	0	
<i>Eucalyptus marginata</i>	574008	6126397	520	50	0	
<i>Eucalyptus marginata</i>	574362	6125838	520	50	0	
<i>Eucalyptus marginata</i>	574070	6126512	520	50	0	
<i>Eucalyptus marginata</i>	573983	6126471	520	50	0	
<i>Eucalyptus marginata</i>	573732	6126914	520	50	0	
<i>Eucalyptus marginata</i>	573749	6126771	520	50	0	
<i>Eucalyptus marginata</i>	573825	6126770	520	50	0	
<i>Eucalyptus marginata</i>	573690	6126157	520	50	0	
<i>Eucalyptus marginata</i>	574321	6128115	530	50	0	
<i>Eucalyptus marginata</i>	574157	6126563	530	50	0	
<i>Eucalyptus marginata</i>	573755	6126290	530	50	0	
<i>Eucalyptus marginata</i>	573859	6126414	530	50	0	
<i>Eucalyptus marginata</i>	573822	6126407	530	50	0	
<i>Eucalyptus marginata</i>	574363	6128581	530	50	0	
<i>Eucalyptus marginata</i>	574367	6128124	540	50	0	
<i>Eucalyptus marginata</i>	574081	6126511	540	50	0	
<i>Eucalyptus marginata</i>	574090	6126618	540	50	0	
<i>Eucalyptus marginata</i>	578734	6124118	540	50	0	
<i>Eucalyptus marginata</i>	574125	6126550	540	50	0	
<i>Eucalyptus marginata</i>	573969	6126287	540	50	0	
<i>Eucalyptus marginata</i>	573734	6126758	540	50	0	
<i>Eucalyptus marginata</i>	573935	6126364	540	50	0	
<i>Eucalyptus marginata</i>	574016	6126619	540	50	0	
<i>Eucalyptus marginata</i>	573891	6126271	540	50	0	
<i>Eucalyptus marginata</i>	573802	6126271	540	50	0	
<i>Eucalyptus marginata</i>	573992	6126647	540	50	0	
<i>Eucalyptus marginata</i>	573915	6126439	540	50	0	
<i>Eucalyptus marginata</i>	573853	6126369	540	50	0	
<i>Eucalyptus marginata</i>	574135	6126437	540	50	0	
<i>Eucalyptus marginata</i>	574118	6126450	540	50	0	
<i>Eucalyptus marginata</i>	574404	6128379	540	50	0	
<i>Eucalyptus marginata</i>	574118	6126449	550	50	0	
<i>Eucalyptus marginata</i>	573974	6126365	550	50	0	
<i>Eucalyptus marginata</i>	573935	6126387	550	50	0	
<i>Eucalyptus marginata</i>	573865	6126341	550	50	0	
<i>Eucalyptus marginata</i>	573767	6126245	550	50	0	
<i>Eucalyptus marginata</i>	573743	6126243	550	50	0	
<i>Eucalyptus marginata</i>	573875	6126398	550	50	0	
<i>Eucalyptus marginata</i>	574144	6126440	550	50	0	

Flora_sp	Easting	Northing	DBH_mm_	Zone	Hollow	Hollow_Sz
<i>Eucalyptus marginata</i>	574157	6126458	550	50	0	
<i>Eucalyptus marginata</i>	574332	6128601	550	50	0	
<i>Eucalyptus marginata</i>	574351	6127582	550	50	0	
<i>Eucalyptus marginata</i>	573626	6126995	550	50	0	
<i>Eucalyptus marginata</i>	574295	6129238	550	50	0	
<i>Eucalyptus marginata</i>	574006	6126394	560	50	0	
<i>Eucalyptus marginata</i>	573987	6126464	560	50	0	
<i>Eucalyptus marginata</i>	574408	6125823	560	50	0	
<i>Eucalyptus marginata</i>	574230	6126013	560	50	0	
<i>Eucalyptus marginata</i>	574115	6126594	560	50	0	
<i>Eucalyptus marginata</i>	574041	6126474	560	50	0	
<i>Eucalyptus marginata</i>	574003	6126486	560	50	0	
<i>Eucalyptus marginata</i>	574008	6126535	560	50	0	
<i>Eucalyptus marginata</i>	573793	6126358	560	50	0	
<i>Eucalyptus marginata</i>	574307	6128519	560	50	0	
<i>Eucalyptus marginata</i>	573678	6126970	570	50	0	
<i>Eucalyptus marginata</i>	574092	6126363	570	50	0	
<i>Eucalyptus marginata</i>	573970	6126329	570	50	0	
<i>Eucalyptus marginata</i>	573970	6126400	570	50	0	
<i>Eucalyptus marginata</i>	573671	6126773	570	50	0	
<i>Eucalyptus marginata</i>	573831	6126219	570	50	0	
<i>Eucalyptus marginata</i>	573842	6126421	570	50	0	
<i>Eucalyptus marginata</i>	574298	6128020	570	50	0	
<i>Eucalyptus marginata</i>	574339	6128484	570	50	0	
<i>Eucalyptus marginata</i>	573676	6126966	570	50	0	
<i>Eucalyptus marginata</i>	574052	6126512	580	50	0	
<i>Eucalyptus marginata</i>	574045	6126515	580	50	0	
<i>Eucalyptus marginata</i>	573900	6126352	580	50	0	
