



# Soldiers Road PSP Targeted Flora and Vegetation Survey



**Prepared for Shire of Serpentine Jarrahdale**

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**Biota**  
Environmental  
Sciences



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# 1.0 Summary

The Shire of Serpentine Jarrahdale is planning to construct a Principal Shared Path (PSP) along Soldiers Road, Byford, Western Australia. A small area (1.33 ha) is proposed to be cleared to construct the PSP. Biota Environmental Sciences (Biota) was commissioned to conduct a targeted flora and vegetation survey and Threatened Ecological Community (TEC) assessment of a broader area (20.25 ha) surrounding the proposed clearing footprint.

A desktop study found that 15 Threatened or Priority flora species were likely to, or may potentially occur, within the survey area. It was also found that six Commonwealth-listed TECs as well as six State-listed TECs and one State-listed Priority Ecological Community (PEC) were identified as previously recorded within the survey area.

To verify the findings of the desktop study, a field survey was conducted in October 2021. The survey consisted of four 10 m x 10 m quadrats to assist with TEC/PEC assessment, as well as targeted searches for significant flora.

Four intact vegetation units were identified within the survey area, with two additional categories of land deemed to be modified and/or disturbed to some extent.

Two Commonwealth TECs were identified within the survey area for a combined total of 11.74 ha:

- *Corymbia calophylla* - *Kingia australis* woodlands on heavy soils of the Swan Coastal Plain; and
- *Corymbia calophylla* - *Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain.

Three State-listed TECs were identified within the survey area:

- *Corymbia calophylla* – *Kingia australis* woodlands on heavy soils, Swan Coastal Plain (FCT 3a);
- *Corymbia calophylla* – *Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain (FCT 3b); and
- *Corymbia calophylla* – *Xanthorrhoea preissii* woodlands and shrublands, Swan Coastal Plain (FCT 3c).

A total of 140 native vascular flora taxa from 85 genera and 35 families were recorded from the survey area.

One species recorded within the survey area, *Synaphea* sp. Pinjarra Plain (A.S. George 17182), is listed as Threatened under the State *Biodiversity Conservation Act 2016*, and 153 individuals were recorded from 57 locations.

Three State-listed Priority species were also recorded within the survey area: *Grevillea bipinnatifida* subsp. *spagnana* (Priority 1), *Calectasia grandiflora* (Priority 2) and *Johnsonia pubescens* subsp. *cygnorum* (Priority 2).

A total of 16 introduced species were recorded. Four of the species recorded within the survey area are listed as declared pests under the *Biosecurity and Agriculture Management Act 2007* (*\*Asparagus asparagoides*, *\*Echium plantagineum*, *\*Moraea flaccida* and *\*Zantedeschia aethiopica*), with *\*Asparagus asparagoides* also listed as a Weed of National Significance.

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## 2.0 Introduction

### 2.1 Project Background

The Shire of Serpentine Jarrahdale is proposing to clear a 1.5 m wide strip of vegetation extending approximately 5.8 km in order to construct a Principal Shared Path (PSP) along Soldiers Road, Byford, Western Australia (Figure 2.1).

The area proposed to be cleared runs along the eastern side of the existing Public Transport Authority (PTA) railway access/maintenance track from Cardup Siding Road down to the freight rail intersection just south of the school on Bishop Road (with additional clearing for access gates required).

The Shire of Serpentine Jarrahdale commissioned Biota Environmental Sciences (Biota) to conduct a targeted flora and vegetation survey and Threatened Ecological Community (TEC) assessment.

### 2.2 Scope and Objectives

The survey area was approximately 20 ha, with the clearing footprint within the survey area much smaller at approximately 1.33 ha (Table 2.1).

Preliminary discussions between the Shire of Serpentine Jarrahdale and Department of Water and Environmental Regulation (DWER) suggested that three Threatened flora species (*Synaphea* sp. Pinjarra Plain (A.S. George 17182), *Synaphea* sp. Serpentine (G.R. Brand 103) and *Morelotia australiensis* (C.B. Clarke)), one Commonwealth-listed TEC 'Banksia Woodlands of the Swan Coastal Plain ecological community' and one State-listed TEC '*Banksia attenuata* and/or *Eucalyptus marginata* woodlands of the eastern side of the Swan Coastal Plain' (FCT 20b), may be present in the survey area. In order to provide context to the survey area a larger 'study area' was considered at desktop level (Table 2.1).

**Table 2.1: Spatial scale and objectives.**

Report Terminology	Definition	Size (ha)	Survey
Survey area	The 5.8 km long area surveyed along Soldiers Road where the development of a PSP has been proposed.	20.25	<ul style="list-style-type: none"> <li>Detailed flora and vegetation survey.</li> <li>Targeted significant flora searches.</li> <li>TEC assessment and TEC/Priority Ecological Community (PEC) mapping.</li> </ul>
Study area	A 5 km buffer around the survey area.	13,815.66	<ul style="list-style-type: none"> <li>Desktop study information gathered from database and literature sources.</li> </ul>

The approach and methodology of the survey was in accordance with all relevant Commonwealth and State policy, including the following:

- *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016a);
- *Environmental Factor Guideline: Flora and Vegetation* (EPA 2016b);
- *Survey Guidelines for Australia's Threatened Orchids* (DoE 2013);
- *Approved Conservation Advice for the Banksia Woodlands of the Swan Coastal Plain ecological community* (DoEE 2016a);
- *Approved Conservation Advice for *Corymbia calophylla* – *Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain* (DoEE 2017a);

- *Approved Conservation Advice for the Corymbia calophylla – Kingia australis woodlands on heavy soils of the Swan Coastal Plain* (DoEE 2017b); and
- *Factsheet: Corymbia calophylla – Eucalyptus marginata woodlands on sandy clay soils of the southern Swan Coastal Plain* Factsheet (DBCA 2020).

The specific objectives of this study were as follows:

1. Undertake a desktop study, including database and literature searches, to consolidate all available existing data relevant to the study and survey area.
2. Undertake a field survey to:
  - describe, photograph and map the dominant vegetation units in the survey area;
  - assess and map vegetation condition throughout the survey area;
  - identify any vegetation units of significance in the survey area, including assessment of potential TECs against relevant Commonwealth conservation advice, and assessment of potential PECs against information published by the State Department of Biodiversity, Conservation and Attractions (DBCA);
  - compile a list of vascular flora species for the survey area; and
  - record flora of significance, including Threatened and Priority species and any other species of interest.
3. Supply all relevant data to the Shire of Serpentine Jarrahdale digitally in accordance with 'Instructions for the preparation of data packages for the Index of Biodiversity Surveys for Assessments (IBSA)' (EPA 2020), submit flora specimens as required to the WA Herbarium, and submit report forms for all Threatened and Priority flora and any TECs or PECs to the DBCA.

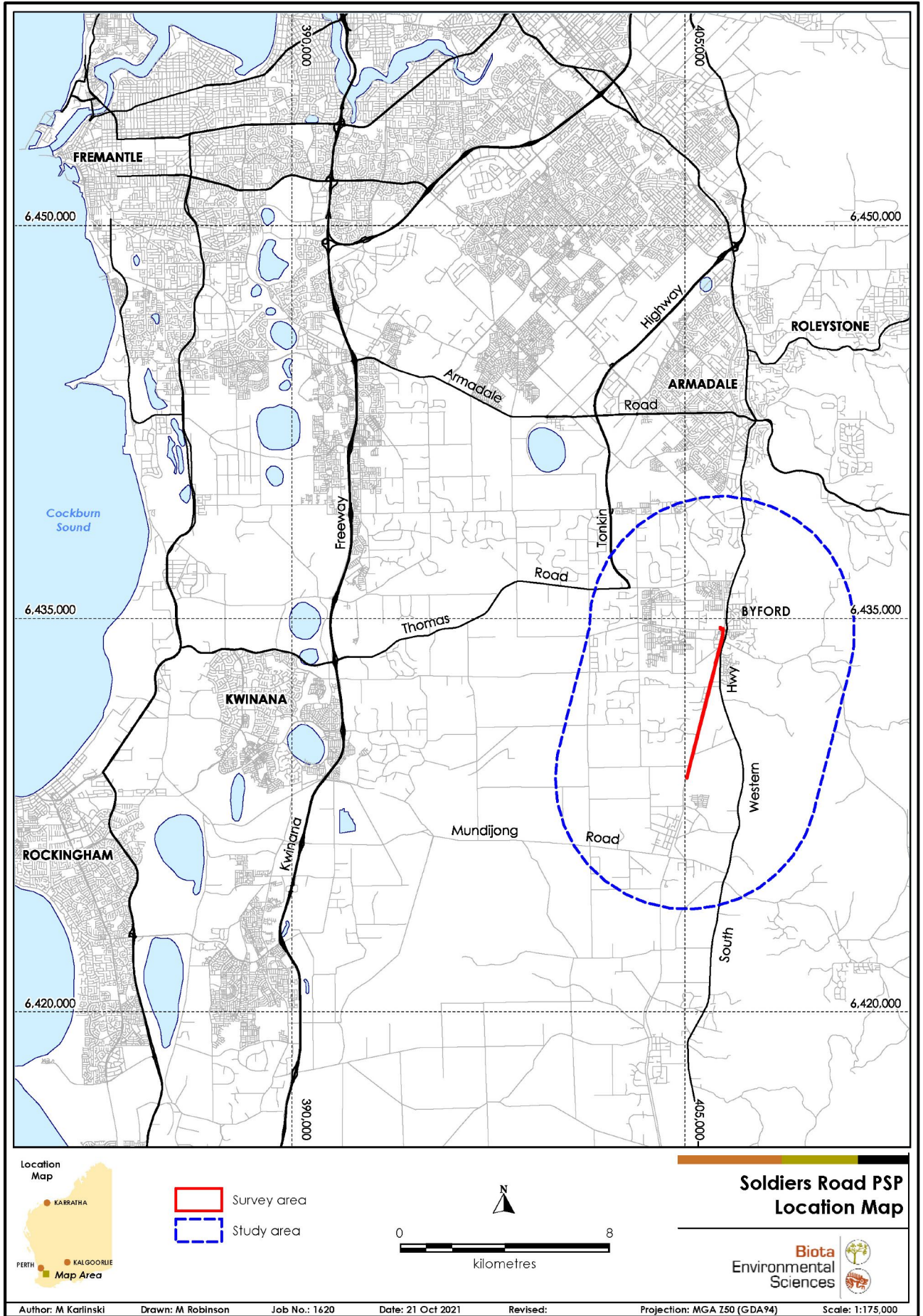


Figure 2.1: Location of survey and study area.

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## 3.0 Methodology

### 3.1 Definitions of Significant Communities and Species

#### 3.1.1 Communities

In Western Australia, an ecological community that is presumed to be totally destroyed or at risk of becoming totally destroyed may be listed as a TEC by the Minister for the Environment under the *Biodiversity Conservation Act 2016* (BC Act). Communities may also be listed as TECs at the Commonwealth level under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Communities with insufficient information available to be considered a TEC, or which are rare but not currently threatened, are placed on the State Priority list and referred to as PECs. Further information regarding the framework for significance ranking of communities in WA is presented in Appendix 1.

#### 3.1.2 Species

Native flora and fauna species that are rare, threatened with extinction, or have high conservation value, are specially protected by law under either or both of the WA BC Act and the Commonwealth EPBC Act. The DBCA also maintains a list of Priority species that are considered to be of significance, but which have not been assigned statutory protection under the BC Act.

Appendix 1 details the categories of significance recognised under the above frameworks and Table 3.1 outlines the codes used throughout this report for each category.

**Table 3.1 Explanation of codes used to identify categories of significance for species.**

Category	Listing		
	EPBC Act	BC Act	DBCA
Critically Endangered	CR	CR	-
Endangered	EN	EN	-
Vulnerable	VU	VU	-
Extinct	-	EX	-
Extinct in the Wild	-	EW	-
Conservation Dependent	CD	-	-
Near Threatened	NT	-	-
Migratory Species	MI	MI	-
Marine Species	M	-	-
Conservation Dependent Fauna	-	CD	-
Other Specially Protected Fauna	-	OS	-
Priority 1	-	-	P1
Priority 2	-	-	P2
Priority 3	-	-	P3
Priority 4	-	-	P4

#### 3.1.3 Environmentally Sensitive Areas

Environmentally sensitive areas (ESAs) are declared by the WA Minister for the Environment under section 51B of the *Environmental Protection Act 1986* (EP Act). ESAs that could potentially be of relevance to the current study would comprise:

- A Bush Forever site;
- a defined wetland and the area within 50 metres of the wetland;
- the area covered by vegetation within 50 metres of Threatened flora; or
- the area covered by a TEC.

## 3.2 Desktop Study

The aim of the desktop study was to compile and review information relevant to the study area, specifically to identify known features of significance, and as a preliminary assessment of potential key issues relating to the vegetation present and significant flora. This assessment considered regional information and previous biological surveys completed in the locality (Section 3.2.1), as well as the results of database searches (Section 3.2.3).

### 3.2.1 Literature Review

Published and unpublished reports relevant to the study area were reviewed. These included:

- Flora and Vegetation Survey: Cardup-Siding Rd, Wright Rd and Soldier's Rd, Byford (Del Botanics 2019);
- Byford Rail Extension: Flora and Vegetation Assessment (GHD 2021);
- Report for Rail Reserves in the Shire of Serpentine Jarrahdale Spring Flora and Vegetation Survey and Fauna and Habitat Assessment (GHD 2012);
- Briggs Park and Brickwood Reserve Management Plan 2016-2026 (Shire of Serpentine Jarrahdale 2016);
- Abernethy Road Upgrade, Byford, Flora, Vegetation and Fauna Report Addendum (360 Environmental 2015);
- Banksia Woodlands of the Swan Coastal Plain: a nationally-protected ecological community (DoEE 2016b);
- Factsheet: *Corymbia calophylla* – *Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain Factsheet (DBCA 2020);
- Vegetation Mapping in the South West of Western Australia and Regional Forest Agreement vegetation complexes (Mattiske and Havel 1998);
- The extension of vegetation complex mapping to landform boundaries within the Swan Coastal Plain landform and forested region of south-west Western Australia (Webb et al. 2016); and
- John Beard's vegetation mapping (Beard 1981a).

### 3.2.2 Spatial Data Review

Several regional-scale data sets and accompanying reports were examined, as well as bioregional data, soils and geology (Northcote et al. 1960, WA Planning Commission 2000a), vegetation complex mapping (Heddle et al. 1980, Webb et al. 2016), the Geomorphic Wetland data set (DBCA 2017) and Bush Forever (WA Planning Commission 2000a). These were spatially focused on the survey area, rather than the broader study area, to inform the general nature of the habitats and physical framework present.

### 3.2.3 Database Searches

The following databases were searched to assist in the determination of significant flora and vegetation occurring in the study area:

1. NatureMap (<https://naturemap.dpaw.wa.gov.au>) is a joint project of the DBCA and the WA Museum (WAM). This database represents the most comprehensive source of information on the distribution of Western Australia's flora and includes location records from the WA Herbarium Specimen Database (derived from lodgement of voucher specimens), as well as records from Threatened and Priority Flora Report Forms submitted to the DBCA. A NatureMap search was completed using a 5 km buffer around the survey area (-32.22°E 116.01°S, -32.27°E 115.99°S) (see Appendix 2).
2. A specific search of the DBCA Threatened and Priority Flora Database was also commissioned to confirm the Threatened and Priority flora species known from the area.
3. The DBCA database of TECs, PECs and ESAs was searched to identify significant communities known to occur in the locality.
4. The EPBC Act Protected Matters Search Tool (PMST) was used to identify flora and fauna species and other matters of national environmental significance (MNES) that may occur in the study area. The EPBC Protected Matters database search used a 5 km buffer around the survey area (-32.22°E 116.01°S, -32.27°E 115.99°S) (see Appendix 2).



### 3.2.4 Assessment of Likelihood of Occurrence

The likelihood of occurrence of significant species identified in the desktop study was assessed prior to and after the survey. This assessment was based on the proximity of previous records to the survey area, knowledge of the habitat preferences of each taxon, an assessment of the habitats present within the survey area, and any records obtained during the field survey. The criteria used to assess likelihood of occurrence are outlined in Table 3.2. For the purposes of this report, the term "close proximity" is defined as within 5 km of the survey area.

**Table 3.2: Criteria used to assign the likelihood of occurrence of flora and fauna of significance.**

Likelihood	Criteria
Recorded	1. The species was in this study or has been previously recorded in the survey area.
Likely to occur	1. There are existing records of the species within the study area; and <ul style="list-style-type: none"> <li>the species is strongly linked to a specific habitat, which is present in the survey area; or</li> <li>the species has more general habitat preferences, and suitable habitat is present.</li> </ul>
May potentially occur	1. There are existing records of the species within the study area, however <ul style="list-style-type: none"> <li>the species is strongly linked to a specific habitat, of which only a small amount is present in the survey area; or</li> <li>the species has more general habitat preferences, but only some suitable habitat is present in the survey area.</li> </ul> 2. There is suitable habitat in the survey area, but the species is recorded infrequently in the locality
Unlikely to occur	1. The species is linked to a specific habitat, which is absent in the survey area; or 2. Suitable habitat is present, however there are no existing records of the species from within the study area despite reasonable previous search effort in suitable habitat; or 3. There is some suitable habitat in the study area, however the species is very infrequently recorded in the locality or the only records are historic (>40 years ago).
Would not occur	1. The species is strongly linked to a specific habitat, which is absent from the survey area; and/or 2. The species' range is very restricted and would not include the survey area.

## 3.3 Survey Team, Timing and Weather

### 3.3.1 Survey Team

The quadrat sampling and rare flora searches were completed by two botanists from 6<sup>th</sup>-8<sup>th</sup> October 2021 (Table 3.3).

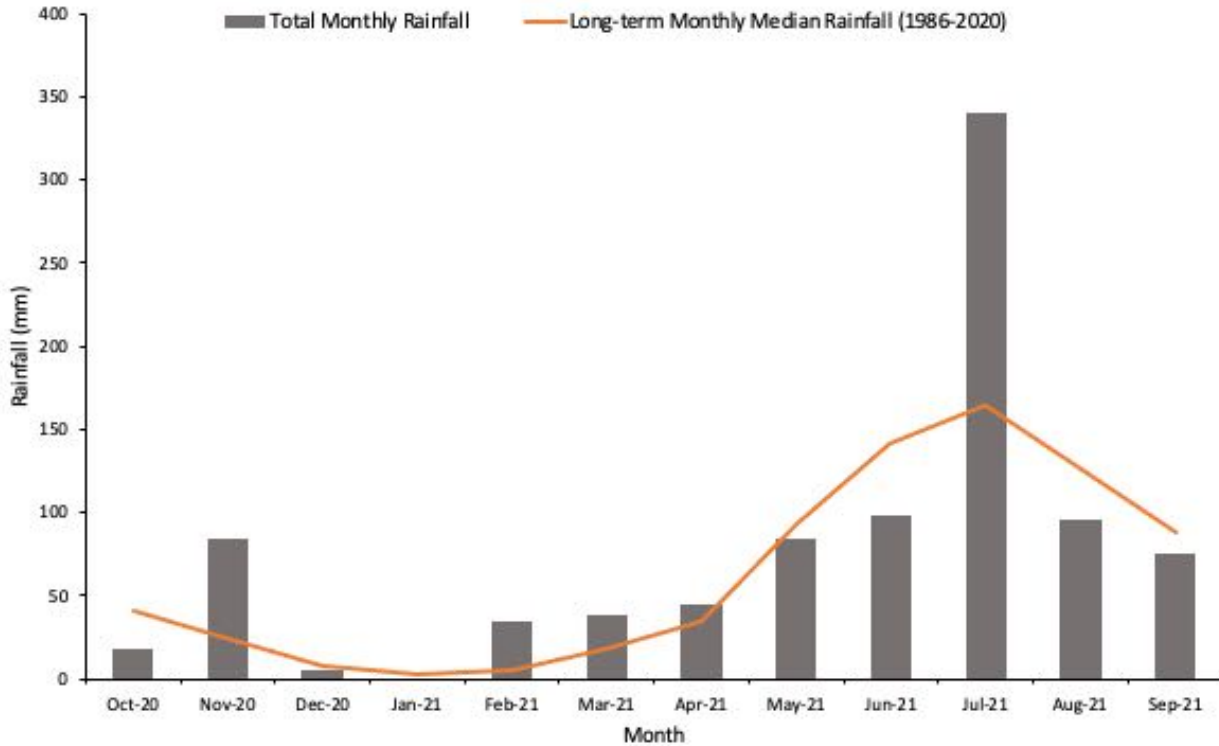
**Table 3.3: Summary of personnel involved in the flora and vegetation survey.**

Name	Position	Qualification	Years of Experience	Survey Role	Flora Licence
Melissa Karlinski	Botanist	BSc, MSc (Biological Sciences)	3	Team lead; Quadrat sampling, Rare flora searches, TEC Assessment/Mapping	FB62000285
Scott Werner	Senior Botanist	BSc (Cons Biol & Mgt) Hons	10	Quadrat sampling, Rare flora searches	FB62000038

### 3.3.2 Weather and Climate

The current survey was undertaken in spring, which is within the recommended season for botanical surveys in the Swan Coastal Plain (SCP) bioregion (EPA 2016a).

Long-term rainfall data were obtained from the Bureau of Meteorology weather station in Forrestdale (No. #009257), located approximately 10 km northwest of the survey area. Monthly rainfall totals followed a similar pattern to the long-term monthly median rainfall for the area, however, there was 340.6 mm of rainfall recorded in July 2021, which is more than double the long-term median rainfall total for July (163.7 mm; 1986-2020) (Figure 3.1). The spring survey timing was therefore considered optimal for the collection of annual and cryptic perennial flora.



**Figure 3.1:** Rainfall graph depicting long-term monthly median rainfall (1986-2020) and total monthly rainfall for 12 months preceding the survey. Data from Forrestdale weather station (No. #009257).

## 3.4 Flora and Vegetation Survey

### 3.4.1 Floristic Data Collection: Assessment of Quadrats

Indicative sampling locations were selected prior to the field survey. The survey area boundary was overlain on aerial imagery, and sampling sites were then selected based on the broad habitats and vegetation types apparent. Once in the field, the actual locations of the sampling sites were adjusted as necessary (e.g. to be placed in the best representative area of the broader vegetation unit).

The standard sampling site for the SCP bioregion comprises a 10 m x 10 m quadrat. Unpegged quadrats were measured using optical squares and measuring tapes.

The following parameters were recorded for all sampling sites:

1. Digital location using MGA coordinates (GDA94, zone 50K) recorded with a handheld Unistrong tablet with accuracy <1.5 m; coordinates were recorded for all four corners of each quadrat;
2. Habitat: A description of the landform and habitat;
3. Soil: A broad description of the soil and any stony surface mantle or rocky outcropping;
4. Fire History: An estimate of time since last fire;
5. Disturbance Details: Vegetation condition was ranked according to the scale from EPA (2016), which was based on that developed by Keighery (1994); this considered evidence of grazing, physical disturbance, weed invasion etc. (see Appendix 3);
6. Vegetation Description: a broad description based on the height and estimated percent foliar cover of dominant species using the vegetation structural scheme adapted from Muir (1977), and Aplin's (1979) modification of the vegetation classification system of Specht (1970) (see Appendix 3);
7. Flora Species: The estimated percentage foliar cover of each flora species present within the sampling site; and

8. Photographs: representative digital photographs of the vegetation were taken, from all four corners of both understorey and overstorey.

Sampling sites were assigned the prefix 'SOL', followed by a unique number. A total of four quadrats were assessed. The quadrat locations and overall survey effort are shown on Figure 3.2, with sampling site coordinates provided in Table 3.4 and raw sampling site data and photographs in Appendix 5.

### **3.4.2 Targeted Searches for Significant Flora**

The desktop study identified a subset of significant flora (i.e. Threatened and Priority listed species) from the locality that had either been previously recorded from the survey area or were considered to have some potential to occur (Appendix 4). Targeted systematic searches for these species were conducted on foot throughout the entire survey area.

Locations of significant species were recorded using a hand-held GPS unit. The number of individuals and extent of the population were also recorded for each location, together with the habitat and associated species. DBCA Threatened and Priority Flora Report Forms were completed for all new populations of significant species recorded from the survey area and submitted to the DBCA.

### **3.4.3 Vegetation Description and Condition Mapping**

Vegetation types in the survey area were described at the sub-association level (Level VI as per the National Vegetation Information System<sup>1</sup>). The sub-association level includes information about the dominant growth form, height and cover for up to five species in all layers/sub-strata observed.

Field data and aerial imagery were reviewed to determine boundaries of vegetation types, which were then mapped to an appropriate scale (generally 1:10,000; with finer-scale mapping at 1:5,000 for TECs/PECs).

Vegetation types and vegetation condition mapping were mapped by Melissa Karlinski using Geographical Information System (GIS) software (QGIS v3.10). The final figures were produced by Melissa Robinson (Senior Cartographer) of Biota, using MapInfo Professional GIS v12.

In addition to spatially mapping the extent of vegetation through the survey area, an assessment of the condition of the vegetation was also carried out.

Vegetation condition is determined in relation to the (perceived) ability of the vegetation to maintain itself (Keighery 1994). This is commonly interpreted from the visible amount of introduced species compared to native species. However, numerous other factors are also considered in the assessment of condition, including disturbance (e.g. grazing, erosion), degree of alteration to community and habitat structure, and overall site ecology.

Locations of any declared pests (weeds listed under the BAM Act) or Weeds of National Significance (WoNS) were also recorded during the foot traverses, along with an estimate of their population size.

The categories of vegetation condition used were consistent with the descriptive and qualitative method developed by Keighery (1994) (see Appendix 3).

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<sup>1</sup> See the NVIS Information Hierarchy: <http://www.environment.gov.au/land/publications/australian-vegetation-attribute-manual-v6/>



Figure 3.2: Flora and vegetation survey effort.

**Table 3.4: Quadrat location data.**

Site	Peg ID	Position	Datum Zone	Easting (mE)	Northing (mN)
SOL01	1	NE	WGS84 Z50	405241	6429531
	2	NW	WGS84 Z50	405233	6429534
	3	SE	WGS84 Z50	405239	6429522
	4	SW	WGS84 Z50	405230	6429526
SOL02	1	NE	WGS84 Z50	405393	6430118
	2	NW	WGS84 Z50	405384	6430121
	3	SE	WGS84 Z50	405389	6430109
	4	SW	WGS84 Z50	405381	6430112
SOL03	1	NE	WGS84 Z50	405727	6431431
	2	NW	WGS84 Z50	405718	6431434
	3	SE	WGS84 Z50	405724	6431423
	4	SW	WGS84 Z50	405716	6431425
SOL04	1	NE	WGS84 Z50	406216	6433371
	2	NW	WGS84 Z50	406207	6433374
	3	SE	WGS84 Z50	406211	6433359
	4	SW	WGS84 Z50	406203	6433364

### 3.4.4 Flora Specimen Identification, Nomenclature and Data Management

Flora species were identified either in the field, or in the office following the field survey. If a species was common and well known to the survey botanists, the identification was confirmed and noted in the field. If the species was difficult to determine without microscopic examination, belonged to a recognised species complex, or was poorly collected or otherwise unusual, a voucher specimen was collected. Specimens were pressed in the field, and then dried for further study and confirmation.

Voucher specimens were identified using flora keys, reference to appropriate publications, use of voucher reference collections and comparisons to the collections held at the WA Herbarium. Biota botanist Melissa Karlinski identified most specimens, which were then confirmed by specialist taxonomist Greg Keighery. A subset of specimens was also submitted to the WA Herbarium for paid identifications, which were completed by Mike Hislop.

All data were entered into a Microsoft Access Vegetation Database structure held internally at Biota. The database structure employed by Biota was developed by Ted Griffin (private consultant) at the request of Malcolm Trudgen (M.E. Trudgen and Associates). Nomenclature and significance rankings used in this report are in accordance with the current listing of WA flora recognised by the WA Herbarium, as listed on FloraBase<sup>2</sup> at the time of reporting.

### 3.4.5 Assessment of Potential TECs/PECs Against Diagnostic Criteria

TECs are described by DBCA as “biological (flora or fauna) assemblages occurring in a particular habitat, which are under threat of modification or destruction from various processes” (DEC 2010). TECs listed by the Minister for the Environment are protected by law under the *Environmental Protection Act 1986* and the BC Act. Twenty-five of the 69 TECs listed in WA are also nationally recognised and listed under the Commonwealth EPBC Act. The latest listing of TECs (DBCA 2018a) recognises 24 communities from the Swan Coastal Plain bioregion. TECs are also considered to be ESAs under the section 51B of WA's *Environmental Protection Act 1986* (EP Act).

<sup>2</sup> <http://florabase.dpaw.wa.gov.au>

PECs include possible TECs that do not meet survey criteria or are not adequately defined. These are added to the DBCA's PEC list under Priorities 1 (highest priority), 2 and 3. Ecological communities that are: 1) adequately known; 2) rare but not threatened, or meet criteria for Near Threatened; or 3) have been recently removed from the Threatened list, are placed in Priority 4. Conservation dependent ecological communities are placed in Priority 5 (see Appendix 1).

The primary method for classification of TECs on the Swan Coastal Plain (SCP) is to objectively assign floristic data collected from identified vegetation units to a Floristic Community Type (FCT), as classified by Gibson et al. (1994). Sites that exhibit a similar species composition to those identified in Gibson et al. (1994) can be confirmed to belong to specific FCT(s), and thus can be demonstrated to have an affinity to certain PECs or TECs. This method of classification relies on a spring survey conducted with the assessment of floristic quadrats and subsequent data analysis.

### 3.4.6 Floristic Analysis to Identify TECs/PECs

Floristic analyses were conducted using PATN v4 (Belbin 2020) to compare the sites from the survey area to the SCP reference data set using the same analysis software utilised by Gibson et al. (1994). The analyses were used to assign sites in the survey area, and thus distinct areas of vegetation units, to the equivalent floristic community type (FCT) as defined by Gibson et al. (1994), and to assist with determining the presence of significant vegetation, including TECs and PECs.

In keeping with the original Gibson et al. (1994) floristic analysis, the following protocols were used for the analysis and applied to the quadrat data set recorded during the current survey:

- Presence/absence data were used.
- All weeds were included.
- Some taxa were combined for the analysis. These were typically those that were considered difficult to accurately differentiate without sufficient flowering material (e.g. the taxa listed in Appendix 3 of Gibson et al. (1994)), or those that were represented by at species level rather than sub-species level.
- Records of taxa that were only identified to genus level (e.g. *Caladenia* sp.) were excluded, as these could refer to multiple taxa.

A test analysis was run using the reference data set, with the clustering analysis technique kept consistent with that used by Gibson et al. (1994):

- Sites were classified into 30 groups using the Bray Curtis (Czekanowski) association measure, followed by an agglomerative hierarchical fusion classification using "flexible unweighted pair-group mean average" (flexible UPGMA). The beta value was set at -0.1.

Once the basic technique had been validated, the data from the sampling sites were combined with the Gibson et al. (1994) data set. It is widely recognised that adding multiple new samples (sites) to a data set can result in considerable reassignment of samples to different groups than those produced through the original hierarchical clustering process. To minimise disruption to the existing floristic groups identified by Gibson et al. (1994), each site was added individually to the data set, and clustering was checked against the original. This process was referred to as Single Site Insertion by Trudgen and Trudgen (2010); we have modified this to Single Sample Insertion (SSI), due to the use of the "single-site insertion" term in the genetics field.

A further analysis, Nearest Neighbour Border (NNB), was completed in PATN to determine the 20 original Gibson et al. (1994) sites that were most similar to the new sites. The NNB analysis determines the most similar sites on the basis of species composition, and forms linkages without imposing clustering. This technique often reveals relationships that may be lost when a clustering technique is used.

Summary outputs from all analyses are provided in Appendix 6.

## 3.5 Study Limitations

The results of the field survey provide an adequate representation of the flora and vegetation values of the survey area. However, there are limitations to this study that must be considered when reviewing and applying the results detailed in this report. As per the Environmental Protection Authority's (EPA) Technical Guidance for flora for EIA (EPA 2016a), potential constraints and consequent limitations of this study are summarised in Table 3.5.

**Table 3.5: Potential constraints and limitations of the current surveys.**

Potential Constraint	Statement of Limitations
1. Availability of contextual information at a regional and local scale	<ul style="list-style-type: none"> <li>Extensive previous survey work has been undertaken in the region and contextual information was readily available.</li> <li>Contextual information was not considered a limitation.</li> </ul>
2. Competency/ experience of the team carrying out the survey, including experience in the bioregion surveyed	<ul style="list-style-type: none"> <li>The field personnel have extensive experience in the SCP region and were suitably qualified to identify flora and conduct biological surveys.</li> <li>Competency was not considered to be a limitation.</li> </ul>
3. Proportion of species recorded and/or collected, any identification issues	<ul style="list-style-type: none"> <li>All vascular flora encountered in the survey area were recorded, with collections made of any taxa that were unusual, or difficult to identify without microscopic examination. The great majority of flora taxa were able to be identified to the lowest level possible within the current taxonomic framework.</li> <li>Overall, identification and the proportion of flora recorded was not considered to be a limitation given the objectives of this survey.</li> </ul>
4. Appropriate area fully surveyed (effort and extent)	<ul style="list-style-type: none"> <li>The survey area was surveyed appropriately from a flora perspective, with sampling sites assessed and foot traverses completed through the entirety of the survey area.</li> <li>Low intensity sampling of the vegetation with quadrats was undertaken, which matched the requirements of a targeted flora survey as per the EPA guidance (EPA 2016a).</li> <li>Survey effort and extent for the survey was not considered to be a limitation.</li> </ul>
5. Access restrictions within the survey and contextual areas	<ul style="list-style-type: none"> <li>There were no restrictions with accessing the survey area, however there were minor restrictions regarding the proximity to the railway.</li> <li>This did not reduce the efficiency of the surveying and therefore access was not considered to be a limitation.</li> </ul>
6. Survey timing, rainfall, season of survey	<ul style="list-style-type: none"> <li>The survey took place in spring, which is optimal timing for SCP surveys.</li> <li>The survey area had received adequate rainfall for flora collecting in the months prior to the survey.</li> <li>Survey timing was not considered to be a limitation.</li> </ul>
7. Disturbance that may have affected the results of the survey (such as fire, flood or clearing)	<ul style="list-style-type: none"> <li>No parts of the survey area had been recently burnt.</li> <li>Existing clearing associated with the PTA rail access road and railway network comprised the majority of cleared areas within the survey area. However, the majority of the survey area remained uncleared.</li> <li>Disturbance is not considered to have been a limitation for the study.</li> </ul>

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## 4.0 Desktop Study

### 4.1 IBRA Bioregion and Subregion

The study area lies within the SCP bioregion, one of 89 bioregions defined by the Interim Biogeographic Regionalisation for Australia (IBRA) (DSEWPaC 2012). This bioregion is characterised by *“a low lying coastal plain, mainly covered with woodlands. It is dominated by Banksia or Tuart on sandy soils, paperbark in swampy areas and Jarrah where the plain rises to duricrusted Mesozoic sediments”* (Mitchell et al. 2003).

The study area is located in the Perth subregion (SWA02), which is described by Mitchell et al. (2003) as:

“composed of colluvial and aeolian sands, alluvial river flats, coastal limestone. Heath and/or Tuart woodlands on limestone, Banksia and Jarrah- Banksia woodlands on Quaternary marine dunes of various ages, Marri on colluvial and alluvials. Includes a complex series of seasonal wetlands and also includes Rottneest, Carnac and Garden Islands. The subregional area is 1, 333, 901 ha.”

### 4.2 Conservation Reserves in the Locality

Numerous parcels of land are vested for the purposes of the Conservation of Flora and Fauna within the study area (Figure 4.1). In particular, the study area intersects the following:

- Cardup Nature Reserve;
- Watkins Road Nature Reserve; and
- Jarrahdale State Forest.

### 4.3 Bush Forever

Bush Forever is a State government policy and program, which identified 51,200 ha of regionally significant bushland on the SCP for protection (WA Planning Commission 2000b). Bush Forever areas are protected as ESAs pursuant to the EP Act.

Bush Forever site 350 (Byford to Serpentine Rail/Road Reserves and Adjacent Bushland) intersects the survey area. Thirteen Bush Forever sites occur within the study area, four of which occur within 100 m of the survey area:

- Site 321 (Brickwood Reserve and Adjacent Bushland, Byford);
- Site 352 (Cardup Nature Reserve and Adjacent Bushland, Cardup);
- Site 354 (Norman Road Bushland, Whitby/Cardup); and
- Site 361 (Norman Road Bushland, Whitby/Cardup) (Figure 4.1).

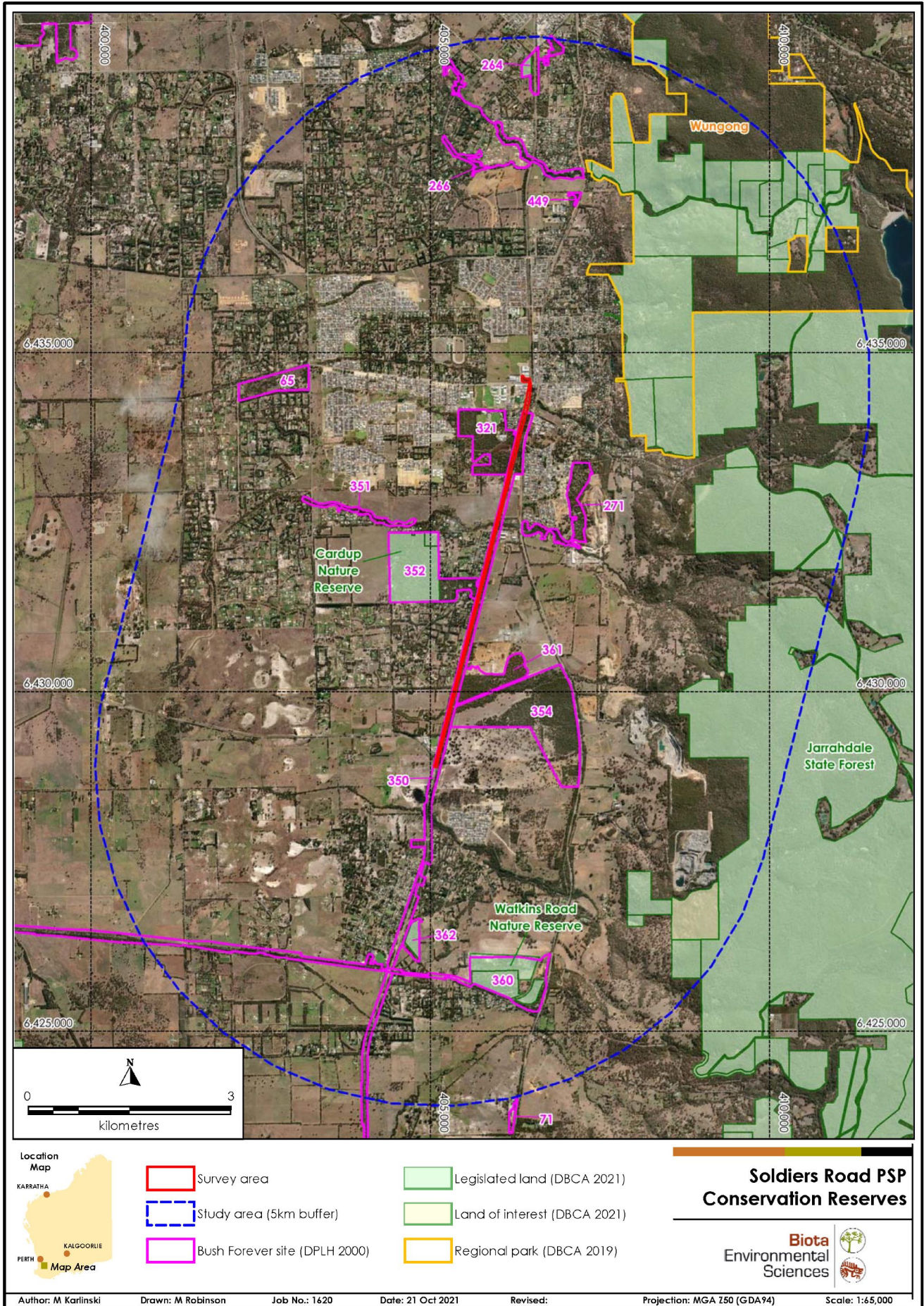


Figure 4.1: Conservation estate within the study area.

## 4.4 Surface Geology

Geological units for the locality were mapped at 1:50,000 scale on the 2033-1 map sheet by the Geological Survey of Western Australia (2001) as part of the Geological Survey of WA series.

Four geological units intersect the survey area, which is dominated by gravelly, sandy clay (Table 4.1 and Figure 4.2).

**Table 4.1: Surface geology units within the survey area.**

Unit	Description	Area in Survey Area (ha)
Csg	GRAVELLY SANDY CLAY - variable, with lenses of silt and gravel, quartz sand, subangular with eolian rounded component; heavy minerals common; gravel rounded, of colluvial origin.	13.89 (68.6 %)
Cs	SANDY CLAY - white-grey to brown, fine to coarse-grained, subangular to rounded sand, clay of moderate plasticity gravel and silt layers near scarp.	2.82 (13.9%)
FS1	IRONSTONE - red-brown limonite gravel cemented in a quartz sand/limonite/silt matrix, of alluvial origin.	2.51 (12.4%)
S8	SAND - white to pale grey at surface, yellow at depth, fine to medium-grained, moderately sorted, subangular to subrounded, minor heavy minerals, of eolian origin.	1.03 (5.1 %)

## 4.5 Soils

The survey area occurs predominately within the Forrestfield soil-landscape system, with some smaller areas also intersecting the Bassendean and Pinjarra systems. The Forrestfield system is described as "Low relief spurs forming the foothills of the Darling and Whicher Scarps. Soils are sands and gravels" (DPIRD 2018).

Soil units for the locality were mapped at 1:1,000,000 scale by Northcote et al. (1967) as part of the Atlas of Australian Soils. The entirety of the survey area lies within the 'Wd6' soil unit (Table 4.2, Figure 4.3).

**Table 4.2: Soil units within the survey area as described and mapped by Northcote et al. (1967).**

Unit	Description	Area in Survey Area (ha)
Wd6	Plain: chief soils are sandy acidic yellow mottled soils (Dy5.81), some of which contain ironstone gravel, and in some deeper varieties (18 in. of A horizon) (Uc2.22) soils are now forming. Associated are acid yellow earths (Gn2.24). Other soils include (Dy3.81) containing ironstone gravel; (Dy3.71); low dunes of (Uc2.33) soils; and some swamps with variable soils.	20.24 (100%)

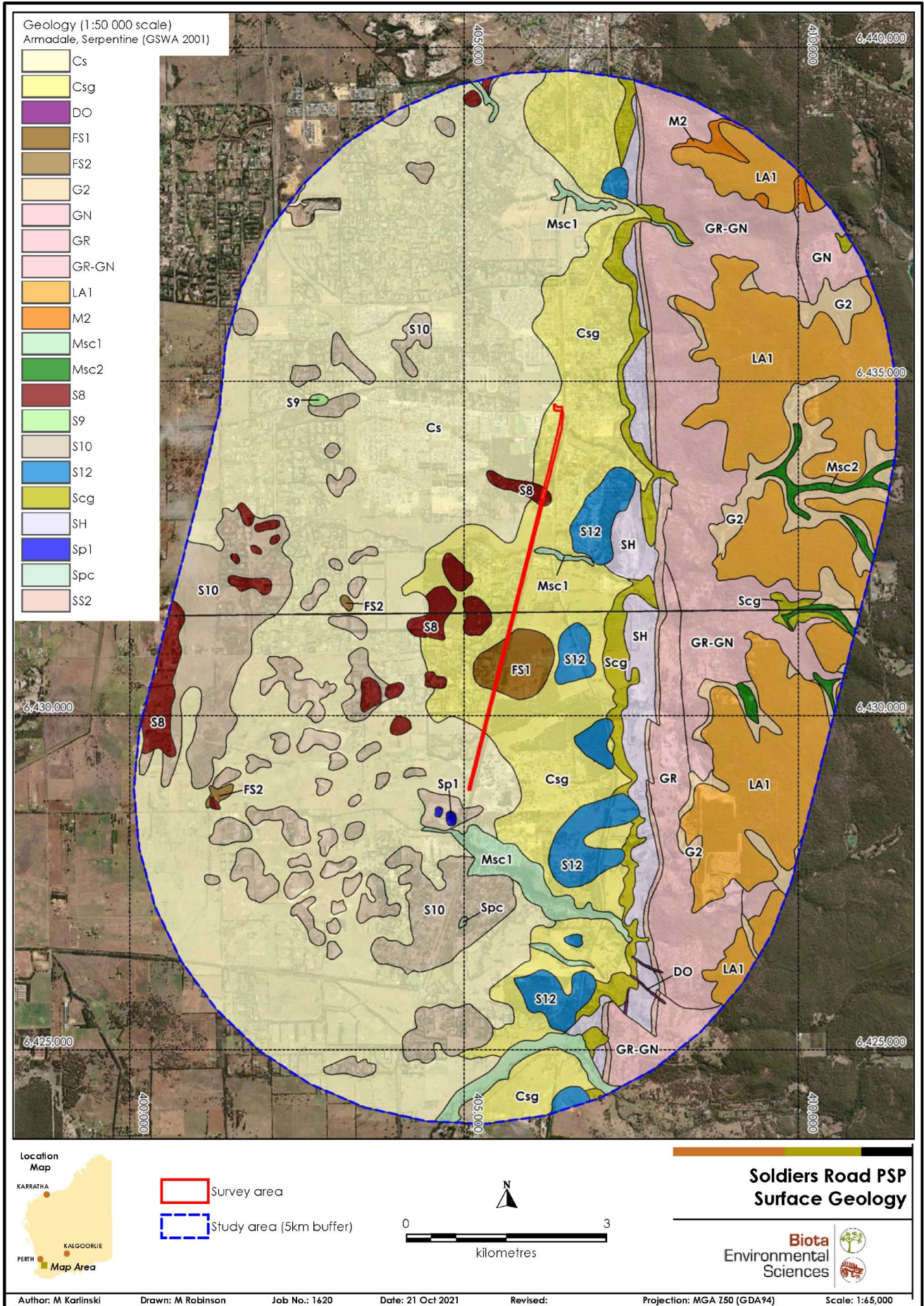


Figure 4.2: Geological units of the study area.