<i>Eucalyptus marginata</i>	573884	6126421	580	50	0	
<i>Eucalyptus marginata</i>	574376	6128552	590	50	0	
<i>Eucalyptus marginata</i>	574340	6128072	590	50	0	
<i>Eucalyptus marginata</i>	574021	6126521	590	50	0	
<i>Eucalyptus marginata</i>	574227	6125602	590	50	0	
<i>Eucalyptus marginata</i>	574123	6126608	590	50	0	
<i>Eucalyptus marginata</i>	573810	6126433	590	50	0	
<i>Eucalyptus marginata</i>	574018	6126492	600	50	0	
<i>Eucalyptus marginata</i>	574428	6125870	600	50	0	
<i>Eucalyptus marginata</i>	573966	6126302	600	50	0	
<i>Eucalyptus marginata</i>	573819	6126761	600	50	0	
<i>Eucalyptus marginata</i>	573934	6126273	600	50	0	
<i>Eucalyptus marginata</i>	573803	6126214	600	50	0	
<i>Eucalyptus marginata</i>	574339	6127598	600	50	0	
<i>Eucalyptus marginata</i>	574333	6128501	600	50	0	
<i>Eucalyptus marginata</i>	574118	6126438	610	50	0	
<i>Eucalyptus marginata</i>	574031	6126322	610	50	0	
<i>Eucalyptus marginata</i>	573682	6126997	610	50	0	
<i>Eucalyptus marginata</i>	574053	6126384	610	50	0	

Flora_sp	Easting	Northing	DBH_mm_	Zone	Hollow	Hollow_Sz
<i>Eucalyptus marginata</i>	574069	6126421	610	50	0	
<i>Eucalyptus marginata</i>	573860	6126251	610	50	0	
<i>Eucalyptus marginata</i>	573804	6126270	610	50	0	
<i>Eucalyptus marginata</i>	578796	6124008	610	50	0	
<i>Eucalyptus marginata</i>	574074	6126436	620	50	0	
<i>Eucalyptus marginata</i>	574171	6126851	620	50	0	
<i>Eucalyptus marginata</i>	573716	6126268	630	50	0	
<i>Eucalyptus marginata</i>	573631	6126925	630	50	0	
<i>Eucalyptus marginata</i>	573918	6126271	630	50	0	
<i>Eucalyptus marginata</i>	573931	6126279	630	50	0	
<i>Eucalyptus marginata</i>	573775	6126234	630	50	0	
<i>Eucalyptus marginata</i>	573842	6126382	630	50	0	
<i>Eucalyptus marginata</i>	574200	6126562	630	50	0	
<i>Eucalyptus marginata</i>	574162	6126420	630	50	0	
<i>Eucalyptus marginata</i>	574316	6129140	630	50	0	
<i>Eucalyptus marginata</i>	573961	6126325	640	50	0	
<i>Eucalyptus marginata</i>	574233	6126509	640	50	0	
<i>Eucalyptus marginata</i>	573973	6126388	640	50	0	
<i>Eucalyptus marginata</i>	573743	6126767	640	50	0	
<i>Eucalyptus marginata</i>	573803	6126873	640	50	0	
<i>Eucalyptus marginata</i>	573914	6126376	640	50	0	
<i>Eucalyptus marginata</i>	573858	6126420	640	50	0	
<i>Eucalyptus marginata</i>	574330	6128583	640	50	0	
<i>Eucalyptus marginata</i>	574380	6128364	640	50	0	
<i>Eucalyptus marginata</i>	574411	6125862	650	50	0	
<i>Eucalyptus marginata</i>	574106	6126580	650	50	0	
<i>Eucalyptus marginata</i>	573983	6126477	650	50	0	
<i>Eucalyptus marginata</i>	573979	6126535	650	50	0	
<i>Eucalyptus marginata</i>	573701	6127000	650	50	0	
<i>Eucalyptus marginata</i>	573684	6126957	670	50	0	
<i>Eucalyptus marginata</i>	573712	6126995	670	50	0	
<i>Eucalyptus marginata</i>	574099	6126547	680	50	0	
<i>Eucalyptus marginata</i>	573960	6126360	680	50	0	
<i>Eucalyptus marginata</i>	573982	6126482	680	50	0	
<i>Eucalyptus marginata</i>	574011	6126527	680	50	0	
<i>Eucalyptus marginata</i>	573648	6126993	680	50	0	
<i>Eucalyptus marginata</i>	573847	6126780	680	50	0	
<i>Eucalyptus marginata</i>	573776	6126299	680	50	0	
<i>Eucalyptus marginata</i>	574341	6128603	680	50	0	
<i>Eucalyptus marginata</i>	574343	6125767	680	50	0	
<i>Eucalyptus marginata</i>	574075	6126514	690	50	0	
<i>Eucalyptus marginata</i>	573962	6126289	690	50	0	
<i>Eucalyptus marginata</i>	573642	6126955	690	50	0	
<i>Eucalyptus marginata</i>	576777	6124640	690	50	0	
<i>Eucalyptus marginata</i>	574327	6128050	710	50	0	
<i>Eucalyptus marginata</i>	574043	6126452	710	50	0	
<i>Eucalyptus marginata</i>	573969	6126377	710	50	0	

Flora_sp	Easting	Northing	DBH_mm_	Zone	Hollow	Hollow_Sz
<i>Eucalyptus marginata</i>	573755	6126349	710	50	0	
<i>Eucalyptus marginata</i>	573707	6126937	710	50	0	
<i>Eucalyptus marginata</i>	574069	6126545	720	50	0	
<i>Eucalyptus marginata</i>	573751	6126781	720	50	0	
<i>Eucalyptus marginata</i>	573796	6126859	720	50	0	
<i>Eucalyptus marginata</i>	573865	6126315	720	50	0	
<i>Eucalyptus marginata</i>	574407	6128369	720	50	0	
<i>Eucalyptus marginata</i>	573608	6126973	730	50	0	
<i>Eucalyptus marginata</i>	573659	6126997	730	50	0	
<i>Eucalyptus marginata</i>	574093	6126419	730	50	0	
<i>Eucalyptus marginata</i>	573952	6126341	730	50	0	
<i>Eucalyptus marginata</i>	573699	6126975	730	50	0	
<i>Eucalyptus marginata</i>	573610	6126965	740	50	0	
<i>Eucalyptus marginata</i>	573657	6127035	740	50	0	
<i>Eucalyptus marginata</i>	574337	6128618	740	50	0	
<i>Eucalyptus marginata</i>	573650	6126966	740	50	0	
<i>Eucalyptus marginata</i>	574030	6126586	750	50	0	
<i>Eucalyptus marginata</i>	574020	6126525	760	50	0	
<i>Eucalyptus marginata</i>	574100	6126369	780	50	0	
<i>Eucalyptus marginata</i>	573646	6126990	790	50	0	
<i>Eucalyptus marginata</i>	574008	6126347	800	50	0	
<i>Eucalyptus marginata</i>	573954	6126434	800	50	0	
<i>Eucalyptus marginata</i>	574318	6127593	800	50	0	
<i>Eucalyptus marginata</i>	573971	6126456	800	50	0	
<i>Eucalyptus marginata</i>	574332	6128392	800	50	0	
<i>Eucalyptus marginata</i>	573766	6126796	810	50	0	
<i>Eucalyptus marginata</i>	578764	6124079	810	50	0	
<i>Eucalyptus marginata</i>	574406	6125789	820	50	0	
<i>Eucalyptus marginata</i>	574359	6128117	850	50	0	
<i>Eucalyptus marginata</i>	573707	6126985	880	50	0	
<i>Eucalyptus marginata</i>	574297	6127664	880	50	0	
<i>Eucalyptus marginata</i>	573844	6126769	920	50	0	
<i>Eucalyptus marginata</i>	573827	6126223	920	50	0	
<i>Eucalyptus marginata</i>	573659	6126974	1010	50	0	
<i>Eucalyptus marginata</i>	574352	6128119	1070	50	0	
<i>Eucalyptus marginata</i>	574029	6126497	1070	50	0	
<i>Eucalyptus marginata</i>	573645	6126999	1080	50	0	
<i>Eucalyptus marginata</i>	574282	6126311	1140	50	0	
<i>Eucalyptus marginata</i>	574314	6129139	650	50	0	
<i>Eucalyptus marginata</i>	573904	6126312	540	50	0	
<i>Eucalyptus marginata</i>	574339	6128403	600	50	0	
<i>Eucalyptus marginata</i>	574400	6128462	790	50	0	
<i>Eucalyptus marginata</i>	574340	6128303	710	50	0	
<i>Eucalyptus marginata</i>	573614	6126987	620	50	0	
<i>Eucalyptus marginata</i>	574418	6125899	500	50	1	100
<i>Eucalyptus marginata</i>	573749	6126274	500	50	1	100
<i>Eucalyptus marginata</i>	573915	6126281	550	50	1	100

Flora_sp	Easting	Northing	DBH_mm_	Zone	Hollow	Hollow_Sz
<i>Eucalyptus marginata</i>	573866	6126429	550	50	1	100
<i>Eucalyptus marginata</i>	574342	6128483	560	50	1	100
<i>Eucalyptus marginata</i>	574232	6126686	570	50	1	100
<i>Eucalyptus marginata</i>	573954	6126483	570	50	1	100
<i>Eucalyptus marginata</i>	573900	6126425	590	50	1	100
<i>Eucalyptus marginata</i>	573744	6126341	590	50	1	100
<i>Eucalyptus marginata</i>	573673	6126332	600	50	1	100
<i>Eucalyptus marginata</i>	573728	6126252	610	50	1	100
<i>Eucalyptus marginata</i>	573977	6126491	620	50	1	100
<i>Eucalyptus marginata</i>	574382	6125900	670	50	1	100
<i>Eucalyptus marginata</i>	574345	6128471	690	50	1	100
<i>Eucalyptus marginata</i>	573929	6126292	730	50	1	100
<i>Eucalyptus marginata</i>	573772	6126285	740	50	1	100
<i>Eucalyptus marginata</i>	574281	6126287	870	50	1	100
<i>Eucalyptus marginata</i>	574116	6126441	610	50	1	100
<i>Eucalyptus marginata</i>	574318	6129210	580	50	1	100
<i>Eucalyptus marginata</i>	573764	6126210	590	50	2	100,100
<i>Eucalyptus marginata</i>	573756	6126282	540	50	2	100,100