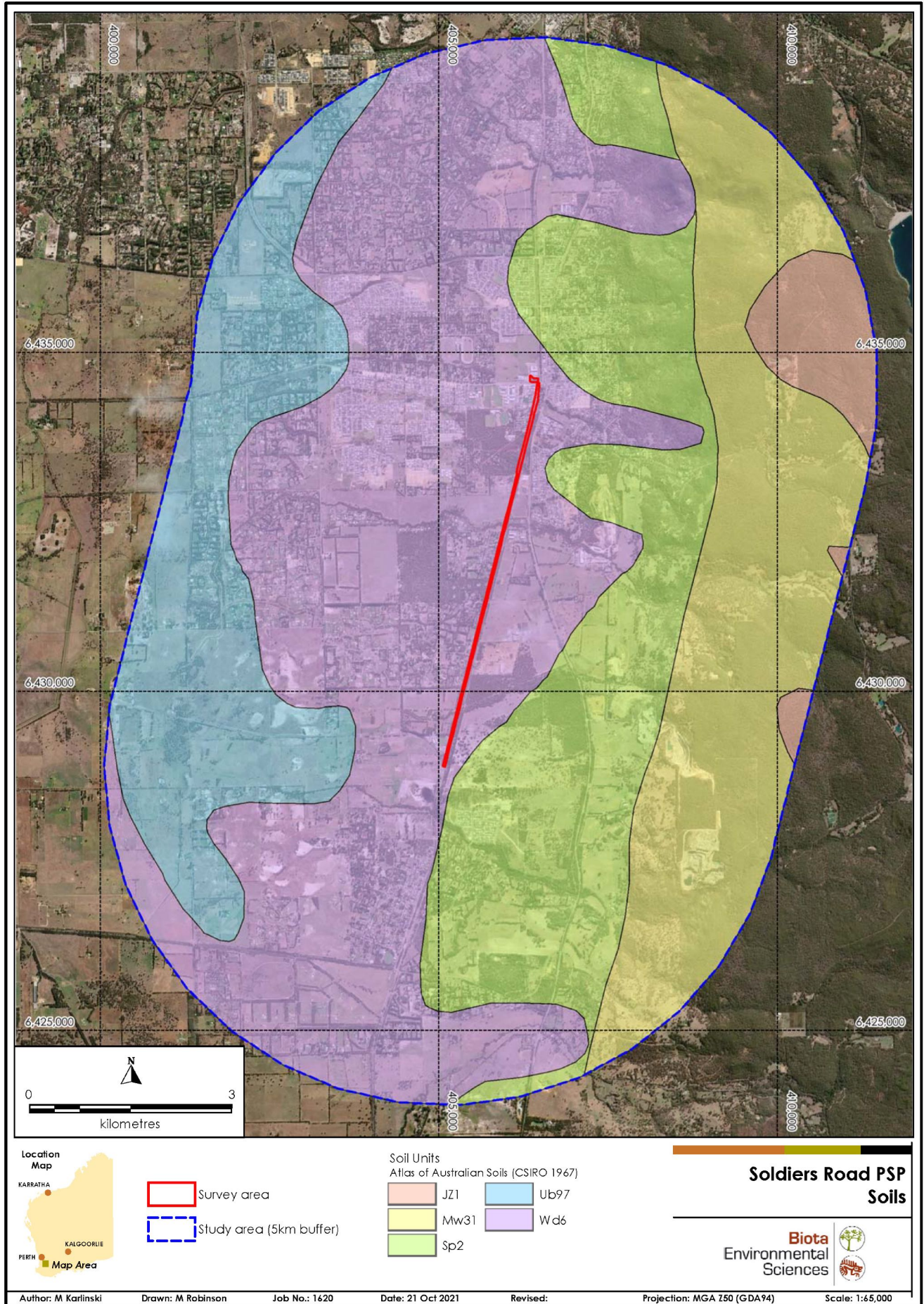


Figure 4.3: Soil units of the study area.

## 4.6 Wetlands of the Study Area

### 4.6.1 Geomorphic Wetlands

Wetlands on the SCP are assigned management categories to provide guidance on protection and appropriate use. These categories include:

- Conservation (wetland supports a high level of ecological attributes and functions);
- Resource Enhancement (wetland may have been modified or degraded, but still supports substantial ecological attributes and functions); and
- Multiple Use (wetland with few remaining important attributes and functions) (DBCAs 2017).

Geomorphic wetlands intersecting the survey area are outlined in Table 4.3 and shown in Figure 4.4. The 'Conservation' category occupies the largest area of the survey area (8.43 ha), closely followed by the 'Multiple Use' category (8.03 ha).

**Table 4.3: Geomorphic Wetlands intersecting the survey area (DBCAs 2018b)**

Wetland Name	Wetland Unique Feature Identifier (UFI)	Landform	Wetland Type	Management Category	Total Wetland Size (ha)
Armadale Palusplain	15797	Flat	Palusplain	Multiple Use	3.86
	15383	Flat	Palusplain	Multiple Use	2.98
	14507	Flat	Palusplain	Multiple Use	2.08
Byford Rail Reserve	14505	Flat	Palusplain	Conservation	2.05
	14506	Flat	Palusplain	Conservation	1.31
Unknown	13010	Flat	Palusplain	Conservation	1.22
	15462	Flat	Palusplain	Conservation	1.09
	14543	Flat	Palusplain	Multiple Use	0.62
	15382	Flat	Palusplain	Multiple Use	0.57
	15461	Flat	Palusplain	Multiple Use	0.49
	15015	Flat	Palusplain	Multiple Use	0.18
	14538	Flat	Palusplain	Resource Enhancement	0.17
16021	Flat	Palusplain	Multiple Use	0.02	

### 4.6.2 Wetlands of International Importance (Ramsar)

The EPBC Act Protected Matters search tool identified two Wetlands of International Importance (Ramsar) or Nationally Important Wetlands in the study area locality, however neither intersects the survey area.

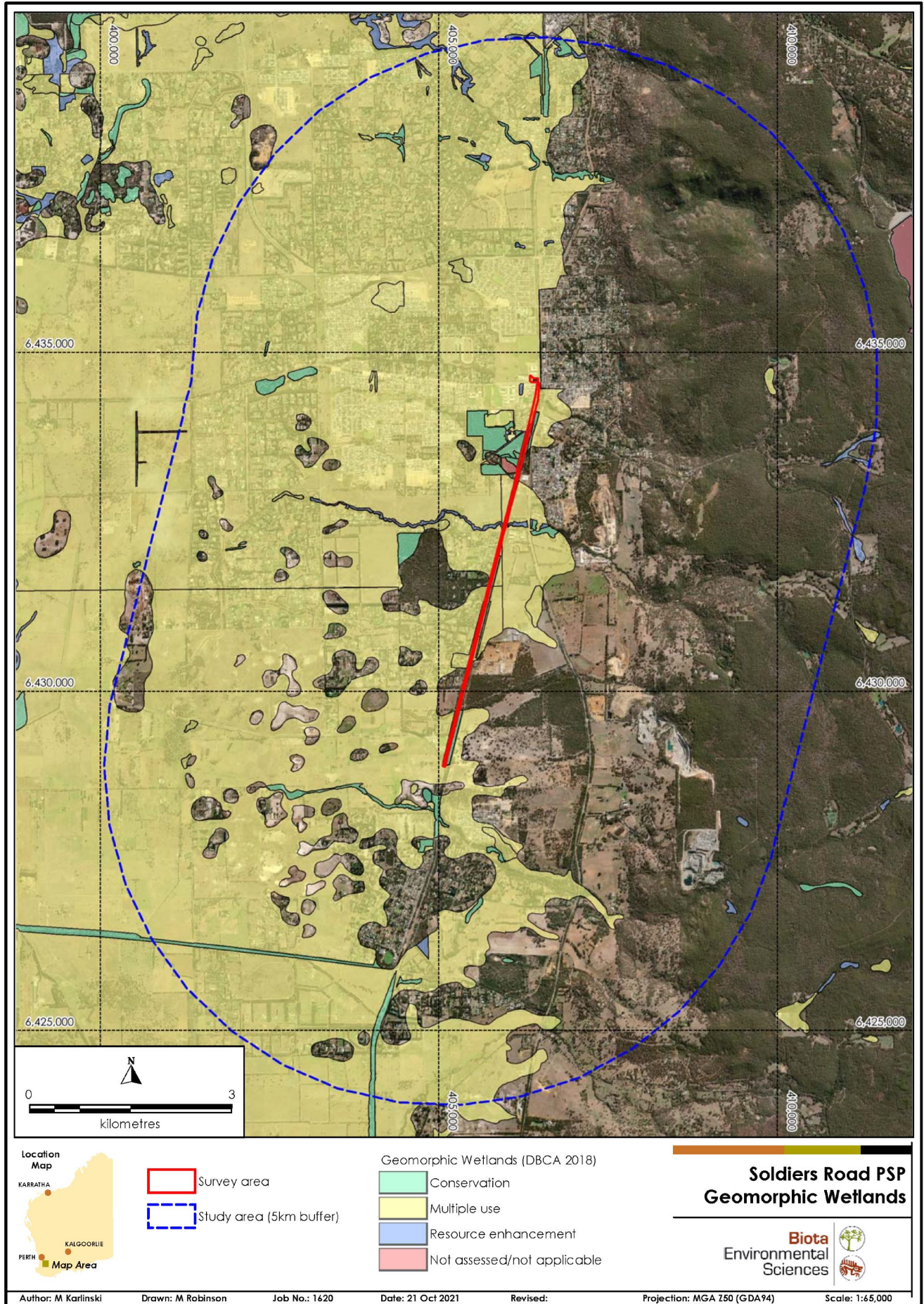


Figure 4.4: Location of geomorphic wetlands intersecting the survey area.

## 4.7 Regional Vegetation Mapping

### 4.7.1 Pre-European Vegetation Mapping of Beard (1981)

John Beard mapped the vegetation of the SCP at 1:1,000,000 scale (Beard 1981a). Based on Beard's mapping, the survey area lies within two vegetation system associations (Table 4.4, Figure 4.5). The majority of the survey area (98.4%) was mapped as Pinjarra\_968: "Medium woodland: jarrah, marri & wandoo".

**Table 4.4: Vegetation associations in the survey area as described and mapped by Beard (1981).**

System Association	Descriptions (NVIS Level VI)	Survey Area (ha)/%
<b>Pinjarra_968</b>	<p><b>Beard:</b> Medium woodland; jarrah, marri &amp; wandoo</p> <p><b>NVIS VI:</b> U1+ ^Eucalyptus marginata, ^Corymbia calophylla, ^Eucalyptus subangusta\^tree\7\i; U2 ^Allocasuarina fraseriana, Banksia grandis, Persoonia longifolia, Persoonia elliptica, Nuytsia floribunda\^tree\6\i; M1 ^Acacia sp., Adenanthos sp., Agonis parviceps, Baeckea sp., Bossiaea sp.\^shrub, grass-tree\4\i; G1 ^Astroloma sp., Leucopogon sp., Macrozamia riedlei\^shrub, cycad\2\i</p>	19.92 (98.4%)
<b>Pinjarra_3</b>	<p><b>Beard:</b> Medium forest; jarrah-marri</p> <p><b>NVIS VI:</b> U1+ ^Eucalyptus marginata, ^Corymbia calophylla, Eucalyptus wandoo, Eucalyptus rudis\^tree\7\i; U2 ^Allocasuarina fraseriana, Melaleuca preissiana\^tree\6\i</p>	0.33 (1.6%)

### 4.7.2 Vegetation Complex Mapping of Heddle (1980)

The vegetation complexes of the SCP have been mapped by Heddle et al. (1980) at a scale of 1:250,000. The 'Guildford Complex' is the dominant vegetation complex within the survey area (Figure 4.6). Vegetation complexes and their extent within the survey area are listed in Table 4.5.

**Table 4.5: Vegetation complexes in the survey area as described by Heddle et al. (1980).**

Vegetation Complex	Description	Survey Area (ha)/%
<b>Guildford Complex</b>	A mixture of open forest to tall open forest of <i>Corymbia calophylla</i> (Marri) - <i>Eucalyptus wandoo</i> (Wandoo) - <i>Eucalyptus marginata</i> (Jarrah) and woodland of <i>Eucalyptus wandoo</i> (Wandoo) (with rare occurrences of <i>Eucalyptus lane-poolei</i> (Salmon White Gum)). Minor components include <i>Eucalyptus rudis</i> (Flooded Gum) - <i>Melaleuca raphiophylla</i> (Swamp Paperbark).	15.55 (76.81%)
<b>Forrestfield Complex</b>	Vegetation ranges from open forest of <i>Corymbia calophylla</i> (Marri) - <i>Eucalyptus wandoo</i> (Wandoo) - <i>Eucalyptus marginata</i> (Jarrah) to open forest of <i>Eucalyptus marginata</i> (Jarrah) - <i>Corymbia calophylla</i> (Marri) - <i>Allocasuarina fraseriana</i> (Sheoak) - <i>Banksia</i> species. Fringing woodland of <i>Eucalyptus rudis</i> (Flooded Gum) in the gullies that dissect this landform.	4.70 (23.19%)



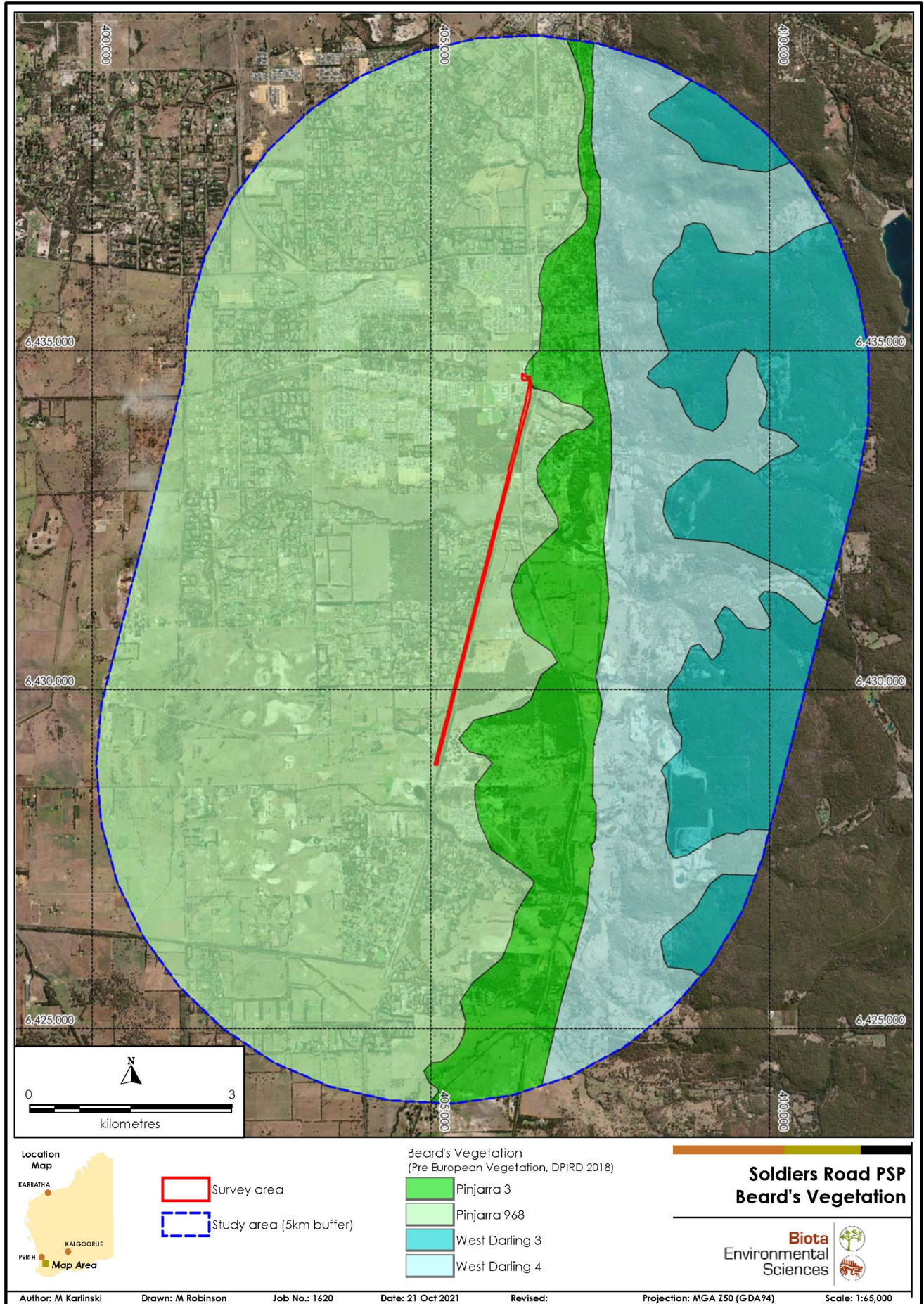


Figure 4.5: Beard's vegetation associations of the study area (Beard 1981b).

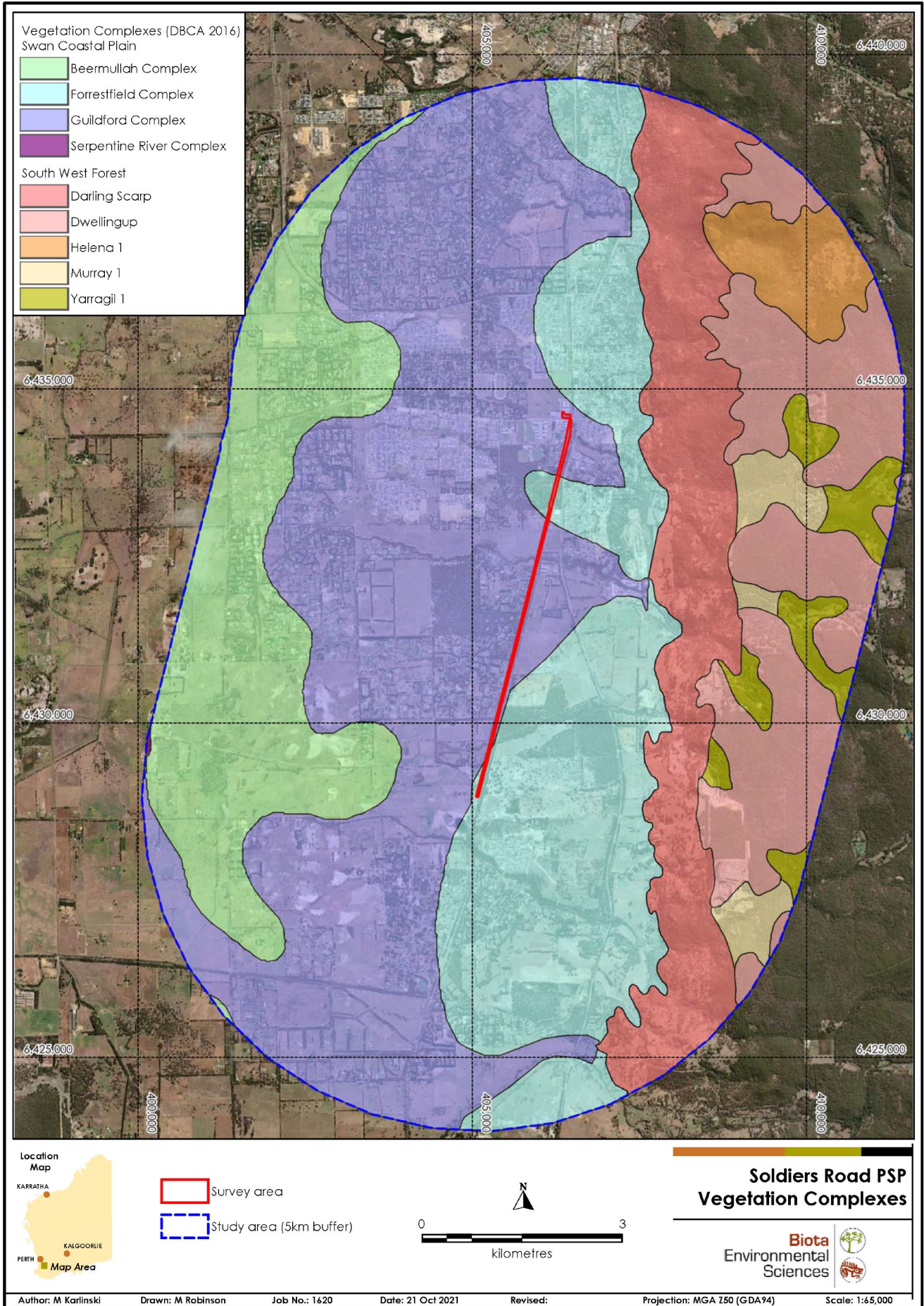


Figure 4.6: Heddle vegetation complexes of the study area (Heddle et al. 1980).