<i>Eucalyptus marginata</i>	574349	6128450	610	50	4	100,100,200,200
<i>Eucalyptus marginata</i>	573945	6126386	900	50	4	100,100,200,200
<i>Eucalyptus marginata</i>	574341	6129177	500	50	2	100,150
<i>Eucalyptus marginata</i>	573790	6126257	690	50	2	100,150
<i>Eucalyptus marginata</i>	574366	6127579	1140	50	2	100,150
<i>Eucalyptus marginata</i>	573917	6126429	510	50	2	100,200
<i>Eucalyptus marginata</i>	573952	6126354	620	50	2	100,200
<i>Eucalyptus marginata</i>	574330	6128419	660	50	2	100,300
<i>Eucalyptus marginata</i>	573914	6126431	500	50	1	150
<i>Eucalyptus marginata</i>	573790	6126302	500	50	1	150
<i>Eucalyptus marginata</i>	574337	6127609	520	50	1	150
<i>Eucalyptus marginata</i>	574166	6126453	520	50	1	150
<i>Eucalyptus marginata</i>	573692	6126238	630	50	1	150
<i>Eucalyptus marginata</i>	574358	6128115	880	50	1	150
<i>Eucalyptus marginata</i>	574445	6125791	1010	50	1	150
<i>Eucalyptus marginata</i>	573852	6126313	500	50	2	150,100
<i>Eucalyptus marginata</i>	573833	6126403	510	50	2	150,100
<i>Eucalyptus marginata</i>	574413	6125855	700	50	2	150,150
<i>Eucalyptus marginata</i>	574396	6125868	500	50	2	150,150
<i>Eucalyptus marginata</i>	573843	6126408	520	50	2	150,150
<i>Eucalyptus marginata</i>	574330	6128419	580	50	2	150,150
<i>Eucalyptus marginata</i>	574288	6126331	930	50	2	150,150
<i>Eucalyptus marginata</i>	574333	6128180	960	50	2	150,150
<i>Eucalyptus marginata</i>	574337	6128594	1030	50	2	150,150
<i>Eucalyptus marginata</i>	573724	6126207	590	50	3	150,150,150
<i>Eucalyptus marginata</i>	574326	6128366	710	50	2	150,200
<i>Eucalyptus marginata</i>	574412	6125867	730	50	2	150,200
<i>Eucalyptus marginata</i>	573827	6126355	530	50	1	200
<i>Eucalyptus marginata</i>	574013	6126584	540	50	1	200

Flora_sp	Easting	Northing	DBH_mm_	Zone	Hollow	Hollow_Sz
<i>Eucalyptus marginata</i>	573873	6126431	560	50	1	200
<i>Eucalyptus marginata</i>	574354	6128526	580	50	1	200
<i>Eucalyptus marginata</i>	573832	6126396	650	50	1	200
<i>Eucalyptus marginata</i>	574439	6125806	660	50	1	200
<i>Eucalyptus marginata</i>	574446	6125814	710	50	1	200
<i>Eucalyptus marginata</i>	574357	6128399	720	50	1	200
<i>Eucalyptus marginata</i>	574354	6128442	820	50	1	200
<i>Eucalyptus marginata</i>	574330	6128060	920	50	1	200
<i>Eucalyptus marginata</i>	573927	6126340	500	50	2	200,200
<i>Eucalyptus marginata</i>	573692	6126288	550	50	2	200,200
<i>Eucalyptus marginata</i>	573972	6126504	630	50	2	200,200
<i>Eucalyptus marginata</i>	573908	6126333	740	50	2	200,200
<i>Eucalyptus marginata</i>	573828	6126307	750	50	2	200,200
<i>Eucalyptus marginata</i>	573812	6126368	660	50	3	200,200,100
<i>Eucalyptus marginata</i>	573785	6126221	550	50	4	200,200,150,100
<i>Eucalyptus marginata</i>	574315	6129174	760	50	1	300
<i>Eucalyptus marginata</i>	574327	6128431	570	50	1	300
<i>Eucalyptus marginata</i>	573871	6126250	900	50	1	300
<i>Eucalyptus marginata</i>	574181	6126648	540	50	1	300
<i>Eucalyptus marginata</i>	574370	6128436	700	50	1	300
<i>Eucalyptus marginata</i>	573857	6126373	610	50	2	300,200
<i>Eucalyptus marginata</i>	573719	6126219	630	50	2	300,200
<i>Eucalyptus marginata</i>	574143	6126539	520	50	2	300,300
<i>Eucalyptus marginata</i>	573921	6126453	600	50	2	300,300
<i>Eucalyptus marginata</i>	573693	6126995	520	50	1	350
<i>Eucalyptus marginata</i>	573981	6126346	570	50	1	400
<i>Eucalyptus staeri</i>	574078	6126464	540	50	0	
<i>Eucalyptus staeri</i>	574342	6127597	560	50	0	
<i>Eucalyptus staeri</i>	574325	6127631	670	50	0	
<i>Eucalyptus staeri</i>	574084	6126480	890	50	0	
<i>Eucalyptus staeri</i>	574361	6127591	1080	50	0	

F4. Fauna observations.

Fauna_Hab	Description	Easting	Northing
Baudin_feed	Baudin's Cockatoo feeding evidence, Marri nuts	574406	6125814
Baudin_feed	Baudin's Cockatoo feeding evidence, Marri nuts	574388	6125848
Baudin_feed	Baudin's Cockatoo feeding evidence, Marri nuts	574400	6125864
Baudin_feed	Baudin's Cockatoo feeding evidence, Marri nuts	574420	6125872
Baudin_feed	Baudin's Cockatoo feeding evidence, Marri nuts	578404	6124615
Baudin_feed	Baudin's Cockatoo feeding evidence, Marri nuts	576829	6124696
Baudin_feed	Baudin's Cockatoo feeding evidence, Marri nuts	578668	6124312
Baudin_feed	Baudin's Cockatoo feeding evidence, Marri nuts	578635	6124362
Baudin_feed	Baudin's Cockatoo feeding evidence, Marri nuts	578808	6124032
Baudin_feed	Baudin's Cockatoo feeding evidence, Marri nuts	576798	6124627
Baudin_feed	Baudin's Cockatoo feeding evidence, Marri nuts	576763	6124646
Baudin_feed	Baudin's Cockatoo feeding evidence, Marri nuts	578693	6124200
Baudin_feed	Baudin's Cockatoo feeding evidence, Marri nuts	578685	6124233
Baudin_feed	Baudin's Cockatoo feeding evidence, Marri nuts	578897	6123935
Baudin_feed	Baudin's Cockatoo feeding evidence, Marri nuts	578910	6123954

Fauna_Hab	Description	Easting	Northing
Baudin_feed	Baudin's Cockatoo feeding evidence, Marri nuts	578929	6124005
Baudin_feed	Baudin's Cockatoo feeding evidence, Marri nuts	579031	6123926
Baudin_feed	Baudin's Cockatoo feeding evidence, Marri nuts	579071	6123901
Baudin_feed	Baudin's Cockatoo feeding evidence, Marri nuts	579023	6123916
Baudin_feed	Baudin's Cockatoo feeding evidence, Marri nuts	579017	6123928
Bodensee	Baudin's Cockatoo see, flock of 1-15 seen flying over Baudin's Cockatoo see, flock of 1-15 feeding in Marri, approx. 50m SE of this point	575504	6130098
Baudin_seen		575441	6130224
Bird	Whistling kite circling	574244	6125244
BTPhas_hollow	Potential Brush-tailed Phascogale hollow in Sheoak, wear marks.	573929	6126429
Bush_rat	Bush rat burrow system	579105	6123743
BushRat_tunnel	Bush rat tunnel entrance, possible	574030	6126560
Carns_feed	Carnaby's Cockatoo feeding evidence, Marri nuts	574406	6125799
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574383	6125798
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574651	6128299
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574517	6128299
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	575495	6124957
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	578343	6124336
Carns_feed	Carnaby's feeding evidence, Marri nuts	578658	6124287
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574329	6130082
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574333	6130067
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574332	6130050
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	578601	6124587
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	573865	6127024
Carns_feed	Carnaby's Cockatoo feeding evidence	576305	6124809
Carns_feed	Carnaby's Cockatoo feeding evidence	576265	6124814
Carns_feed	Carnaby's Cockatoo feeding evidence	576259	6124815
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	576250	6124817
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	576117	6124826
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	576113	6124831
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	576156	6124831
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	576192	6124831
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	576152	6124831
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	576168	6124832
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	576155	6124832
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	576125	6124833
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	576166	6124834
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	576102	6124843
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	576101	6124843
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	576123	6124844
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	576069	6124861
Carns_feed	Carnaby's Cockatoo feeding evidence	574868	6125270
Carns_feed	Carnaby's Cockatoo feeding evidence	574869	6125289
Carns_feed	Carnaby's Cockatoo feeding evidence	574869	6125301
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574470	6125573
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574511	6125623
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574523	6125629
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574495	6125631
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574496	6125631
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574498	6125632
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574500	6125632
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574504	6125633
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574502	6125634