## 4.8 Previous Biological Surveys in the Locality

A small number of directly relevant flora surveys were sourced for the current study. These comprised surveys conducted since 2011 and in habitats similar to those in the survey area (Table 4.6).

**Table 4.6: Relevant surveys conducted previously in or nearby the survey area.**

Report/Survey	Survey Timing	Survey Description	Significant Findings
Byford Rail Extension Flora and Vegetation Assessment (GHD 2021)	Sep & Nov 2020	<ul style="list-style-type: none"> <li>• Desktop study</li> <li>• Targeted survey</li> <li>• Flora and vegetation assessment</li> </ul>	<ul style="list-style-type: none"> <li>• Floristic Community Type 3a (inconclusive)</li> <li>• <i>Eucalyptus x balanites</i> (Threatened)</li> <li>• <i>Johnsonia pubescens</i> subsp. <i>cygnorum</i> (Priority 2)</li> </ul>
Flora and Vegetation Survey: Cardup-Siding Rd, Wright Rd and Soldier's Rd, Byford (Del Botanics 2019)	Sep-Nov 2019	<ul style="list-style-type: none"> <li>• Desktop study</li> <li>• Targeted survey</li> <li>• Flora and vegetation assessment</li> </ul>	<ul style="list-style-type: none"> <li>• Floristic Community Types 3a &amp; 3c</li> </ul>
Report for Rail Reserves in the Shire of Serpentine Jarrahdale Spring Flora and Vegetation Survey and Fauna and Habitat Assessment (GHD 2012)	Nov 2011	<ul style="list-style-type: none"> <li>• Desktop study</li> <li>• Targeted survey</li> <li>• Flora and vegetation assessment</li> </ul>	<ul style="list-style-type: none"> <li>• Floristic Community Types 3a &amp; 3c</li> <li>• <i>Johnsonia pubescens</i> subsp. <i>cygnorum</i> (Priority 2)</li> </ul>

## 4.9 Significant Flora Species Known from the Study Area

A total of 16 Threatened flora species and 18 Priority species were identified through the desktop study as having been recorded within the study area or having the potential to occur (see Figure 4.7 and Appendix 4). An assessment of the likelihood of occurrence of each of these species within the survey area was completed, based on the habitats and vegetation types present, as well as the currency of records.

Two Threatened species have previously been recorded within the survey area, with a further nine species (four Threatened and five Priority) considered likely to occur and three Priority species that may potentially occur (see Appendix 4):

1. Previously recorded within the survey area:
  - *Synaphea* sp. Pinjarra Plain (A.S. George 17182) (Threatened); and
  - *Synaphea* sp. Serpentine (G.R. Brand 103) (Threatened).
2. Likely to occur within the survey area:
  - *Diuris purdiei* (Threatened);
  - *Drakaea elastica* (Threatened);
  - *Eucalyptus x balanites* (Threatened);
  - *Morelotia australiensis* (Threatened);
  - *Calectasia grandiflora* (Priority 2);
  - *Johnsonia pubescens* subsp. *cygnorum* (Priority 2);
  - *Babingtonia urbana* (Priority 3);
  - *Schoenus pennisetis* (Priority 3); and
  - *Drosera occidentalis* (Priority 4).
3. May potentially occur within the survey area:
  - *Acacia lasiocarpa* var. *bracteolata* long peduncle variant (G.J. Keighery 5026) (Priority 1);
  - *Stylidium aceratum* (Priority 3); and
  - *Verticordia lindleyi* subsp. *lindleyi* (Priority 4).

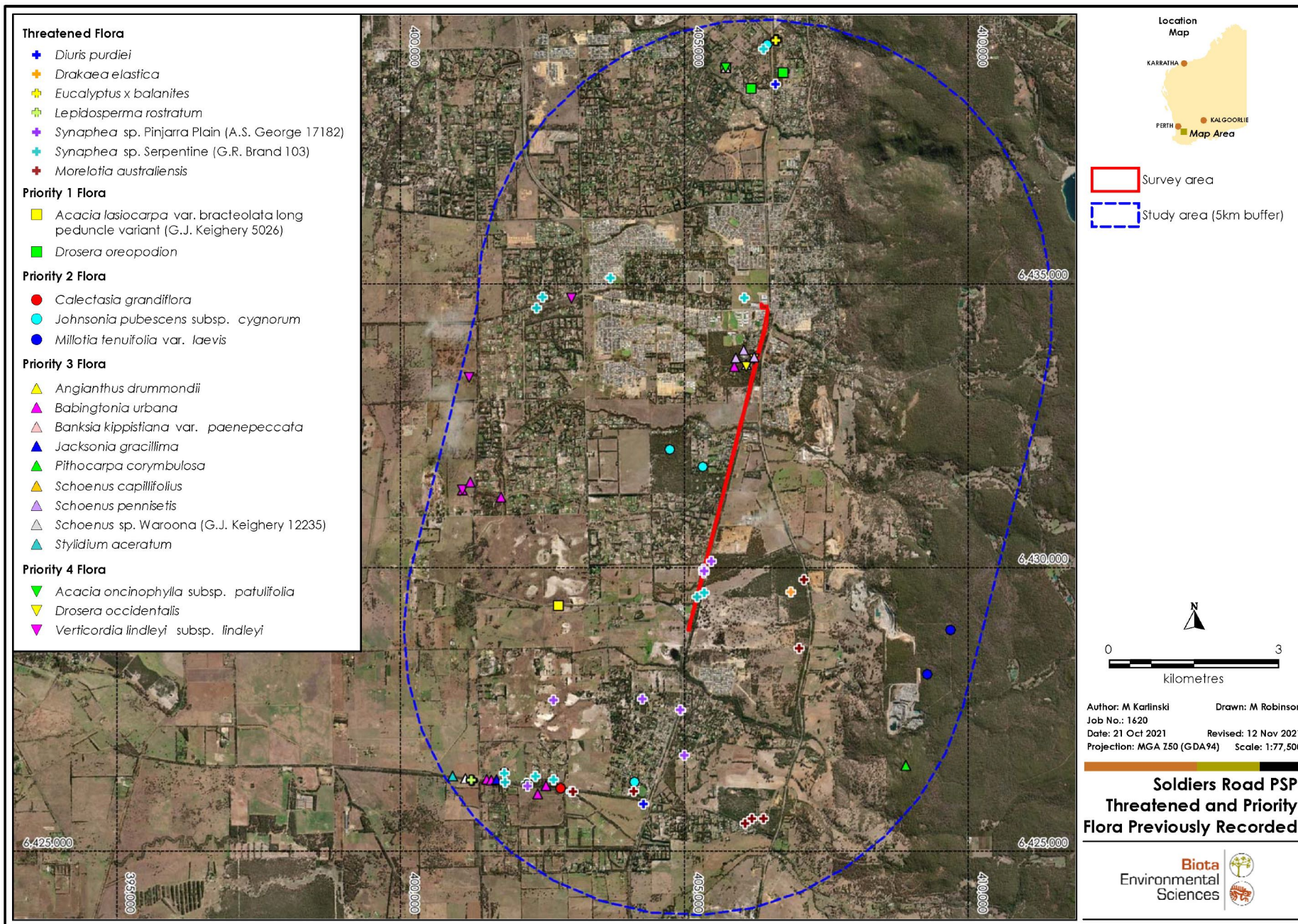


Figure 4.7: Threatened and Priority Flora records from the study area.

## 4.10 Vegetation of Significance

### 4.10.1 Threatened and Priority Ecological Communities

Communities listed as TECs are of significance at the State level and are protected as ESAs under the EP Act. Twenty-five of the 69 TECs listed in WA are also nationally recognised and listed under the Commonwealth EPBC Act. The description, area, and condition thresholds that apply to any EPBC-listed TEC also apply to any corresponding equivalent State-listed PEC of the same name (DBCA 2019). The latest State listing of TECs (DBCA 2018a) recognises 23 such communities from the SCP bioregion. Fifteen of these TECs are listed under the EPBC Act.

Based on database search results and reviewed literature, the buffers of eight Commonwealth-listed TECs as well as eight State-listed TECs and three State-listed PECs and were identified as occurring within the study area (Table 4.7; Figure 4.8). The likelihood that each vegetation community would occur in the survey area was then assessed (Table 4.7).

**Table 4.7: Threatened and Priority Ecological Communities identified during the desktop study and the likelihood that they would occur in the survey area.**

Community Name	Status		Likelihood of Occurrence (pre-survey)
	EPBC Act	State-level	
<b>Threatened Ecological Community (TEC)</b>			
Dense shrublands on clay flats (FCT 9 of Gibson et al. 1994)	Critically Endangered	Vulnerable	Recorded
Herb rich shrublands in clay pans (FCT 8 of Gibson et al. 1994)	Critically Endangered	Vulnerable	Unlikely to occur
<i>Corymbia calophylla</i> – <i>Kingia australis</i> woodlands on heavy soils, Swan Coastal Plain (FCT 3a of Gibson et al. 1994)	Endangered	Critically Endangered	Recorded
<i>Corymbia calophylla</i> – <i>Xanthorrhoea preissii</i> woodlands and shrublands, Swan Coastal Plain (FCT 3c of Gibson et al. 1994)	Endangered	Critically Endangered	Recorded
<i>Banksia attenuata</i> and/or <i>Eucalyptus marginata</i> woodlands of the eastern side of the Swan Coastal Plain (FCT 20b of Gibson et al. 1994)	Endangered	Endangered	Recorded
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Priority 3	Recorded
Low lying <i>Banksia attenuata</i> woodlands or shrublands (FCT 21c of Gibson et al. 1994)	Endangered	Priority 3	Unlikely to occur
Communities of Tumulus Springs (Organic Mound Springs, Swan Coastal Plain)	Endangered	Critically Endangered	Recorded
<i>Corymbia calophylla</i> – <i>Eucalyptus marginata</i> woodlands on sandy clay soils of the southern Swan Coastal Plain (FCT 3b of Gibson et al. 1994)	-	Vulnerable	Recorded
Southern wet shrublands, Swan Coastal Plain (FCT 2 of Gibson et al. 1994)	-	Endangered	Unlikely to occur
<b>Priority Ecological Community (PEC)</b>			
<i>Casuarina obesa</i> association	-	Priority 1	Unlikely to occur

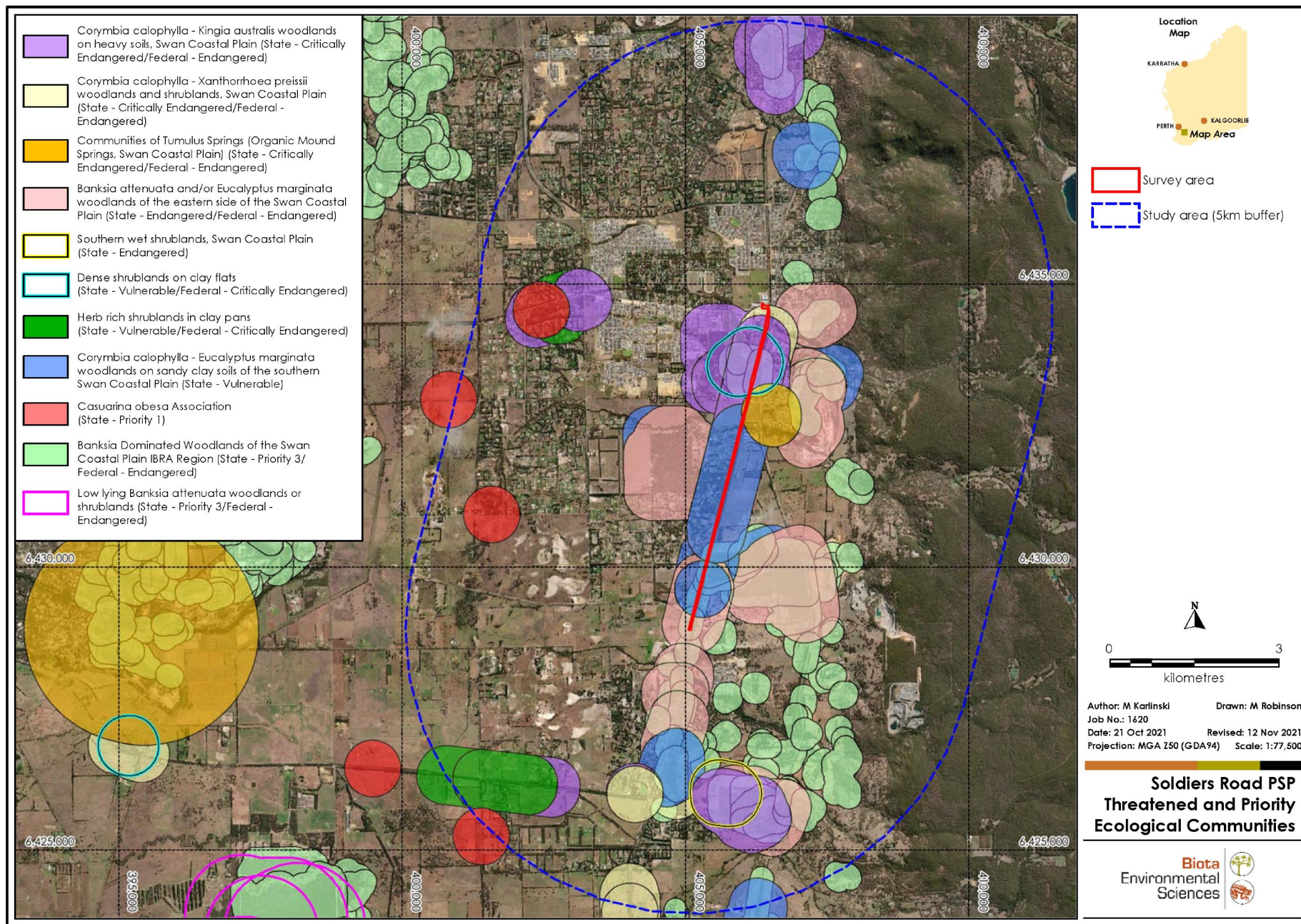


Figure 4.8: Records of both Commonwealth TECs and state listed TECs and PECs within the study area.

#### 4.10.2 Floristic Community Types known from the Study Area

Floristic Community Types (FCTs) are an alternate classification system for regional vegetation, which define groupings based on floristic composition instead of structural vegetation units. FCTs are important as they represent context for describing and determining whether sampled vegetation represents TECs and PECs.

The WA Planning Commission (2000a) states that 12 FCTs described by Gibson et al. (1994) have been identified or inferred within 14 of the Bush Forever sites that occur within the study area or intersect the survey area (Table 4.8, Figure 4.1).

**Table 4.8: FCTs that occur on the SCP and have been identified within Bush Forever sites that occur within or intersect the study area.**

Community Name	FCT (Gibson et al. 1994)	State listing & status	Bush Forever Site
Supergroup 1: Foothills/Pinjarra Plain			
<i>Eucalyptus haematoxylon</i> – <i>E. marginata</i> woodlands on Whicher foothills	FCT 1a	Priority 3	354, 361
<i>Corymbia calophylla</i> – <i>Kingia australis</i> woodlands on heavy soils	FCT 3a	Critically Endangered	65*, 321, 350, 360, 362*, 264, 365*
<i>Corymbia calophylla</i> – <i>Eucalyptus marginata</i> woodlands on sandy clay soils	FCT 3b	Endangered	271*, 350*, 351*, 352, 354, 361, 365*
<i>Corymbia calophylla</i> – <i>Xanthorrhoea preissii</i> woodlands and shrublands	FCT 3c	Critically Endangered	350*, 360, 362*, 449*, 365*
<i>Eucalyptus wandoo</i> woodlands (Scarp)	FCT S8	-	360*, 449*
Supergroup 2: Seasonal Wetlands			
Southern wet shrublands	FCT 2	-	350*, 360*, 365*
Weed dominated wetlands on heavy soils	FCT 6	-	352
Herb rich shrublands in clay pans	FCT 8	Vulnerable	65*, 350*, 360, 365*
Dense shrublands on clay flats	FCT 9	Vulnerable	321, 350*, 360, 365*
Shrublands on dry clay flats	FCT 10a	-	350*, 360*, 365*
Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau			
Eastern <i>Banksia attenuata</i> and/or <i>Eucalyptus marginata</i> woodlands	FCT 20b	Endangered	271*, 321, 350*, 351*, 352, 354, 360*, 361, 362, 365*
Central <i>Banksia attenuata</i> – <i>Eucalyptus marginata</i> woodlands	FCT 21a	-	271*, 351*, 352

\*denotes FCTs not sampled; types inferred.

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## 5.0 Vegetation Survey Results

Four broad vegetation units were identified within the survey area, with C1 representing the large portion (Table 5.1).

Two other units were also identified and mapped within the survey area. These were areas of vegetation that have been Modified/Revegetated/Planted and areas that have been Cleared/Highly Modified/Degraded.

**Table 5.1: Extent of the mapping units within the survey area.**

Mapping Unit Code: Short Description	Survey Area ha (%)
<b>Intact Vegetation Units</b>	
C1: <i>Corymbia calophylla</i> over <i>Xanthorrhoea</i> and <i>Kingia</i>	6.58 (35.5%)
C2: <i>Corymbia calophylla</i> over <i>Xanthorrhoea</i> and <i>Kingia</i> with <i>Watsonia</i>	5.16 (25.5%)
E1: <i>Eucalyptus marginata</i> subsp. <i>marginata</i> and <i>Corymbia calophylla</i> over <i>Xanthorrhoea</i> and <i>Kingia</i> .	2.82 (13.9%)
B1: <i>Banksia sessilis</i> subsp. <i>sessilis</i> with scattered <i>Eucalyptus marginata</i> subsp. <i>marginata</i> over mixed shrubs and <i>Xanthorrhoea</i> .	1.02 (5.0%)
<b>Previously Modified/Cleared Areas</b>	
CL: Roads/infrastructure and areas of isolated trees over previously cleared areas.	3.93 (19.4%)
R: Areas of modified/revegetated vegetation.	0.73 (3.6%)

The distribution of the four vegetation units and the two other mapping units are presented in Figure 5.1.

## 5.1 Vegetation Units of the Survey Area

### 5.1.1 C1: *Corymbia calophylla* over *Xanthorrhoea* and *Kingia*

Vegetation Code	C1
Vegetation Unit Description	<i>Corymbia calophylla</i> open forest over <i>Xanthorrhoea preissii</i> , <i>Kingia australis</i> open shrubland over <i>Cyathochaeta equitans</i> , <i>C. avenacea</i> very open sedgeland over <i>Neurachne alopecuroidea</i> scattered grasses over <i>Caesia micrantha</i> , <i>Anigozanthos manglesii</i> scattered herbs
Vegetation Sub-Association (NVIS Level VI)	U1+ ^ <i>Corymbia calophylla</i> \^ <i>Corymbia</i> \^tree\7\c; M1 ^ <i>Xanthorrhoea preissii</i> , <i>Kingia australis</i> \^ <i>Xanthorrhoea</i> \^grass-tree\4\bc; M2 ^ <i>Cyathochaeta equitans</i> , <i>Cyathochaeta avenacea</i> \^ <i>Cyathochaeta</i> \^sedge\2\r; G1 ^ <i>Neurachne alopecuroidea</i> \^ <i>Neurachne</i> \^grass\1\bc; G2 ^, <i>Caesia micrantha</i> , <i>Anigozanthos manglesii</i> \^ <i>Caesia</i> \^forb\1\bc
Distribution	This vegetation unit (Plate 5.1) was the most common throughout the survey area.
Sites	SOL02, SOL03
Vegetation Condition	The patches of C1 vegetation range from Good to Very Good/Excellent, with the majority of the unit in Very Good/Excellent condition.



**Plate 5.1:** Representative photographs of the C1 vegetation type.

**5.1.2 C2: *Corymbia calophylla* over *Xanthorrhoea* and *Kingia* with *Watsonia***

Vegetation Code	C2
Vegetation Unit Description	<i>Corymbia calophylla</i> open forest over <i>Xanthorrhoea preissii</i> , <i>Kingia australis</i> open shrubland over <i>Cyathochaeta equitans</i> , <i>C. avenacea</i> very open sedgeland over * <i>Watsonia meriana</i> var. <i>bulbillifera</i> scattered herbs over <i>Neurachne alopecuroidea</i> scattered grasses over <i>Caesia micrantha</i> , <i>Anigozanthos manglesii</i> scattered herbs
Vegetation Sub-Association (NVIS Level VI)	U1+ ^ <i>Corymbia calophylla</i> \^ <i>Corymbia</i> \^tree\7\c; M1 ^ <i>Xanthorrhoea preissii</i> , <i>Kingia australis</i> \^ <i>Xanthorrhoea</i> \^grass-tree\4\bc; M2 ^ <i>Cyathochaeta equitans</i> , <i>Cyathochaeta avenacea</i> \^ <i>Cyathochaeta</i> \^sedge\2\r\; G1 ^ <i>Watsonia meriana</i> var. <i>bulbillifera</i> \^ <i>Watsonia</i> \^forb\3\bc; G2 ^ <i>Neurachne alopecuroidea</i> \^ <i>Neurachne</i> \^grass\1\bc; G3 ^, <i>Caesia micrantha</i> , <i>Anigozanthos manglesii</i> \^ <i>Caesia</i> \^forb\1\bc
Distribution	This vegetation unit (Plate 5.2) was the second most common throughout the survey area and was similar to C1, except that * <i>Watsonia meriana</i> var. <i>bulbillifera</i> was scattered throughout the understorey.
Sites	SOL01
Vegetation Condition	Very Good to Degraded, with most patches considered to be in Good to Very Good condition.



**Plate 5.2:** Representative photographs of the C2 vegetation type.

### 5.1.3 E1: *Eucalyptus marginata* subsp. *marginata* and *Corymbia calophylla* over *Xanthorrhoea* and *Kingia*

Vegetation Code	E1
Vegetation Unit Description	<i>Eucalyptus marginata</i> subsp. <i>marginata</i> , <i>Corymbia calophylla</i> open forest over <i>Hakea trifurcata</i> scattered tall shrubs over <i>Xanthorrhoea preissii</i> , <i>Kingia australis</i> open shrubland over <i>Cyathochaeta equitans</i> , <i>C. avenacea</i> very open sedgeland over <i>Banksia nivea</i> subsp. <i>nivea</i> scattered low shrubs over <i>Lomandra caespitosa</i> , <i>Dasypogon bromeliifolius</i> very open herbland
Vegetation Sub-Association (NVIS Level VI)	U1+ ^ <i>Eucalyptus marginata</i> subsp. <i>marginata</i> , <i>Corymbia calophylla</i> \^ <i>Eucalyptus</i> \^tree\7\c; M1 ^ <i>Hakea trifurcata</i> \^ <i>Hakea</i> \^shrub\4\bc; M2 ^ <i>Xanthorrhoea preissii</i> , <i>Kingia australis</i> \^ <i>Xanthorrhoea</i> \^grass-tree\3\bc; M3 ^ <i>Cyathochaeta equitans</i> , <i>Cyathochaeta avenacea</i> \^ <i>Cyathochaeta</i> \^sedge\2\i; G1 ^ <i>Banksia nivea</i> subsp. <i>nivea</i> \^ <i>Banksia</i> \^shrub\1\bc; G2 ^ <i>Lomandra caespitosa</i> , <i>Dasypogon bromeliifolius</i> \^ <i>Lomandra</i> \^forb\2\r
Distribution	This vegetation unit (Plate 5.3) was confined towards the northern section of the survey area.
Sites	SOL04
Vegetation Condition	Very Good to Excellent.



Plate 5.3: Representative photographs of the E1 vegetation type.

### 5.1.4 **B1: *Banksia sessilis* subsp. *sessilis* with scattered *Eucalyptus marginata* subsp. *marginata* over mixed shrubs and *Xanthorrhoea***

Vegetation Code	B1
Vegetation Unit Description	<i>Eucalyptus marginata</i> subsp. <i>marginata</i> low open woodland over <i>Banksia sessilis</i> subsp. <i>sessilis</i> tall open scrub over <i>Jacksonia sternbergiana</i> scattered shrubs over <i>Gompholobium tomentosum</i> , <i>Dampiera linearis</i> scattered low shrubs over <i>Anigozanthos manglesii</i> scattered herbs over <i>Ehrharta calycina</i> very open grasses
Vegetation Sub-Association (NVIS Level VI)	U1 ^Eucalyptus marginata subsp. marginata\Eucalyptus\^tree\6\r; M1+ ^Banksia sessilis var. sessilis\Banksia\^shrub\4\c; M2 ^Jacksonia sternbergiana\Jacksonia\^shrub\4\bc; M3 ^Gompholobium tomentosum,Dampiera linearis\Gompholobium\^shrub\2\bc; G1 ^Anigozanthos manglesii\Anigozanthos\^forb\2\bc; G2 ^*Ehrharta calycina\*Ehrharta\^grass\2\bc
Distribution	This vegetation unit (Plate 5.4) was restricted to a small section within the southern half of the survey area and potentially represents a historical revegetation site.
Vegetation Condition	Good to Excellent.



**Plate 5.4:** Representative photographs of the B1 vegetation type.

### 5.1.5 R: Areas of Modified/Revegetated vegetation

A portion of the survey (0.73 ha) at the very north of Soldiers Road was assessed as being modified/revegetated around a drainage system (Plate 5.5). This area was not surveyed but was assessed as being in Very Good condition.



Plate 5.5: Representative photographs of the R vegetation type.

### 5.1.6 Cleared Areas

These areas comprised roads and rail infrastructure as well as areas that had been historically cleared and consisted of isolated trees with no or very little understorey. Overall, the "CL" unit accounted for 3.93 ha (19.4%) of the survey area (Table 5.1).

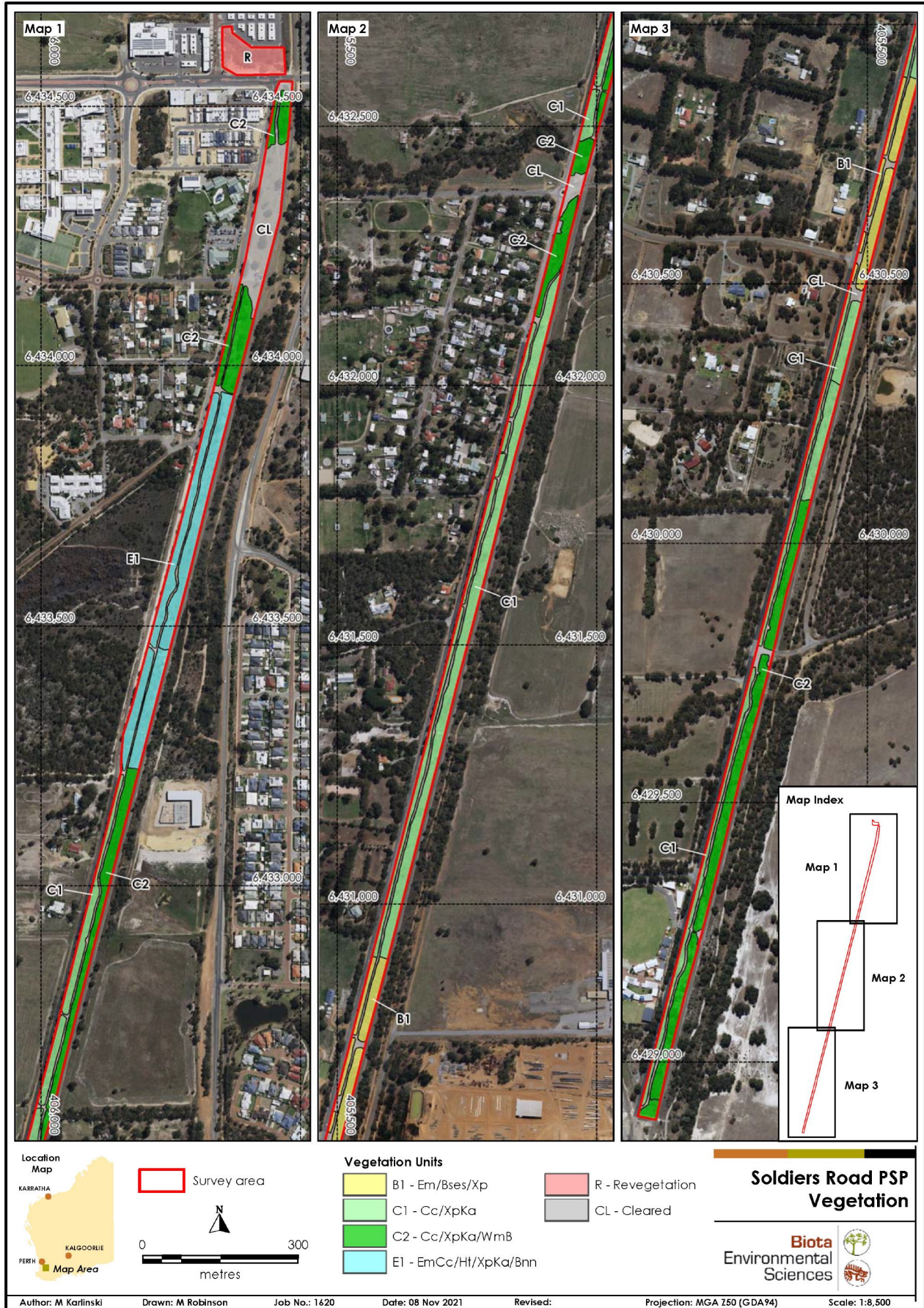


Figure 5.1: Vegetation units of the survey area.

## 5.2 Vegetation Condition

Vegetation condition ranged from Very Good/Excellent to Completely Degraded/Cleared (Table 5.2, Figure 5.2). None of the vegetation was considered to be in 'Pristine' condition. Vegetation mapped as Cleared Areas (CL) was automatically assigned the 'Completely Degraded/Cleared' ranking, which was mostly areas of isolated native trees over introduced species and/or areas that have been cleared for infrastructure.

Areas of vegetation that were in Degraded/Good condition typically showed signs of increased levels of disturbance and higher abundances of introduced flora species.

**Table 5.2: Extent of vegetation condition categories within the survey area.**

Condition Ranking	Survey area ha (%)
Excellent/Very Good	4.69 (23.1%)
Very Good/Good	8.64 (42.7%)
Good/Degraded	2.99 (14.8%)
Completely Degraded/Cleared	3.93 (19.4%)

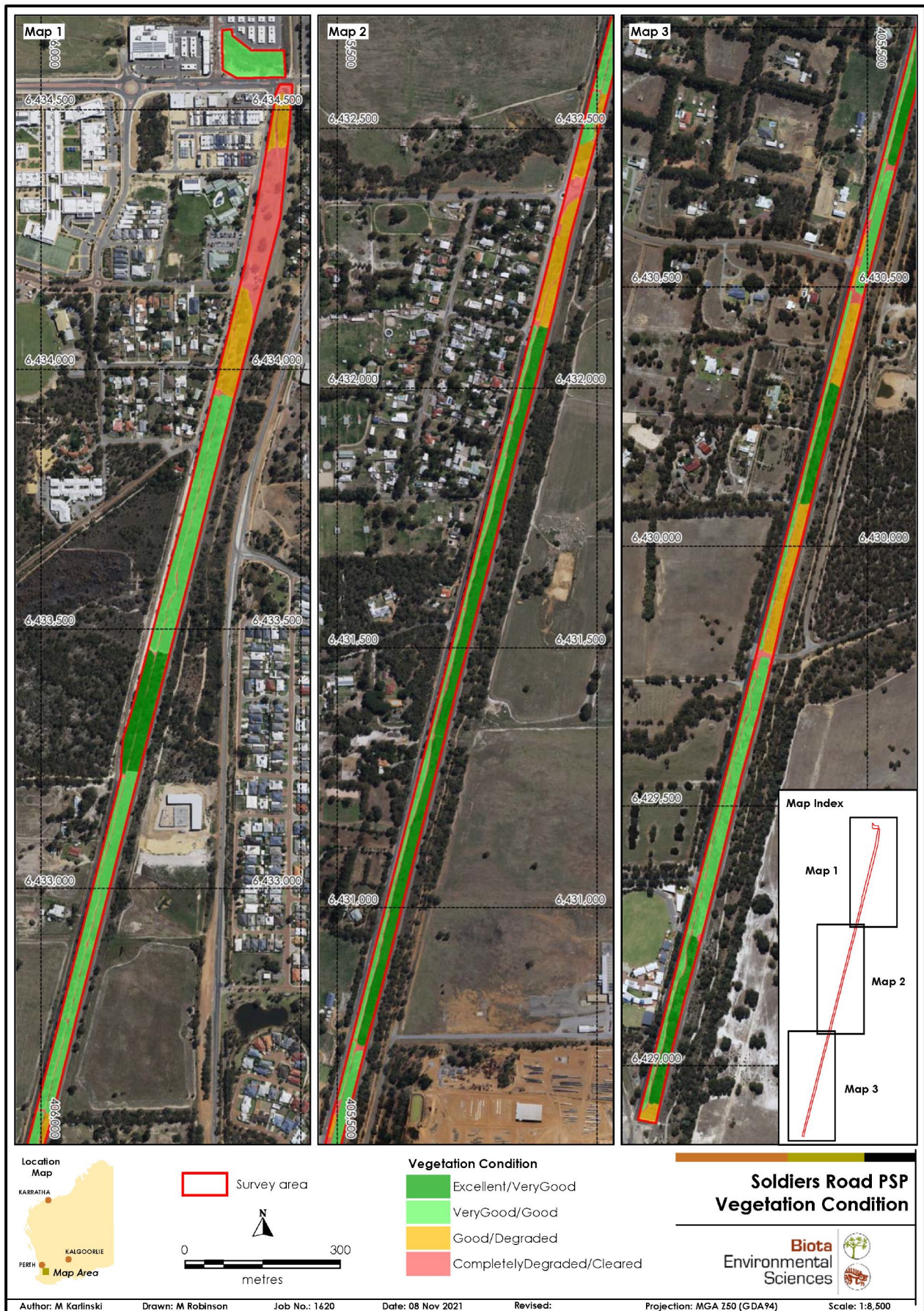


Figure 5.2 Vegetation condition mapping of the survey area.



## 5.3 Floristic Analysis Results

### 5.3.1 Identification of Floristic Community Types

Hierarchical clustering analyses were conducted using PATN v4 (Belbin 2020), to assist with determining which FCTs described by Gibson et al. (1994) were equivalent to the vegetation types in the survey area. No FCTs associated with the 'Banksia Woodlands of the Swan Coastal Plain ecological community' Commonwealth TEC were identified through these analyses, despite having been identified as previously recorded within the survey area (Table 4.7).

The floristic analysis placed the survey area sites within the following FCTs:

- FCT 3a *Corymbia calophylla* – *Kingia australis* woodlands on heavy soils, Swan Coastal Plain – quadrats SOL02, SOL03;
- FCT 3b *Corymbia calophylla* – *Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain – quadrat SOL04; and
- FCT 3c *Corymbia calophylla* – *Xanthorrhoea preissii* woodlands and shrublands, Swan Coastal Plain - quadrat SOL01

A summary of the determinations resulting from the hierarchical clustering and NNB analysis of the 10 most similar sites is presented in Table 5.3. Extracts of the dendrograms of the SSI process are provided in Figures 1 to 4 of Appendix 6. A table summarising the data from the 20 most similar sites (NNB analysis) is provided in Table 2 of Appendix 6, along with a list of species that were omitted from the analysis (Table 1 of Appendix 6).

**Table 5.3 Nearest Neighbour Boundary results (NNB; 10 nearest sites) and UPGMA clustering dendrogram summary.**

Site	Result	Notes	1	2	3	4	5	6	7	8	9	10
SOLO1		Affinity to FCT 3c	talb4	PEARCE-2	waro 01	MUD-4	WATER-3	talb2	brick6	DUCK-2	talb13	brick3
	FCT 3c	NNB & Dendrogram suggest FCT 3c	0.0618	0.0707	0.0707	0.0749	0.0752	0.0768	0.0771	0.0772	0.0782	0.0792
			FCT 3c	FCT 3c	FCT 3b	FCT 3a	FCT 3c	FCT 20c	FCT 3a	FCT 3c	FCT 3c	FCT 3a
SOLO2		NNB suggests affinity to FCT 3b	card12	BRIX-2	card13	talb2	waro 02	brick5	waro 01	card4	brick8	card8
	FCT 3a	Initially paired with two FCT 3c sites	0.0569	0.0600	0.0606	0.0623	0.0658	0.0674	0.0676	0.0703	0.0705	0.0709
		Then inserted into FCT 3a sites	FCT 3b	FCT 3a	FCT 3b	FCT 20c	FCT 3b	FCT 3a	FCT 3b	FCT 6	FCT 3a	FCT 20b
SOLO3		Affinity to FCT 3a	waro 01	brick8	brick6	MUD-4	lamb2	talb2	brick3	brick7	talb4	BRIX-5
	FCT 3a	NNB & Dendrogram suggest FCT 3a	0.0553	0.0590	0.0594	0.0599	0.0626	0.0631	0.0632	0.0644	0.0652	0.0655
			FCT 3b	FCT 3a	FCT 3a	FCT 3a	FCT 3a	FCT 20c	FCT 3a	FCT 3a	FCT 3c	FCT 3a
SOLO4			card12	card13	brick8	AMBR-1	CAPEL-5	AMBR-4	BRIX-2	yarl03	wonn01	AMBR-9
	FCT 3b	NNB & Dendrogram suggest FCT 3b	0.0623	0.0624	0.063	0.0684	0.0684	0.0698	0.0698	0.0704	0.0715	0.0716
			FCT 3b	FCT 3b	FCT 3a	FCT 1b	FCT 1b	FCT 1b	FCT 3a	FCT 3b	FCT 1a	FCT 1b

## 5.4 Vegetation of Significance

TECs were identified within the survey area based on the vegetation types described (Section 5.1), the quadrat data (Appendix 5), and the floristic analysis using PATN (Section 5.3.1).

### 5.4.1 Commonwealth Threatened Ecological Communities

Prior to the field survey, six Commonwealth-listed TECs were expected to occur within the study area, all of which were previously identified by DBCA (see Section 4.10.1). Two Commonwealth-listed TECs were subsequently identified to occur within the survey area:

- '*Corymbia calophylla* - *Kingia australis* woodlands on heavy soils of the Swan Coastal Plain'; and
- '*Corymbia calophylla* - *Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain'.

Due to the difficulty of visually separating these two TECs during mapping, and as they share the same conservation status, they have been considered and mapped as a mosaic unit (Figure 5.3). A combined total of 11.74 ha (58.0% of the survey area) representing a mosaic of both of these Commonwealth TECs was mapped within the survey area (Table 5.4). The TECs and associated diagnostic criteria are described below.

#### 5.4.1.1 *Corymbia calophylla* – *Kingia australis* woodlands on heavy soils of the Swan Coastal Plain

The '*Corymbia calophylla* – *Kingia australis* woodlands on heavy soils of the Swan Coastal Plain' Commonwealth TEC was confirmed to occur within the survey area (Table 5.4), and is listed as Endangered under the EPBC Act. Due to its very restricted distribution, no condition thresholds have been applied to this Federally listed TEC, and hence all areas that align with FCT 3a are considered representative of '*Corymbia calophylla* – *Kingia australis* woodlands on heavy soils of the Swan Coastal Plain' (DoEE 2017b).

#### 5.4.1.2 *Corymbia calophylla* - *Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain.

The '*Corymbia calophylla* – *Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain' Commonwealth TEC was confirmed to occur within the survey area (Table 5.4), and is listed as Endangered under the EPBC Act. Based on the very restricted distribution of the *Corymbia calophylla* – *Xanthorrhoea preissii* TEC, no condition thresholds have been applied and all areas that meet the floristic community type 3c (as described by Gibson et al. (1994)) are habitat areas critical for its survival (DoEE 2017a).

**Table 5.4: Extent of the Commonwealth TECs within the survey area.**

EPBC TEC	Status	Survey Area ha (%)
<i>Corymbia calophylla</i> – <i>Kingia australis</i> woodlands on heavy soils of the Swan Coastal Plain	Endangered	-
<i>Corymbia calophylla</i> - <i>Xanthorrhoea preissii</i> woodlands and shrublands of the Swan Coastal Plain.	Endangered	-
	<b>Total:</b>	<b>11.74 (58.0%)</b>

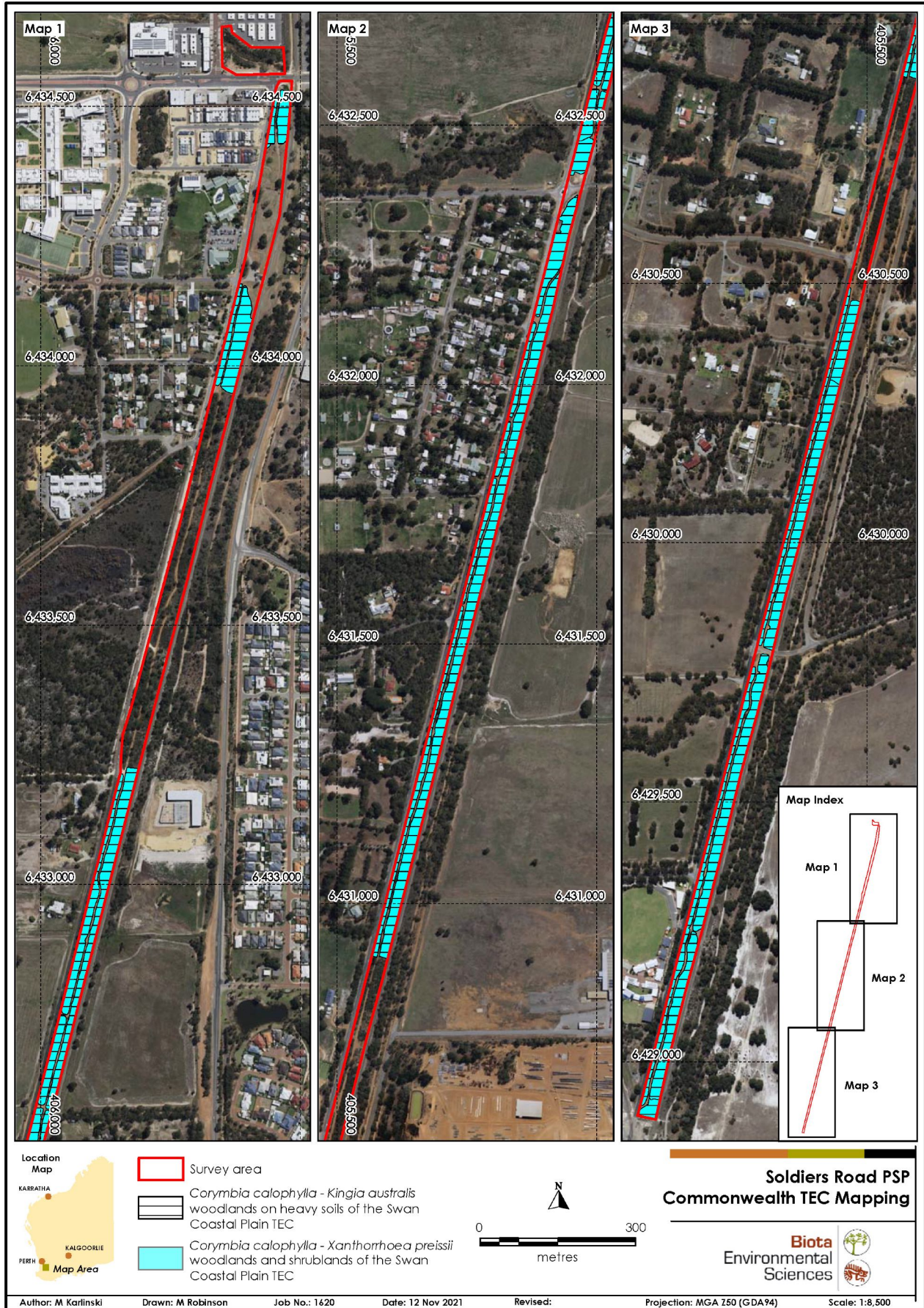


Figure 5.3 Commonwealth TEC occurrences within survey area.

## 5.4.2 State-Listed Threatened Ecological Communities

Three State-listed TECs were identified as occurring within the survey area. A breakdown of the FCTs identified and their relationships to State-listed TECs is presented in Table 5.5 and described below.

Due to difficulties encountered in delineating 'Corymbia calophylla – Kingia australis woodlands on heavy soils, Swan Coastal Plain' (FCT 3a) from 'Corymbia calophylla – Xanthorrhoea preissii woodlands and shrublands, Swan Coastal Plain' (FCT 3c), both these State-listed TECs were considered as a mosaic for the purposes of mapping (Figure 5.4, Table 5.5). A total of 11.74 ha (58.0 % of the survey area) was considered representative of these two TECs.