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574523	6125644
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574111	6126340
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574112	6126341
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574120	6126343
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574118	6126343
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574114	6126343

Fauna_Hab	Description	Easting	Northing
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574114	6126343
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574122	6126344
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574123	6126344
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574219	6126765
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574216	6126766
Carns_feed	Carnaby's Cockatoo feeding evidence	574812	6126815
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	573849	6126924
Carns_feed	Carnaby's Cockatoo feeding evidence, pine cones	574340	6128303
Feral_bees	Feral bees in hollow	578647	6124382
Feral_bees	Feral bees in hollow	576838	6124675
Feral_bees	Feral bees in hollow	574363	6125826
Frog_call	Crinea glauertii heard	574426	6125244
Frog_call	Crinea glauertii heard	575420	6130164
Hollow_bees	Hollow with bees	573873	6126431
Quenda_dig	Quenda diggings	574963	6130563
Quenda_dig	Quenda diggings	578939	6123944
Quenda_dig	Quenda diggings	578964	6123956
Quenda_dig	Quenda diggings	574563	6125468
Quenda_dig	Quenda diggings	574518	6125588
Quenda_dig	Quenda diggings	576318	6124801
Quenda_dig	Quenda diggings	574243	6127421
Quenda_dig	Quenda diggings	574299	6128049
Quenda_dig	Quenda diggings	578333	6124332
Quenda_dig	Quenda diggings, many	578680	6124247
Quenda_dig	Quenda diggings	578650	6124215
Quenda_dig	Quenda diggings	578813	6124314
Quenda_dig	Quenda diggings	578754	6124026
Quenda_dig	Quenda diggings	578783	6123956
Quenda_dig	Quenda diggings	578885	6123972
Quenda_dig	Quenda diggings	576730	6124709
Quenda_dig	Quenda diggings	576673	6124696
Quenda_dig	Quenda diggings	574391	6127562
Quenda_dig	Quenda diggings	576184	6124836
Quenda_dig	Quenda diggings	578508	6123816
Quenda_dig	Quenda diggings	575025	6130496
Quenda_dig	Quenda diggings	578867	6123941
Quenda_dig	Quenda diggings	578897	6123949
Quenda_dig	Quenda diggings	578936	6123927
Quenda_dig	Quenda diggings	578990	6123952
Quenda_dig	Quenda diggings	578993	6123927
Quenda_dig	Quenda diggings	579064	6123897
Quenda_dig	Quenda diggings	579040	6123905
Quenda_dig	Quenda diggings	578957	6123926
Quenda_dig	Quenda diggings	578917	6123992
Quenda_dig	Quenda diggings	579011	6123792
Quenda_dig	Quenda diggings	574898	6125120
Quenda_dig	Quenda diggings	574989	6125081
Quenda_dig	Quenda diggings	575061	6125053
Quenda_dig	Quenda diggings	575120	6125047
Quenda_dig	Quenda diggings	575130	6125022
Quenda_dig	Quenda diggings	575357	6124945
Quenda_dig	Quenda diggings	574806	6125162
Quenda_dig	Quenda diggings	574380	6125248
Quenda_dig	Quenda diggings	575421	6130167
Quenda_dig	Quenda diggings	575496	6130099
Quenda_skull	Quenda skull	574957	6130568
RTBC_feed	Red-tailed Black Cockatoo feeding evidence, Jarrah nuts	574906	6125119
RTBlack_feed	Red-tailed Black Cockatoo feeding evidence, Marri nuts	574374	6125799
RTBlack_feed	Red-tailed Black Cockatoo feeding evidence, Marri nuts	574438	6125800

Fauna_Hab	Description	Easting	Northing
RTBlack_feed	Red-tailed Black Cockatoo feeding evidence, Marri nuts	574230	6125923
RTBlack_feed	Red-tailed Black Cockatoo feeding evidence, Jarrah nuts	574080	6126490
RTBlack_feed	Red-tailed Black Cockatoo feeding evidence, Jarrah nuts	573891	6126841
RTBlack_feed	Red-tailed Black Cockatoo feeding evidence, Jarrah nuts	573849	6126780
RTBlack_feed	Red-tailed Black Cockatoo feeding evidence, Marri nuts	578693	6124199
RTBlack_feed	Red-tailed Black Cockatoo feeding evidence, Marri nuts	576783	6124710
RTBlack_feed	Red-tailed Black Cockatoo feeding evidence, Marri nuts	576775	6124662
RTBlack_feed	Red-tailed Black Cockatoo feeding evidence, Jarrah nuts	576758	6124739
RTBlack_feed	Red-tailed Black Cockatoo feeding evidence, Jarrah nuts	574307	6127630
RTBlack_feed	Red-tailed Black Cockatoo feeding evidence, Jarrah and Marri nuts	574339	6127610
RTBlack_feed	Red-tailed Black Cockatoo feeding evidence, Jarrah nuts	574381	6127543
RTP_drey	Western Ringtail Possum drey, possible, in Taxandria about 8m high	574565	6125568
RTP_drey	Western Ringtail Possum drey in Taxandria	574527	6125609
RTP_drey	Western Ringtail Possum drey in Taxandria	574551	6125629
RTP_drey	Western Ringtail Possum drey in Taxandria	574538	6125619
RTP_drey	Western Ringtail Possum drey, half collapsed	574498	6125557
RTP_drey	Western Ringtail Possum dreys (2) in Victorian Tea Tree	578435	6124435