### 5.4.2.1 *Corymbia calophylla* – *Kingia australis* woodlands on heavy soils, Swan Coastal Plain (FCT 3a)

The Critically Endangered 'Corymbia calophylla – Kingia australis woodlands on heavy soils, Swan Coastal Plain' (FCT 3a) State-listed TEC was identified as occurring within the survey area (Figure 5.4) with the floristic analysis demonstrating support for its presence (Table 5.3).

### 5.4.2.2 *Corymbia calophylla* – *Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain (FCT 3b)

The State-listed 'Corymbia calophylla – Eucalyptus marginata woodlands on sandy clay soils of the southern Swan Coastal Plain' (FCT 3b) TEC was found to represent 2.82 ha within the survey area (Table 5.5). Results of the floristic analysis demonstrate support for its presence (Section 5.3.1, Table 5.3).

### 5.4.2.3 *Corymbia calophylla* – *Xanthorrhoea preissii* woodlands and shrublands, Swan Coastal Plain (FCT 3c)

The Critically Endangered 'Corymbia calophylla – Xanthorrhoea preissii woodlands and shrublands, Swan Coastal Plain' (FCT 3c) State-listed TEC was considered to occur within the survey area, based on the results of the floristic analysis (Section 5.3.1, Table 5.3).

**Table 5.5 FCTs that occur in the survey area and have relationships to State-listed TECs**

TEC Name	Community Name	FCT	State Listing	Survey Area (ha)
<i>Corymbia calophylla</i> – <i>Kingia australis</i> woodlands on heavy soils, Swan Coastal Plain (FCT3a)	<i>Corymbia calophylla</i> – <i>Kingia australis</i> woodlands on heavy soils, Swan Coastal Plain	FCT 3a	Critically Endangered	11.74 (FCT 3a and 3c combined)
<i>Corymbia calophylla</i> – <i>Eucalyptus marginata</i> woodlands on sandy clay soils of the southern Swan Coastal Plain (FCT 3b)	<i>Corymbia calophylla</i> – <i>Eucalyptus marginata</i> woodlands on sandy clay soils of the southern Swan Coastal Plain	FCT 3b	Vulnerable	2.82
<i>Corymbia calophylla</i> – <i>Xanthorrhoea preissii</i> woodlands and shrublands, Swan Coastal Plain (FCT 3c)	<i>Corymbia calophylla</i> – <i>Xanthorrhoea preissii</i> woodlands and shrublands, Swan Coastal Plain	FCT 3c	Critically Endangered	11.74 (FCT 3a and 3c combined)

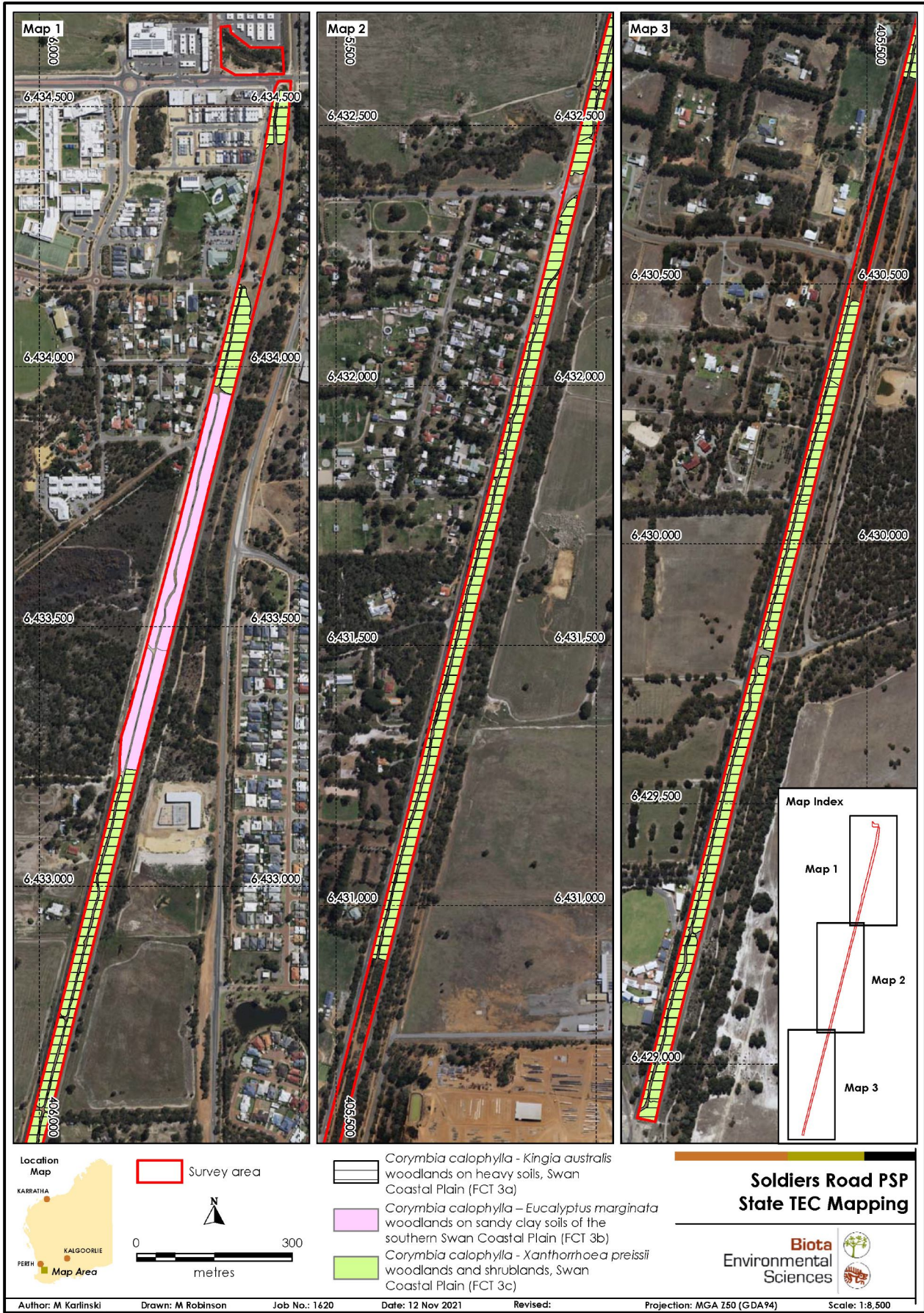


Figure 5.4 State TEC occurrences within the survey area.

## 6.0 Flora Survey Results

### 6.1 Overview

A total of 140 native vascular flora taxa from 85 genera and 35 families were recorded from the survey area (see Appendix 7). In addition, 16 introduced flora species were recorded (Section 6.3).

The dominant native plant families and genera recorded from the survey area are typically well represented in species lists from the SCP (see Table 6.1).

**Table 6.1: Native families and genera with the highest species richness in the survey area.**

Family	No. of Native Species	Genus	No. of Native Species
Fabaceae	16	<i>Drosera</i>	7
Asparagaceae	15	<i>Lomandra</i>	7
Proteaceae	15	<i>Stylidium</i>	5
Orchidaceae	11	<i>Synaphea</i>	5
Myrtaceae	9	<i>Thysanotus</i>	5
Cyperaceae	8		

## 6.2 Significant Flora

### 6.2.1 Threatened Flora

One Threatened species listed under the BC Act was recorded within the survey area during the survey (Appendix 8 and Figure 6.1).

#### ***Synaphea* sp. Pinjarra Plain (A.S. George 17182)**

**(Threatened)**

*Synaphea* sp. Pinjarra Plains (Plate 6.1) is an erect, clumped shrub (sub-shrub) typically found on flats and seasonally wet areas including railroad reserves with wet depressions/drains. It grows to 0.8 m high and flowers September to November (WA Herbarium 2021).

Mike Hislop (specialist taxonomist) noted that the specimen from one particular opportunistic collection (SW20) was somewhat problematic in its taxonomy, but most likely *Synaphea* sp. Pinjarra Plain (A.S. George 17182). These records are denoted as *Synaphea* ? sp. Pinjarra Plain (A.S. George 17182) and are considered as the Threatened species for the purposes of this report.

A total of 153 individuals from 57 locations were recorded throughout the survey area, opportunistically and from SOL02. This count includes a subset (20 individuals from 10 records) that were determined as '*Synaphea* ? sp. Pinjarra Plains' by Mike Hislop.



**Plate 6.1: *Synaphea* sp. Pinjarra Plains (A.S. George 17182).**

## 6.2.2 Priority Flora

Three Priority flora species were identified within the survey area. Locations for each species are presented on Figure 6.1 and in Appendix 8, with a summary of each species provided below.

### *Grevillea bipinnatifida* subsp. *?pagna*

(Priority 1)

*Grevillea bipinnatifida* subsp. *?pagna* (Plate 6.2) is a prostrate, lignotuberous shrub that grows to 0.2-0.7 m high. It is typically found growing along roadsides, seasonal wetlands and swamps in grey sandy clay and loam. It flowers from August to November (WA Herbarium 2021).

Greg Keighery (specialist taxonomist) noted that the collected specimen was somewhat intermediate between the two subspecies (subsp. *bipinnatifida* and subsp. *pagna*), but that the habitat and leaf divisions is a suitable match for subsp. *pagna*. One individual was recorded in SOL02 during the survey. There were numerous other individuals around the survey area, but counts were not recorded as it was not thought to be a Priority species at the time of the survey.



Plate 6.2: *Grevillea bipinnatifida* subsp. *?pagna*.

### *Calectasia grandiflora*

(Priority 2)

*Calectasia grandiflora* (Plate 6.3) is a perennial, rhizomatous shrub that grows to 0.65m tall, and is found in a variety of habitats including sand and swampy areas (WA Herbarium 2021). Two opportunistic records were recorded from the survey area.



Plate 6.3: *Calectasia grandiflora*



***Johnsonia pubescens* subsp. *cygnorum*****(Priority 2)**

*Johnsonia pubescens* subsp. *cygnorum* (Plate 6.4) is a tufted perennial, herb that grows to 0.15-0.25 m high. It has white-green flowers (compared to pink for subsp. *pubescens*) and flowers around September. It can be found on flats and seasonally-wet sites on grey-white-yellow sand (WA Herbarium 2021).

A total of 88 individuals were recorded from 26 locations across the survey area, including seven individuals within SOL02.



**Plate 6.4:** *Johnsonia pubescens* subsp. *cygnorum*

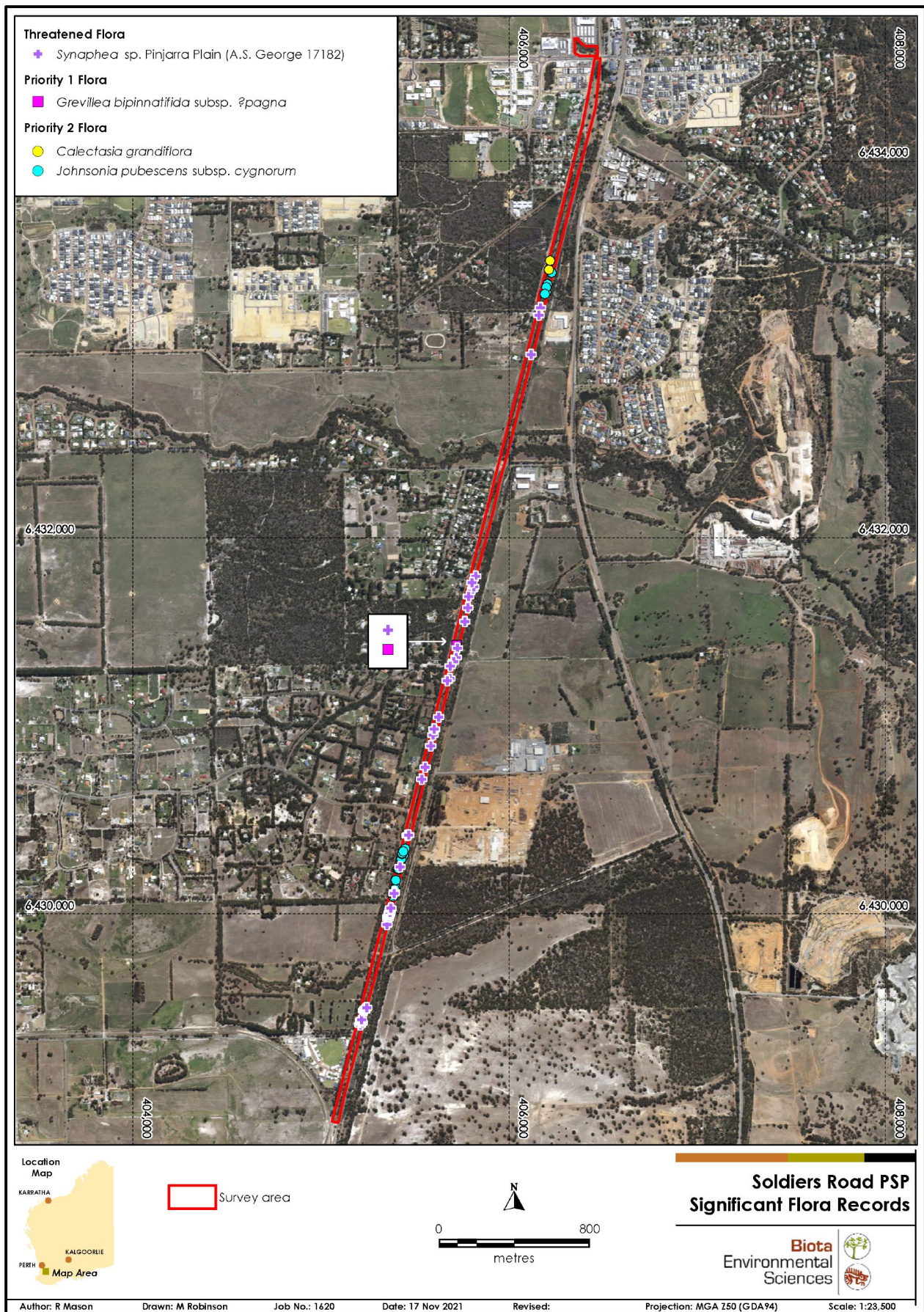


Figure 6.1: Locations of significant flora recorded within the survey area.

## 6.3 Introduced Flora

Introduced flora were common through the entirety of the survey area, reflecting its landscape setting. It was not practical to fully map and record numbers of individuals of all introduced species during the field survey. A non-exhaustive list of 16 introduced species from 16 genera and 9 families were recorded within quadrats and opportunistically during the survey.

### 6.3.1 Weeds of National Significance and Declared Pests

Thirty-two species of weeds have been Federally declared as WoNS based on their invasiveness, potential for spread, and for environmental, social, and economic impacts. To protect agriculture in WA, the Department of Primary Industry and Regional Development (DPIRD) regulates harmful plants under the BAM Act. Plants that are prevented entry into the state or have control or keeping requirements in WA are known as Declared Pests (DPIRD 2020).

Four species listed as Declared Pests under the BAM Act (including *\*Asparagus asparagoides*, which is also listed as a WoNS) were observed within the survey area. Each is discussed briefly below, and their recorded locations are presented in Table 6.2 and Figure 6.2.

#### 6.3.1.1 *\*Asparagus asparagoides* (Bridal Creeper)

*\*Asparagus asparagoides*, listed as a Declared Pest and a WoNS, is a South African native that is a perennial rhizome/tuber climbing herb from the Asparagaceae family. Bridal Creeper has been recorded across the Swan Coastal Plain, Avon Wheatbelt, Coolgardie, Esperance Plains, Geraldton Sandplains, Jarrah Forrest, Mallee, and Warren IBRA bioregions (WA Herbarium 2021). This species is rated as having a 'High' Ecological Impact and 'Rapid' Invasiveness (Department of Parks and Wildlife 2016). Bridal Creeper is highly invasive and can smother other vegetation. It also increases fire risk during the summer die-off phase (WA Herbarium 2021).

Three individuals were recorded opportunistically within the survey area.

#### 6.3.1.2 *\*Echium plantagineum* (Paterson's Curse)

*\*Echium plantagineum*, listed as a Declared Pest, is a native from the Macaronesian Islands region and temperate Asia. It is from the Boraginaceae family and is an erect annual or biennial herb found on roadsides, vacant land and disturbed areas. Paterson's Curse has been recorded across the SCP, Avon Wheatbelt, Carnarvon, Coolgardie, Esperance Plains, Geraldton Sandplains, Hampton, Jarrah Forest, Mallee, Murchison, Nullarbor, Warren and Yalgoo IBRA bioregions (WA Herbarium 2021). This species is poisonous to mammals and is rated as having a 'High' Ecological Impact and 'Moderate' Invasiveness (Department of Parks and Wildlife 2016).

This species was present within the survey area, however individual counts and GPS locations were not recorded.

#### 6.3.1.3 *\*Moraea flaccida* (One-leaf Cape Tulip)

*\*Moraea flaccida*, listed as a Declared Pest, is native to Southern Africa and is a cormous, perennial herb with an annually renewed corm. One-leaf Cape Tulip has been recorded across the Swan Coastal Plain, Avon Wheatbelt, Esperance Plains, Jarrah Forest, Mallee, and Warren IBRA bioregions (WA Herbarium 2021). This species is rated as having a 'High' Ecological Impact and 'Rapid' Invasiveness (Department of Parks and Wildlife 2016).

One individual was recorded within site SOL01.

#### 6.3.1.4 *\*Zantedeschia aethiopica* (Arum Lily)

*\*Zantedeschia aethiopica*, listed as a Declared Pest, is a South African native from the Araceae family. This rhizomatous perennial herb is predominately found in swamps or low-lying areas. Arum Lily has been recorded across the Swan Coastal Plain, Avon Wheatbelt, Geraldton Sandplains, Jarrah Forest, and Warren IBRA bioregions (WA Herbarium 2021). All parts of an Arum Lily plant are toxic, and the species is rated as having a 'High' Ecological Impact and 'Rapid' Invasiveness (Department of Parks and Wildlife 2016).

Four individuals were recorded opportunistically within the survey area.

**Table 6.2** Locations of WoNS and Declared Pests in the survey area.

<b>Species</b>	<b>Site</b>	<b>Date</b>	<b>Easting</b>	<b>Northing</b>	<b>Number of Individuals</b>
<i>Asparagus asparagoides</i>	OppColl	7/10/2021	406333	6433927	3
<i>Moraea flaccida</i>	SOL01	8/10/2021	405235	6429528	1
<i>Zantedeschia aethiopica</i>	OppColl	7/10/2021	405977	6432458	4

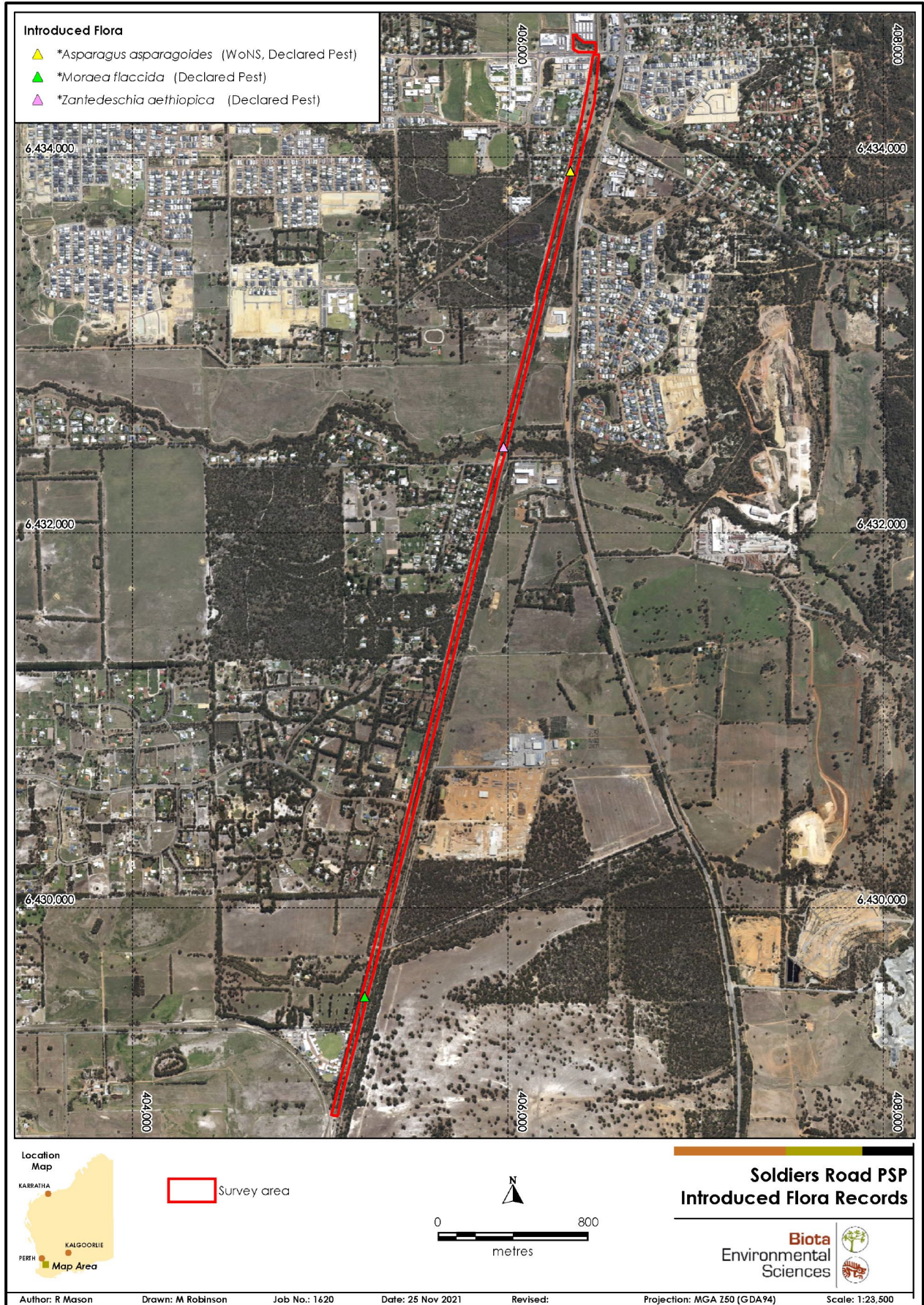


Figure 6.2: Locations of WoNS and Declared Pests within the survey area.

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## 7.0 Discussion

### 7.1 Matters of National Environmental Significance

#### 7.1.1 Vegetation

Two Commonwealth TECs were identified during the survey:

- *Corymbia calophylla* - *Kingia australis* woodlands on heavy soils of the Swan Coastal Plain; and
- *Corymbia calophylla* - *Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain.

Due to difficulties in differentiation, these two Commonwealth TECs were considered as a single entity. Their combined extent represented 11.74 ha of the survey area.

#### 7.1.2 Flora

No species listed under the EPBC Act were recorded from within the survey area.

*Synaphea* sp. Pinjarra Plain (A.S. George 17182) is listed as Threatened under the BC Act, and a total of 153 individuals from 57 locations were recorded throughout the survey area

## 7.2 Other Features of Significance

#### 7.2.1 Vegetation

Three State-listed TECs were identified within the survey area:

- *Corymbia calophylla* – *Kingia australis* woodlands on heavy soils, Swan Coastal Plain (FCT 3a);
- *Corymbia calophylla* – *Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain (FCT 3b); and
- *Corymbia calophylla* – *Xanthorrhoea preissii* woodlands and shrublands, Swan Coastal Plain (FCT 3c).

Due to difficulties in mapping '*Corymbia calophylla* – *Kingia australis* woodlands on heavy soils, Swan Coastal Plain' (FCT 3a) and '*Corymbia calophylla* – *Xanthorrhoea preissii* woodlands and shrublands, Swan Coastal Plain' (FCT 3c), these two State-listed TECs were considered as a single entity. Their combined extent represented 11.74 ha of the survey area.

#### 7.2.2 Flora

Three State-listed Priority species were identified within the survey area during the current study:

- *Grevillea bipinnatifida* subsp. *?pagna* (Priority 1): 1 individual was recorded in quadrat SOL02.
- *Calectasia grandiflora* (Priority 2): 2 individuals were recorded from 2 opportunistic locations.
- *Johnsonia pubescens* subsp. *cygnorum* (Priority 2): 88 individuals were recorded from 26 locations across the survey area.

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# Appendix 1

## Framework for Significance Ranking of Communities and Species in WA





## **A. Definitions, Categories and Criteria for Threatened and Priority Ecological Communities**

Species and Communities Branch, Department of Environment and Conservation, December 2010.

### **1. General Definitions**

#### **Ecological Community**

A naturally occurring biological assemblage that occurs in a particular type of habitat.

Note: The scale at which biological communities are defined will often depend on the level of detail in the information source, therefore no particular scale is specified.

A **threatened ecological community (TEC)** is one which is found to fit into one of the following categories; "presumed totally destroyed", "critically endangered", "endangered" or "vulnerable".

Possible threatened ecological communities that do not meet survey criteria are added to the Department of Parks and Wildlife's Priority Ecological Community Lists under Priorities 1, 2 and 3. Ecological Communities that are adequately known, are rare but not threatened, or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

An **assemblage** is a defined group of biological entities.

**Habitat** is defined as the areas in which an organism and/or assemblage of organisms lives. It includes the abiotic factors (e.g. substrate and topography), and the biotic factors.

**Occurrence:** a discrete example of an ecological community, separated from other examples of the same community by more than 20 metres of a different ecological community, an artificial surface or a totally destroyed community.

By ensuring that every discrete occurrence is recognised and recorded future changes in status can be readily monitored.

**Adequately Surveyed** is defined as follows:

"An ecological community that has been searched for thoroughly in most likely habitats, by relevant experts."

**Community structure** is defined as follows:

"The spatial organisation, construction and arrangement of the biological elements comprising a biological assemblage" (e.g. *Eucalyptus salmonophloia* woodland over scattered small shrubs over dense herbs; structure in a faunal assemblage could refer to trophic structure, e.g. dominance by feeders on detritus as distinct from feeders on live plants).

Definitions of **Modification** and **Destruction** of an ecological community:

**Modification:** "changes to some or all of ecological processes (including abiotic processes such as hydrology), species composition and community structure as a direct or indirect result of human activities. The level of damage involved could be ameliorated naturally or by human intervention."

**Destruction:** "modification such that reestablishment of ecological processes, species composition and community structure within the range of variability exhibited by the original community is unlikely within the foreseeable future even with positive human intervention."

**Note:** Modification and destruction are difficult concepts to quantify, and their application will be determined by scientific judgement. Examples of modification and total destruction are cited below:

Modification of ecological processes: The hydrology of Toolibin Lake has been altered by clearing of the catchment such that death of some of the original flora has occurred due to dependence on fresh water. The system may be bought back to a semblance of the original state by redirecting saline runoff and pumping waters of the rising underground watertable away to restore the hydrological balance. Total destruction of downstream lakes has occurred due to hydrology being altered to the point that few of the original flora or fauna species are able to tolerate the level of salinity and/or water logging.

Modification of structure: The understorey of a plant community may be altered by weed invasion due to nutrient enrichment by addition of fertiliser. Should the additional nutrients be removed from the system the

balance may be restored, and the original plant species better able to compete. Total destruction may occur if additional nutrients continue to be added to the system causing the understorey to be completely replaced by weed species, and death of overstorey species due to inability to tolerate high nutrient levels. Modification of species composition: Pollution may cause alteration of the invertebrate species present in a freshwater lake. Removal of pollutants may allow the return of the original inhabitant species. Addition of residual highly toxic substances may cause permanent changes to water quality, and total destruction of the community.

**Threatening processes** are defined as follows:

"Any process or activity that threatens to destroy or significantly modify the ecological community and/or affect the continuing evolutionary processes within any ecological community."

Examples of some of the continuing threatening processes in Western Australia include: general pollution; competition, predation and change induced in ecological communities as a result of introduced animals; competition and displacement of native plants by introduced species; hydrological changes; inappropriate fire regimes; diseases resulting from introduced micro-organisms; direct human exploitation and disturbance of ecological communities.

**Restoration** is defined as returning an ecological community to its pre-disturbance or natural state in terms of abiotic conditions, community structure and species composition.

**Rehabilitation** is defined as the re-establishment of ecological attributes in a damaged ecological community although the community will remain modified.

## **2. Definitions and Criteria for Presumed Totally Destroyed, Critically Endangered, Endangered and Vulnerable Ecological Communities**

### **ECOLOGICAL COMMUNITIES**

#### **Presumed Totally Destroyed (PD)**

An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future.

An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and either of the following applies (A or B):

- A) Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats or
- B) All occurrences recorded within the last 50 years have since been destroyed

#### **Critically Endangered (CR)**

An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.

An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C):

- A) The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and either or both of the following apply (i or ii):
  - i) geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 10 years);
  - ii) modification throughout its range is continuing such that in the immediate future (within approximately 10 years) the community is unlikely to be capable of being substantially rehabilitated.
- B) Current distribution is limited, and one or more of the following apply (i, ii or iii):
  - i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 10 years);
  - ii) there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes;



- iii) there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes.
- C) The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately 10 years).

### **Endangered (EN)**

An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.

An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B, or C):

- A) The geographic range, and/or total area occupied, and/or number of discrete occurrences have been reduced by at least 70% since European settlement and either or both of the following apply (i or ii):
  - i) the estimated geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short term future (within approximately 20 years);
  - ii) modification throughout its range is continuing such that in the short term future (within approximately 20 years) the community is unlikely to be capable of being substantially restored or rehabilitated.
- B) Current distribution is limited, and one or more of the following apply (i, ii or iii):
  - i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short term future (within approximately 20 years);
  - ii) there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes;
  - iii) there may be many occurrences but total area is small and all or most occurrences are small and/or isolated and very vulnerable to known threatening processes.
- C) The ecological community exists only as very modified occurrences that may be capable of being substantially restored or rehabilitated if such work begins in the short-term future (within approximately 20 years).

### **Vulnerable (VU)**

An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.

An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium to long-term future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B or C):

- A) The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated.
- B) The ecological community may already be modified and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations.
- C) The ecological community may be still widespread but is believed likely to move into a category of higher threat in the medium to long term future because of existing or impending threatening processes.

### 3. Definitions and Criteria for Priority Ecological Communities

#### **PRIORITY ECOLOGICAL COMMUNITY LIST**

Possible threatened ecological communities that do not meet survey criteria or that are not adequately defined are added to the Priority Ecological Community Lists under Priorities 1, 2 and 3. These three categories are ranked in order of priority for survey and/or definition of the community, and evaluation of conservation status, so that consideration can be given to their declaration as threatened ecological communities. Ecological Communities that are adequately known, and are rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

#### **Priority One:** Poorly-known ecological communities

Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.

#### **Priority Two:** Poorly-known ecological communities

Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, State forest, unallocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.

#### **Priority Three:** Poorly known ecological communities

- (i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or;
- (ii) communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or;
- (iii) communities made up of large, and/or widespread occurrences, that may or not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes.

Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.

**Priority Four:** Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring.

- (a) Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands.
- (b) Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.
- (c) Ecological communities that have been removed from the list of threatened communities during the past five years.

#### **Priority Five:** Conservation Dependent ecological communities

Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

## **B. Categories for Flora and Fauna Species**

### **1. Western Australian Biodiversity Conservation Act 2016, and Priority Species Classification**

In Western Australia, 'Threatened', 'Extinct' and 'Specially Protected' fauna and flora species are protected under the *Biodiversity Conservation Act 2016* (the BC Act), making it an offence to take or disturb these species without Ministerial approval. The definition of 'take' is broad, and includes killing, injuring, harvesting or capturing fauna, and gathering, cutting, destroying, harvesting or damaging flora.

Such species are classified within a framework of several categories.

Species of the highest conservation significance are designated as Threatened species and are protected under sections 19(1)(a), 19(1)(b) and 19(1)(c) of the BC Act. Species are listed within one of three categories:

- Critically endangered (CR), Endangered (EN), or Vulnerable (V), representing those species listed in Schedules 1 to 3 respectively of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* or the *Wildlife Conservation (Rare Flora) Notice 2018*.

Presumed extinct species are protected under sections 24 and 25 of the BC Act and are listed in one of two categories:

- Extinct (EX), representing those species listed in Schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* or the *Wildlife Conservation (Rare Flora) Notice 2018*; or
- Extinct in the wild (EW); there are currently no listed species under this category.

Specially protected species are protected under section 13(1) of the BC Act, and include species of special conservation interest, migratory species, cetaceans, species subject to international agreement, or species otherwise in need of special protection. Of these:

- Migratory species (MI) are those listed under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*;
- Species of special conservation interest (conservation dependent fauna) (CD) are those listed under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*; and
- Other specially protected fauna (OS) are those listed under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*;

In addition to the species formally designated as protected under the BC Act, the WA Department of Biodiversity, Conservation and Attractions (DBCA) also maintains a list of 'Priority species'.

Species that appear to be rare or threatened, but for which there is insufficient information to properly evaluate their conservation significance, are assigned to one of three Priority categories (Priority 1 to Priority 3), while species that are adequately known but require regular monitoring are assigned to Priority 4.

Note that of the above classifications, only 'Threatened', 'Extinct' and 'Specially Protected' species have statutory standing. The Priority flora and fauna classifications are employed by the WA DBCA to manage and classify their database of species considered potentially rare or at risk, but these categories have no legislative status.

Further explanations of the categories is provided in more detail in the following pages.

## **A. Definitions, Categories and Criteria for Threatened and Priority Ecological Communities**

Species and Communities Branch, Department of Environment and Conservation, December 2010.

### **1. General Definitions**

#### **Ecological Community**

A naturally occurring biological assemblage that occurs in a particular type of habitat.

Note: The scale at which biological communities are defined will often depend on the level of detail in the information source, therefore no particular scale is specified.

A **threatened ecological community (TEC)** is one which is found to fit into one of the following categories; "presumed totally destroyed", "critically endangered", "endangered" or "vulnerable".

Possible threatened ecological communities that do not meet survey criteria are added to the Department of Parks and Wildlife's Priority Ecological Community Lists under Priorities 1, 2 and 3. Ecological Communities that are adequately known, are rare but not threatened, or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

An **assemblage** is a defined group of biological entities.

**Habitat** is defined as the areas in which an organism and/or assemblage of organisms lives. It includes the abiotic factors (e.g. substrate and topography), and the biotic factors.

**Occurrence:** a discrete example of an ecological community, separated from other examples of the same community by more than 20 metres of a different ecological community, an artificial surface or a totally destroyed community.

By ensuring that every discrete occurrence is recognised and recorded future changes in status can be readily monitored.

**Adequately Surveyed** is defined as follows:

"An ecological community that has been searched for thoroughly in most likely habitats, by relevant experts."

**Community structure** is defined as follows:

"The spatial organisation, construction and arrangement of the biological elements comprising a biological assemblage" (e.g. *Eucalyptus salmonophloia* woodland over scattered small shrubs over dense herbs; structure in a faunal assemblage could refer to trophic structure, e.g. dominance by feeders on detritus as distinct from feeders on live plants).

Definitions of **Modification** and **Destruction** of an ecological community:

**Modification:** "changes to some or all of ecological processes (including abiotic processes such as hydrology), species composition and community structure as a direct or indirect result of human activities. The level of damage involved could be ameliorated naturally or by human intervention."

**Destruction:** "modification such that reestablishment of ecological processes, species composition and community structure within the range of variability exhibited by the original community is unlikely within the foreseeable future even with positive human intervention."

**Note:** Modification and destruction are difficult concepts to quantify, and their application will be determined by scientific judgement. Examples of modification and total destruction are cited below:

Modification of ecological processes: The hydrology of Toolibin Lake has been altered by clearing of the catchment such that death of some of the original flora has occurred due to dependence on fresh water. The system may be bought back to a semblance of the original state by redirecting saline runoff and pumping waters of the rising underground watertable away to restore the hydrological balance. Total destruction of downstream lakes has occurred due to hydrology being altered to the point that few of the original flora or fauna species are able to tolerate the level of salinity and/or water logging.

**Modification of structure:** The understorey of a plant community may be altered by weed invasion due to nutrient enrichment by addition of fertiliser. Should the additional nutrients be removed from the system the balance may be restored, and the original plant species better able to compete. Total destruction may occur if additional nutrients continue to be added to the system causing the understorey to be completely replaced by weed species, and death of overstorey species due to inability to tolerate high nutrient levels.

**Modification of species composition:** Pollution may cause alteration of the invertebrate species present in a freshwater lake. Removal of pollutants may allow the return of the original inhabitant species. Addition of residual highly toxic substances may cause permanent changes to water quality, and total destruction of the community.

**Threatening processes** are defined as follows:

“Any process or activity that threatens to destroy or significantly modify the ecological community and/or affect the continuing evolutionary processes within any ecological community.”

Examples of some of the continuing threatening processes in Western Australia include: general pollution; competition, predation and change induced in ecological communities as a result of introduced animals; competition and displacement of native plants by introduced species; hydrological changes; inappropriate fire regimes; diseases resulting from introduced micro-organisms; direct human exploitation and disturbance of ecological communities.

**Restoration** is defined as returning an ecological community to its pre-disturbance or natural state in terms of abiotic conditions, community structure and species composition.

**Rehabilitation** is defined as the re-establishment of ecological attributes in a damaged ecological community although the community will remain modified.

## **2. Definitions and Criteria for Presumed Totally Destroyed, Critically Endangered, Endangered and Vulnerable Ecological Communities**

### **ECOLOGICAL COMMUNITIES**

#### **Presumed Totally Destroyed (PD)**

An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future.

An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and either of the following applies (A or B):

- A) Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats or
- B) All occurrences recorded within the last 50 years have since been destroyed

#### **Critically Endangered (CR)**

An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.

An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C):

- A) The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and either or both of the following apply (i or ii):
  - i) geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 10 years);
  - ii) modification throughout its range is continuing such that in the immediate future (within approximately 10 years) the community is unlikely to be capable of being substantially rehabilitated.
- B) Current distribution is limited, and one or more of the following apply (i, ii or iii):

- i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 10 years);
  - ii) there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes;
  - iii) there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes.
- C) The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately 10 years).

### **Endangered (EN)**

An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.

An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B, or C):

- A) The geographic range, and/or total area occupied, and/or number of discrete occurrences have been reduced by at least 70% since European settlement and either or both of the following apply (i or ii):
  - i) the estimated geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short term future (within approximately 20 years);
  - ii) modification throughout its range is continuing such that in the short term future (within approximately 20 years) the community is unlikely to be capable of being substantially restored or rehabilitated.
- B) Current distribution is limited, and one or more of the following apply (i, ii or iii):
  - i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short term future (within approximately 20 years);
  - ii) there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes;
  - iii) there may be many occurrences but total area is small and all or most occurrences are small and/or isolated and very vulnerable to known threatening processes.
- C) The ecological community exists only as very modified occurrences that may be capable of being substantially restored or rehabilitated if such work begins in the short-term future (within approximately 20 years).

### **Vulnerable (VU)**

An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.

An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium to long-term future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B or C):

- A) The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated.
- B) The ecological community may already be modified and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations.
- C) The ecological community may be still widespread but is believed likely to move into a category of higher threat in the medium to long term future because of existing or impending threatening processes.

### 3. Definitions and Criteria for Priority Ecological Communities

#### **PRIORITY ECOLOGICAL COMMUNITY LIST**

Possible threatened ecological communities that do not meet survey criteria or that are not adequately defined are added to the Priority Ecological Community Lists under Priorities 1, 2 and 3. These three categories are ranked in order of priority for survey and/or definition of the community, and evaluation of conservation status, so that consideration can be given to their declaration as threatened ecological communities. Ecological Communities that are adequately known, and are rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

#### **Priority One:** Poorly-known ecological communities

Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.

#### **Priority Two:** Poorly-known ecological communities

Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, State forest, unallocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.

#### **Priority Three:** Poorly known ecological communities

- (i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or;
- (ii) communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or;
- (iii) communities made up of large, and/or widespread occurrences, that may or not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes.

Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.

**Priority Four:** Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring.

- (a) Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands.
- (b) Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.
- (c) Ecological communities that have been removed from the list of threatened communities during the past five years.

#### **Priority Five:** Conservation Dependent ecological communities

Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

## **B. Categories for Flora and Fauna Species**

### **1. Western Australian Biodiversity Conservation Act 2016, and Priority Species Classification**

In Western Australia, 'Threatened', 'Extinct' and 'Specially Protected' fauna and flora species are protected under the *Biodiversity Conservation Act 2016* (the BC Act), making it an offence to take or disturb these species without Ministerial approval. The definition of 'take' is broad, and includes killing, injuring, harvesting or capturing fauna, and gathering, cutting, destroying, harvesting or damaging flora.

Such species are classified within a framework of several categories.

Species of the highest conservation significance are designated as Threatened species and are protected under sections 19(1)(a), 19(1)(b) and 19(1)(c) of the BC Act. Species are listed within one of three categories:

- Critically endangered (CR), Endangered (EN), or Vulnerable (V), representing those species listed in Schedules 1 to 3 respectively of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* or the *Wildlife Conservation (Rare Flora) Notice 2018*.

Presumed extinct species are protected under sections 24 and 25 of the BC Act and are listed in one of two categories:

- Extinct (EX), representing those species listed in Schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* or the *Wildlife Conservation (Rare Flora) Notice 2018*;
- Extinct in the wild (EW); there are currently no listed species under this category.

Specially protected species are protected under section 13(1) of the BC Act, and include species of special conservation interest, migratory species, cetaceans, species subject to international agreement, or species otherwise in need of special protection. Of these:

- Migratory species (MI) are those listed under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*;
- Species of special conservation interest (conservation dependent fauna) (CD) are those listed under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*; and
- Other specially protected fauna (OS) are those listed under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*;

In addition to the species formally designated as protected under the BC Act, the WA Department of Biodiversity, Conservation and Attractions (DBCA) also maintains a list of 'Priority species'.

Species that appear to be rare or threatened, but for which there is insufficient information to properly evaluate their conservation significance, are assigned to one of three Priority categories (Priority 1 to Priority 3), while species that are adequately known but require regular monitoring are assigned to Priority 4.

Note that of the above classifications, only 'Threatened', 'Extinct' and 'Specially Protected' species have statutory standing. The Priority flora and fauna classifications are employed by the WA DBCA to manage and classify their database of species considered potentially rare or at risk, but these categories have no legislative status.

Further explanations of the categories is provided in more detail in the following pages.





# CONSERVATION CODES

## For Western Australian Flora and Fauna

Threatened, Extinct and Specially Protected fauna or flora<sup>1</sup> are species<sup>2</sup> which have been adequately searched for and are deemed to be, in the wild, threatened, extinct or in need of special protection, and have been gazetted as such.

**The *Wildlife Conservation (Specially Protected Fauna) Notice 2018* and the *Wildlife Conservation (Rare Flora) Notice 2018* have been transitioned under regulations 170, 171 and 172 of the *Biodiversity Conservation Regulations 2018* to be the lists of Threatened, Extinct and Specially Protected species under Part 2 of the *Biodiversity Conservation Act 2016*.**

Categories of Threatened, Extinct and Specially Protected fauna and flora are:

### **T**     **Threatened species**

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

**Threatened fauna** is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna.

**Threatened flora** is that subset of 'Rare Flora' listed under schedules 1 to 3 of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

### **CR**     **Critically endangered species**

Threatened species considered to be "*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for critically endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.

### **EN**     **Endangered species**

Threatened species considered to be "*facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for endangered flora.

### **VU**     **Vulnerable species**

Threatened species considered to be "*facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.

## **Extinct species**

Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.

### **EX Extinct species**

Species where “*there is no reasonable doubt that the last member of the species has died*”, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).

Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.

### **EW Extinct in the wild species**

Species that “*is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form*”, and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).

Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

## **Specially protected species**

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

### **MI Migratory species**

Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).

Includes 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 fauna subject to the *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

Published as migratory birds protected under an international agreement under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

### **CD Species of special conservation interest (conservation dependent fauna)**

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).

Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

### **OS Other specially protected species**

Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Published as other specially protected fauna under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

**P** **Priority species**

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

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

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

**1** **Priority 1: Poorly-known species**

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

**2** **Priority 2: Poorly-known species**

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

**3** **Priority 3: Poorly-known species**

Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

**4** **Priority 4: Rare, Near Threatened and other species in need of monitoring**

(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.

(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.

(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

<sup>1</sup> The definition of flora includes algae, fungi and lichens

<sup>2</sup> Species includes all taxa (plural of taxon - a classificatory group of any taxonomic rank, e.g. a family, genus, species or any infraspecific category i.e. subspecies or variety, or a distinct population).