RTP_drey	Western Ringtail Possum drey in Victorian Tea Tree	578451	6124459
RTP_drey	Western Ringtail Possum drey in Taxandria	574237	6125297
RTP_drey	Western Ringtail Possum drey in Hakea ?florida, not occupied but intact, 2m up tree	574175	6126860
RTP_drey	Western Ringtail Possum drey in Sydney Golden Wattle, probably unoccupied	578754	6124166
RTP_drey	Western Ringtail Possum drey, collapsed	578689	6124271
RTP_drey	Western Ringtail Possum drey, 6m up in Acacia longifolia	578925	6123931
RTP_drey	Western Ringtail Possum drey, intact	574809	6125161
RTP_drey	Western Ringtail Possum drey, in Callistachys	574451	6125244
RTP_scats	Western Ringtail Possum scats, one seen in fork of Swamp Mahogany	574845	6125407
RTP_scats	Western Ringtail Possum scats, one seen	574545	6125642
RTP_scats	Western Ringtail Possum scats, one seen, in fork of Swamp Mahogany	574471	6125555
RTP_scats	Western Ringtail Possum scats, one seen	576308	6124803
RTP_scats	Western Ringtail Possum scats, one seen	576301	6124814
RTP_scats	Western Ringtail Possum scats, one seen	576251	6124815
RTP_scats	Western Ringtail Possum scats, one seen, under Victorian Tea Tree	576683	6124635
RTP_scats	Western Ringtail Possum scats, one seen, under Sheoak	574231	6125636
RTP_scats	Western Ringtail Possum scats, one seen, under Sheoak	574229	6125585
RTP_scats	Western Ringtail Possum scats, one seen	574226	6125514
RTP_scats	Western Ringtail Possum scats, one seen, under Sheoak	574335	6128302
RTP_scats	Western Ringtail Possum scats, one seen	574314	6128303
RTP_scats	Western Ringtail Possum scats, one seen	578380	6124566
RTP_scats	Western Ringtail Possum scats, one seen, on very large Eucalyptus botryoides	578274	6124486
RTP_scats	Western Ringtail Possum scats, one seen, under Peppermint	578285	6124499
RTP_scats	Western Ringtail Possum scats, one seen	578308	6124474
RTP_scats	Western Ringtail Possum scats, one seen	574485	6128301
RTP_scats	Western Ringtail Possum scats, one seen	574334	6128151
RTP_scats	Western Ringtail Possum scats, one seen	574329	6128581
RTP_scats	Western Ringtail Possum scats, one seen	574514	6125301
RTP_scats	Western Ringtail Possum scats, one seen	574334	6125299
RTP_scats	Western Ringtail Possum scats, one seen	574907	6125199
RTP_scats	Western Ringtail Possum scats,	575210	6125104
RTP_scats	Western Ringtail Possum scats, one seen	575669	6124924
RTP_scats	Western Ringtail Possum scats, one seen	576542	6124765
RTP_scats	Western Ringtail Possum scats	576777	6124633
RTP_scats	Western Ringtail Possum scats, one seen	574204	6126515
RTP_scats	Western Ringtail Possum scats, one seen	574173	6126438
RTP_scats	Western Ringtail Possum scats, one seen	574141	6126469
RTP_scats	Western Ringtail Possum scats large and small (7mm length)	574162	6126420
RTP_scats	Western Ringtail Possum scats, one seen	574132	6126519
RTP_scats	Western Ringtail Possum scats, one seen	574135	6126508
RTP_scats	Western Ringtail Possum scats, one seen	574103	6126486

Fauna_Hab	Description	Easting	Northing
RTP_scats	Western Ringtail Possum scats, one seen	574113	6126417
RTP_scats	Western Ringtail Possum scats, one seen	574070	6126390
RTP_scats	Western Ringtail Possum scats, one seen	574075	6126426
RTP_scats	Western Ringtail Possum scats, one seen	574094	6126530
RTP_scats	Western Ringtail Possum scats, one seen	574104	6126562
RTP_scats	Western Ringtail Possum scats large and small (7mm length)	574197	6126851
RTP_scats	Western Ringtail Possum scats, one seen	574144	6126856
RTP_scats	Western Ringtail Possum scats, one seen	573993	6126385
RTP_scats	Western Ringtail Possum scats, one seen	573991	6126360
RTP_scats	Western Ringtail Possum scats, one seen	573976	6126335
RTP_scats	Western Ringtail Possum scats, one seen	573974	6126420
RTP_scats	Western Ringtail Possum scats, small (7mm length)	573997	6126475
RTP_scats	Western Ringtail Possum scats, one seen	574022	6126522
RTP_scats	Western Ringtail Possum scats, small (7mm length)	573764	6126843
RTP_scats	Western Ringtail Possum scats large and small (7mm length)	573747	6126853
RTP_scats	Western Ringtail Possum scats, one seen	573743	6126871
RTP_scats	Western Ringtail Possum scats, one seen	573898	6126864
RTP_scats	Western Ringtail Possum scats, one seen	573913	6126870
RTP_scats	Western Ringtail Possum scats large and small (7mm length)	573918	6126856
RTP_scats	Western Ringtail Possum scats, many seen	573923	6126846
RTP_scats	Western Ringtail Possum scats, one seen	574299	6127696
RTP_scats	Western Ringtail Possum scats, one seen	574302	6127920
RTP_scats	Western Ringtail Possum scats, one seen	574304	6127983
RTP_scats	Western Ringtail Possum scats, one seen	573891	6126333
RTP_scats	Western Ringtail Possum scats, one seen	573909	6126291
RTP_scats	Western Ringtail Possum scats, one seen	573987	6126622
RTP_scats	Western Ringtail Possum scats, one seen	573966	6126601
RTP_scats	Western Ringtail Possum scats, one seen	573965	6126516
RTP_scats	Western Ringtail Possum scats, one seen	573797	6126408
RTP_scats	Western Ringtail Possum scats, one seen	573767	6126401
RTP_scats	Western Ringtail Possum scats, one seen	573755	6126381
RTP_scats	Western Ringtail Possum scats, one seen	573732	6126261
RTP_scats	Western Ringtail Possum scats large and small (7mm length)	573792	6126211
RTP_scats	Western Ringtail Possum scats, one seen	573862	6126243
RTP_scats	Western Ringtail Possum scats, one seen	573894	6126287
RTP_scats	Western Ringtail Possum scats, one seen	573904	6126439
RTP_scats	Western Ringtail Possum scats, one seen	573925	6126493
RTP_scats	Western Ringtail Possum scats, one seen	573957	6126577
RTP_scats	Western Ringtail Possum scats, one seen	573995	6126680
RTP_scats	Western Ringtail Possum scats, one seen	574170	6126637
RTP_scats	Western Ringtail Possum scats, small (<10mm length)	573997	6126696
RTP_scats	Western Ringtail Possum scats, one seen	573932	6126752
RTP_scats	Western Ringtail Possum scats, one seen	573916	6126708
RTP_scats	Western Ringtail Possum scats, one seen	573932	6126687
RTP_scats	Western Ringtail Possum scats, one seen	574236	6126638
RTP_scats	Western Ringtail Possum scats, one seen	578086	6124686
RTP_scats	Western Ringtail Possum scats	578754	6124134
RTP_scats	Western Ringtail Possum scats, many, in Victorian Tea Tree grove	578727	6124143
RTP_scats	Western Ringtail Possum scats	578711	6124149
RTP_scats	Western Ringtail Possum scats, one seen	578685	6124233
RTP_scats	Western Ringtail Possum scats, one seen	578809	6124143
RTP_scats	Western Ringtail Possum scats, one seen	578780	6124204
RTP_scats	Western Ringtail Possum scats, one seen	578812	6124157
RTP_scats	Western Ringtail Possum scats, small, old	578797	6124033
RTP_scats	Western Ringtail Possum scats, one seen	578775	6124041
RTP_scats	Western Ringtail Possum scats, one seen	578862	6124195
RTP_scats	Western Ringtail Possum scats, one seen	576831	6124682
RTP_scats	Western Ringtail Possum scats, one seen	576781	6124738
RTP_scats	Western Ringtail Possum scats, one seen	578657	6124283

Fauna_Hab	Description	Easting	Northing
RTP_scats	Western Ringtail Possum scats, one seen	578662	6124227
RTP_scats	Western Ringtail Possum scats, one seen, under Tuart	578655	6124122
RTP_scats	Western Ringtail Possum scats, one seen	578593	6124190
RTP_scats	Western Ringtail Possum scats, one seen	578637	6124306
RTP_scats	Western Ringtail Possum scats, one seen	578773	6124252
RTP_scats	Western Ringtail Possum scats, one seen	578598	6124392
RTP_scats	Western Ringtail Possum scats, one seen	578577	6124435
RTP_scats	Western Ringtail Possum scats, one seen	578760	6123991
RTP_scats	Western Ringtail Possum scats, one seen	578806	6123984
RTP_scats	Western Ringtail Possum scats, one seen	578809	6124013
RTP_scats	Western Ringtail Possum scats, one seen	578815	6124030
RTP_scats	Western Ringtail Possum scats, one seen	578883	6123995
RTP_scats	Western Ringtail Possum scats, one seen	576756	6124708
RTP_scats	Western Ringtail Possum scats	574384	6127573
RTP_scats	Western Ringtail Possum scats, one seen	574373	6127531
RTP_scats	Western Ringtail Possum scats, one seen	574355	6127535
RTP_scats	Western Ringtail Possum scats, one seen	574322	6127559
RTP_scats	Western Ringtail Possum scats, one seen	574311	6127574
RTP_scats	Western Ringtail Possum scats, one seen	574315	6127583
RTP_scats	Western Ringtail Possum scats, one seen	578507	6123816
RTP_scats	Western Ringtail Possum scats	578890	6124001
RTP_scats	Western Ringtail Possum scats	578871	6123966
RTP_scats	Western Ringtail Possum scats	578876	6123950
RTP_scats	Western Ringtail Possum scats	578912	6123954
RTP_scats	Western Ringtail Possum scats	578976	6123965
RTP_scats	Western Ringtail Possum scats	578982	6123954
RTP_scats	Western Ringtail Possum scats	579029	6123930
RTP_scats	Western Ringtail Possum scats	579059	6123916
RTP_scats	Western Ringtail Possum scats	579021	6123914
RTP_scats	Western Ringtail Possum scats	578982	6123795
RTP_scats	Western Ringtail Possum scats	579035	6123780
RTP_scats	Western Ringtail Possum scats	579059	6123766
RTP_scats	Western Ringtail Possum scats	579111	6123741
RTP_scats	Western Ringtail Possum scats	574905	6125124
RTP_scats	Western Ringtail Possum scats	574946	6125106
RTP_scats	Western Ringtail Possum scats	575015	6125066
RTP_scats	Western Ringtail Possum scats	575049	6125059
RTP_scats	Western Ringtail Possum scats	575367	6124943
RTP_scats	Western Ringtail Possum scats	574805	6125162
RTP_scats	Western Ringtail Possum scats	574752	6125188
RTP_scats	Western Ringtail Possum scats	574724	6125198

14 APPENDIX G - TPFL forms (see attached)

15 APPENDIX H - Naturemap and PMST search results (see attached)