## 2. Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

Many of the species that are specially protected at State level are also listed as Threatened species at the Federal level, as one of the Matters of National Environmental Significance (MNES) identified under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act). These may be classified as 'critically endangered', 'endangered', 'vulnerable' or 'lower risk', consistent with IUCN categories:

1. **Critically Endangered (CR):** a taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future.
2. **Endangered (EN):** a taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future.
3. **Vulnerable (VU):** a taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future.
4. **Lower Risk (LR):** a taxon is Lower Risk when it has been evaluated, does not satisfy the criteria for any of the categories Critically Endangered, Endangered or Vulnerable. Taxa included in the Lower Risk category can be separated into three subcategories:
  - **Conservation Dependent (CD).** Taxa which are the focus of a continuing taxon-specific or habitat-specific conservation program targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years.
  - **Near Threatened (NT).** Taxa which do not qualify for Conservation Dependent, but which are close to qualifying for Vulnerable.
  - **Least Concern (LC).** Taxa which do not qualify for Conservation Dependent or Near Threatened.

In addition, numerous Migratory species are listed as MNES under the EPBC Act (some of which are also listed as Threatened). Migratory species are those animals that migrate to Australia and its external territories, or pass through or over Australian waters during their annual migrations. The list of migratory species consists of those species listed under the following international conventions:

1. Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention);
2. China-Australia Migratory Bird Agreement (CAMBA);
3. Japan-Australia Migratory Bird Agreement (JAMBA); and,
4. Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

Marine species are also protected under the EPBC Act, and are listed to ensure the long-term conservation of the species. Marine species include all Australian sea snakes, seals, crocodiles, dugongs, marine turtles, seahorses and seabirds that naturally occur in the Commonwealth marine area.

Under the terms of the EPBC Act, an action (e.g. a project or development) is required to be referred to the Australian Government Environment Minister for approval if it has, will have, or is likely to have, a significant impact on an MNES. The term 'action' includes projects and developments subsequent to commencement of the Act, however there are a number of exemptions (e.g. projects in Commonwealth areas). According to Department of the Environment (2013), a 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts.

### References:

Department of the Environment (2013). Matters of National Environmental Significance - Significant Impact Guidelines 1.1 *Environment Protection and Biodiversity Conservation Act 1999*. Department of the Environment, Canberra, Australia.

## 2. Commonwealth Environment Protection and Biodiversity Conservation Act 1999

Many of the species that are specially protected at State level are also listed as Threatened species at the Federal level, as one of the Matters of National Environmental Significance (MNES) identified under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act). These may be classified as 'critically endangered', 'endangered', 'vulnerable' or 'lower risk', consistent with IUCN categories:

1. **Critically Endangered (CR):** a taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future.
2. **Endangered (EN):** a taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future.
3. **Vulnerable (VU):** a taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future.
4. **Lower Risk (LR):** a taxon is Lower Risk when it has been evaluated, does not satisfy the criteria for any of the categories Critically Endangered, Endangered or Vulnerable. Taxa included in the Lower Risk category can be separated into three subcategories:
  - **Conservation Dependent (CD).** Taxa which are the focus of a continuing taxon-specific or habitat-specific conservation program targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years.
  - **Near Threatened (NT).** Taxa which do not qualify for Conservation Dependent, but which are close to qualifying for Vulnerable.
  - **Least Concern (LC).** Taxa which do not qualify for Conservation Dependent or Near Threatened.

In addition, numerous Migratory species are listed as MNES under the EPBC Act (some of which are also listed as Threatened). Migratory species are those animals that migrate to Australia and its external territories, or pass through or over Australian waters during their annual migrations. The list of migratory species consists of those species listed under the following international conventions:

1. Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention);
2. China-Australia Migratory Bird Agreement (CAMBA);
3. Japan-Australia Migratory Bird Agreement (JAMBA); and,
4. Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

Marine species are also protected under the EPBC Act, and are listed to ensure the long-term conservation of the species. Marine species include all Australian sea snakes, seals, crocodiles, dugongs, marine turtles, seahorses and seabirds that naturally occur in the Commonwealth marine area.

Under the terms of the EPBC Act, an action (e.g. a project or development) is required to be referred to the Australian Government Environment Minister for approval if it has, will have, or is likely to have, a significant impact on an MNES. The term 'action' includes projects and developments subsequent to commencement of the Act, however there are a number of exemptions (e.g. projects in Commonwealth areas). According to Department of the Environment (2013), a 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts.

### References:

Department of the Environment (2013). Matters of National Environmental Significance - Significant Impact Guidelines 1.1 *Environment Protection and Biodiversity Conservation Act 1999*. Department of the Environment, Canberra, Australia.



## Appendix 2

### Database Searches







# 1620 5km

Created By Guest user on 07/09/2021

**Kingdom** Plantae  
**Current Names Only** Yes  
**Core Datasets Only** Yes  
**Method** 'By Line'  
**Vertices** 32° 13' 19" S, 116° 00' 27" E 32° 16' 19" S, 115° 59' 34" E  
**Group By** Family

Family	Species	Records
Aizoaceae	1	1
Amaranthaceae	1	1
Anacardiaceae	1	1
Anarthriaceae	4	11
Apiaceae	8	41
Apocynaceae	2	2
Araliaceae	6	28
Areaceae	1	1
Asparagaceae	32	155
Asphodelaceae	1	2
Asteraceae	42	157
Boryaceae	2	20
Brassicaceae	1	1
Campanulaceae	8	25
Caryophyllaceae	3	3
Casuarinaceae	5	27
Celastraceae	2	10
Centrolepidaceae	9	50
Colchicaceae	3	23
Convolvulaceae	1	2
Crassulaceae	7	11
Cupressaceae	1	3
Cyperaceae	63	331
Dasypogonaceae	6	55
Dilleniaceae	10	53
Dioscoreaceae	1	5
Droseraceae	19	109
Elaeocarpaceae	4	8
Ericaceae	14	49
Euphorbiaceae	7	15
Fabaceae	84	303
Gentianaceae	2	20
Geraniaceae	3	5
Goodeniaceae	17	80
Haemodoraceae	26	123
Haloragaceae	3	4
Hemerocallidaceae	12	53
Hydatellaceae	2	7
Hypoxidaceae	1	1
Iridaceae	18	99
Isoetaceae	1	2
Juncaceae	6	19
Juncaginaceae	2	4
Lamiaceae	1	2
Lauraceae	4	23
Lentibulariaceae	3	4
Linaceae	1	1
Loganiaceae	2	2
Loranthaceae	3	10
Macarthuriaceae	1	1
Malvaceae	3	4
Montiaceae	1	1
Myrtaceae	65	265
Olacaceae	1	1
Onagraceae	3	3
Orchidaceae	36	81
Orobanchaceae	3	7
Oxalidaceae	3	9
Papaveraceae	1	2
Philydraceae	3	13
Phyllanthaceae	2	11
Pittosporaceae	3	5
Plantaginaceae	3	3
Poaceae	50	249
Polygalaceae	3	7
Polygonaceae	2	3
Potamogetonaceae	1	1
Pottiaceae	1	1
Primulaceae	2	7
Proteaceae	55	266
Pteridaceae	3	7
Ranunculaceae	1	1
Restionaceae	18	69
Rhamnaceae	2	3
Rosaceae	1	5
Rubiaceae	4	14
Rutaceae	4	10

Santalaceae	1	1
Scrophulariaceae	4	6
Solanaceae	2	2
Stylidiaceae	35	150
Thymelaeaceae	5	18
Violaceae	2	5
Xanthorrhoeaceae	5	65
Xyridaceae	1	2
Zamiaceae	1	3
<b>TOTAL</b>	<b>787</b>	<b>3263</b>

Name ID	Species Name	Naturalised	Conservation Code	Endemic To Query Area
<b>Aizoaceae</b>				
1.	48513 <i>Aizoon pubescens</i>	Y		
<b>Amaranthaceae</b>				
2.	2742 <i>Ptilotus manglesii</i> (Pom Poms, Mulamula)			
<b>Anacardiaceae</b>				
3.	17055 <i>Schinus molle</i>	Y		
<b>Anarthriaceae</b>				
4.	1058 <i>Anarthria gracilis</i>			
5.	1059 <i>Anarthria humilis</i>			
6.	1097 <i>Lyginia barbata</i>			
7.	18049 <i>Lyginia imberbis</i>			
<b>Apiaceae</b>				
8.	6205 <i>Actinotus leucocephalus</i> (Flannel Flower)			
9.	6218 <i>Daucus glochidiatus</i> (Australian Carrot)			
10.	6222 <i>Homalosciadium homalocarpum</i>			
11.	6245 <i>Pentapeltis peltigera</i>			
12.	6263 <i>Schoenolaena juncea</i>			
13.	6284 <i>Xanthosia candida</i>			
14.	6285 <i>Xanthosia ciliata</i>			
15.	6289 <i>Xanthosia huegelii</i>			
<b>Apocynaceae</b>				
16.	6580 <i>Asclepias curassavica</i> (Redhead Cottonbush)	Y		
17.	6587 <i>Gomphocarpus fruticosus</i> (Narrowleaf Cottonbush)	Y		
<b>Araliaceae</b>				
18.	6223 <i>Hydrocotyle alata</i>			
19.	6226 <i>Hydrocotyle callicarpa</i> (Small Pennywort)			
20.	6229 <i>Hydrocotyle diantha</i>			
21.	6236 <i>Hydrocotyle pilifera</i>			
22.	19041 <i>Trachymene coerulea</i> subsp. <i>coerulea</i>			
23.	6280 <i>Trachymene pilosa</i> (Native Parsnip)			
<b>Areaceae</b>				
24.	17910 <i>Washingtonia filifera</i>	Y		
<b>Asparagaceae</b>				
25.	8779 <i>Asparagus asparagoides</i> (Bridal Creeper)	Y		
26.	1287 <i>Dichopogon capillipes</i>			
27.	13562 <i>Lachenalia aloides</i>	Y		
28.	1307 <i>Laxmannia ramosa</i> (Branching Lily)			
29.	11911 <i>Laxmannia ramosa</i> subsp. <i>ramosa</i>			
30.	11464 <i>Laxmannia sessiliflora</i> subsp. <i>australis</i>			
31.	1309 <i>Laxmannia squarrosa</i>			
32.	1222 <i>Lomandra brittanii</i>			
33.	1223 <i>Lomandra caespitosa</i> (Tufted Mat Rush)			
34.	1228 <i>Lomandra hermaphrodita</i>			
35.	1229 <i>Lomandra integra</i>			
36.	1232 <i>Lomandra micrantha</i> (Small-flower Mat-rush)			
37.	1234 <i>Lomandra nigricans</i>			
38.	1236 <i>Lomandra odora</i> (Tiered Matrush)			
39.	1239 <i>Lomandra preissii</i>			
40.	1240 <i>Lomandra purpurea</i> (Purple Mat Rush)			
41.	1243 <i>Lomandra sericea</i> (Silky Mat Rush)			
42.	<i>Lomandra</i> sp.			
43.	1245 <i>Lomandra spartea</i>			
44.	1246 <i>Lomandra suaveolens</i>			
45.	1312 <i>Sowerbaea laxiflora</i> (Purple Tassels)			
46.	1319 <i>Thysanotus arenarius</i>			
47.	1328 <i>Thysanotus dichotomus</i> (Branching Fringe Lily)			
48.	1338 <i>Thysanotus manglesianus</i> (Fringed Lily)			
49.	<i>Thysanotus manglesianus/patersonii</i> complex			
50.	1339 <i>Thysanotus multiflorus</i> (Many-flowered Fringe Lily)			
51.	1343 <i>Thysanotus patersonii</i>			
52.	46055 <i>Thysanotus</i> sp. Coastal plain (N.H. Brittan 66/63)			
53.	1351 <i>Thysanotus sparteus</i>			
54.	1354 <i>Thysanotus tenellus</i>			

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55.	1357 <i>Thysanotus thyrsoides</i>			
56.	1358 <i>Thysanotus triandrus</i>			
<b>Asphodelaceae</b>				
57.	1366 <i>Bulbine semibarbata</i> (Leek Lily)			
<b>Asteraceae</b>				
58.	7829 <i>Angianthus drummondii</i>		P3	
59.	7838 <i>Arctotheca calendula</i> (Cape Weed, African Marigold)	Y		
60.	7867 <i>Brachyscome bellidioides</i>			
61.	7883 <i>Brachyscome pusilla</i>			
62.	7909 <i>Carduus pycnocephalus</i> (Slender Thistle)	Y		
63.	11900 <i>Chrysanthemoides monilifera</i> subsp. <i>monilifera</i>	Y		
64.	7935 <i>Cichorium intybus</i> (Chicory)	Y		
65.	7946 <i>Cotula cotuloides</i> (Smooth Cotula)			
66.	7953 <i>Crepis foetida</i> (Foetid Hawksbeard)	Y		
67.	29054 <i>Crepis foetida</i> subsp. <i>foetida</i> (Stinking Hawksbeard)	Y		
68.	7961 <i>Dittrichia graveolens</i> (Stinkwort)	Y		
69.	7991 <i>Gnephosis drummondii</i>			
70.	12741 <i>Hyalosperma cotula</i>			
71.	8086 <i>Hypochoeris glabra</i> (Smooth Catsear)	Y		
72.	9352 <i>Hypochoeris radicata</i> (Flat Weed, Cats-ear)	Y		
73.	18585 <i>Lagenophora huegelii</i>			
74.	9356 <i>Logfia gallica</i>	Y		
75.	8105 <i>Millotia myosotidifolia</i>			
76.	14337 <i>Millotia tenuifolia</i> var. <i>laevis</i>		P2	
77.	14344 <i>Millotia tenuifolia</i> var. <i>tenuifolia</i> (Soft Millotia)			
78.	8133 <i>Olearia elaeophila</i>			
79.	32716 <i>Olearia lehmanniana</i>			
80.	8143 <i>Olearia paucidentata</i> (Autumn Scrub Daisy)			
81.	8163 <i>Pithocarpa corymbulosa</i> (Corymbose Pithocarpa)		P3	
82.	8175 <i>Podolepis gracilis</i> (Slender Podolepis)			
83.	8188 <i>Pogonolepis stricta</i>			
84.	13255 <i>Pterochaeta paniculata</i>			
85.	8195 <i>Quinetia urvillei</i>			
86.	13234 <i>Rhodanthe manglesii</i>			
87.	20663 <i>Senecio multicaulis</i> subsp. <i>multicaulis</i>			
88.	25884 <i>Senecio pinnatifolius</i> var. <i>latilobus</i>			
89.	8217 <i>Senecio quadridentatus</i>			
90.	8224 <i>Siloxerus filifolius</i>			
91.	8225 <i>Siloxerus humifusus</i> (Procumbent Siloxerus)			
92.	14583 <i>Siloxerus multiflorus</i>			
93.	8230 <i>Sonchus asper</i> (Rough Sowthistle)	Y		
94.	8231 <i>Sonchus oleraceus</i> (Common Sowthistle)	Y		
95.	25902 <i>Symphytichum squamatum</i> (Bushy Starwort)	Y		
96.	8251 <i>Trichocline spathulata</i> (Native Gerbera)			
97.	8255 <i>Ursinia anthemoides</i> (Ursinia)	Y		
98.	38388 <i>Ursinia anthemoides</i> subsp. <i>anthemoides</i>	Y		
99.	8257 <i>Vellereophyton dealbatum</i> (White Cudweed)	Y		
<b>Boryaceae</b>				
100.	1272 <i>Borya scirpoidea</i>			
101.	1273 <i>Borya sphaerocephala</i> (Pincushions)			
<b>Brassicaceae</b>				
102.	19403 <i>Stenopetalum gracile</i>			
<b>Campanulaceae</b>				
103.	7396 <i>Isotoma hypocrateriformis</i> (Woodbridge Poison)			
104.	7407 <i>Lobelia rhytidosperra</i> (Wrinkled-seeded Lobelia)			
105.	7408 <i>Lobelia tenuior</i> (Slender Lobelia)			
106.	7410 <i>Monopsis debilis</i>	Y		
107.	37440 <i>Monopsis debilis</i> var. <i>depressa</i>	Y		
108.	7384 <i>Wahlenbergia capensis</i> (Cape Bluebell)	Y		
109.	7386 <i>Wahlenbergia gracilentia</i> (Annual Bluebell)			
110.	7389 <i>Wahlenbergia preissii</i>			
<b>Caryophyllaceae</b>				
111.	2889 <i>Cerastium glomeratum</i> (Mouse Ear Chickweed)	Y		
112.	2909 <i>Silene gallica</i> (French Catchfly)	Y		
113.	2918 <i>Stellaria media</i> (Chickweed)	Y		
<b>Casuarinaceae</b>				
114.	1728 <i>Allocasuarina fraseriana</i> (Sheoak, Kondii)			

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115.	1732 <i>Allocasuarina humilis</i> (Dwarf Sheoak)			
116.	1734 <i>Allocasuarina microstachya</i>			
117.	1739 <i>Allocasuarina thuyoides</i> (Horned Sheoak)			
118.	1742 <i>Casuarina obesa</i> (Swamp Sheoak, Kuli)			
<b>Celastraceae</b>				
119.	4733 <i>Stackhousia monogyna</i>			
120.	4737 <i>Tripterococcus brunonis</i> (Winged Stackhousia)			
<b>Centrolepidaceae</b>				
121.	1117 <i>Aphelia cyperoides</i>			
122.	1119 <i>Aphelia nutans</i>			
123.	1121 <i>Centrolepis aristata</i> (Pointed Centrolepis)			
124.	1123 <i>Centrolepis caespitosa</i>			
125.	13122 <i>Centrolepis cephaliformis</i> subsp. <i>cephaloformis</i>			
126.	1125 <i>Centrolepis drummondiana</i>			
127.	1130 <i>Centrolepis humillima</i> (Dwarf Centrolepis)			
128.	1132 <i>Centrolepis mutica</i>			
129.	1134 <i>Centrolepis polygyna</i> (Wiry Centrolepis)			
<b>Colchicaceae</b>				
130.	12770 <i>Burchardia congesta</i>			
131.	1385 <i>Burchardia multiflora</i> (Dwarf Burchardia)			
132.	12072 <i>Wurmbea dioica</i> subsp. <i>alba</i>			
<b>Convolvulaceae</b>				
133.	6663 <i>Cuscuta epithymum</i> (Lesser Dodder, Greater Dodder)	Y		
<b>Crassulaceae</b>				
134.	3136 <i>Crassula alata</i>	Y		
135.	17701 <i>Crassula closiana</i>			
136.	3137 <i>Crassula colorata</i> (Dense Stonecrop)			
137.	3138 <i>Crassula decumbens</i> (Rufous Stonecrop)			
138.	20271 <i>Crassula extrorsa</i>			
139.	15706 <i>Crassula natans</i> var. <i>minus</i>	Y		
140.	3144 <i>Crassula peduncularis</i> (Purple Stonecrop)			
<b>Cupressaceae</b>				
141.	36600 <i>Callitris pyramidalis</i> (Swamp Cypress)			
<b>Cyperaceae</b>				
142.	739 <i>Baumea acuta</i> (Pale Twig-rush)			
143.	740 <i>Baumea arthropphylla</i>			
144.	743 <i>Baumea juncea</i> (Bare Twigrush)			
145.	43241 <i>Carex thecata</i>			
146.	763 <i>Chorizandra enodis</i> (Black Bristlerush)			
147.	768 <i>Cyathochaeta avenacea</i>			
148.	815 <i>Cyperus tenellus</i> (Tiny Flatsedge)	Y		
149.	899 <i>Gahnia ancistrophylla</i> (Hooked-leaf Saw Sedge)			
150.	900 <i>Gahnia aristata</i>			
151.	910 <i>Isolepis cernua</i> (Nodding Club-rush)			
152.	20200 <i>Isolepis cernua</i> var. <i>setiformis</i>			
153.	912 <i>Isolepis cyperoides</i>			
154.	14540 <i>Isolepis hystrix</i>	Y		
155.	917 <i>Isolepis marginata</i> (Coarse Club-rush)			
156.	919 <i>Isolepis oldfieldiana</i>			
157.	<i>Lepidosperma</i> aff. <i>coastale</i> (#134)			Y
158.	<i>Lepidosperma</i> aff. <i>resinosum</i>			
159.	925 <i>Lepidosperma angustatum</i>			
160.	42741 <i>Lepidosperma apricola</i>			
161.	41620 <i>Lepidosperma asperatum</i>			
162.	929 <i>Lepidosperma carphoides</i> (Black Rapier Sedge)			
163.	930 <i>Lepidosperma costale</i>			
164.	<i>Lepidosperma eastern terete scps</i> (BJK&NG 232)			
165.	936 <i>Lepidosperma leptostachyum</i>			
166.	937 <i>Lepidosperma longitudinale</i> (Pithy Sword-sedge)			
167.	940 <i>Lepidosperma pubisquamum</i>			
168.	941 <i>Lepidosperma resinosum</i>			
169.	942 <i>Lepidosperma rostratum</i>		T	
170.	944 <i>Lepidosperma scabrum</i>			
171.	<i>Lepidosperma</i> sp.			
172.	29141 <i>Lepidosperma</i> sp. Gosnells (A. Markey 1145)			
173.	29150 <i>Lepidosperma</i> sp. Margaret River (B.J. Lepschi 1841)			
174.	<i>Lepidosperma</i> sp. Mud3			

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				Y
175.	945 <i>Lepidosperma squamatum</i>			
176.	948 <i>Lepidosperma tetraquetrum</i>			
177.	955 <i>Mesomelaena pseudostygia</i>			
178.	956 <i>Mesomelaena stygia</i>			
179.	11473 <i>Mesomelaena stygia</i> subsp. <i>stygia</i>			
180.	957 <i>Mesomelaena tetragona</i> (Semaphore Sedge)			
181.	<i>Schoenus</i> aff. <i>brevisetis</i> (Mud2, #135)			
182.	975 <i>Schoenus bifidus</i>			
183.	978 <i>Schoenus brevisetis</i>			
184.	979 <i>Schoenus caespitius</i>			
185.	980 <i>Schoenus capillifolius</i>		P3	
186.	982 <i>Schoenus clandestinus</i>			
187.	991 <i>Schoenus grammatophyllus</i>			
188.	1002 <i>Schoenus nanus</i> (Tiny Bog Rush)			
189.	1006 <i>Schoenus odontocarpus</i>			
190.	1008 <i>Schoenus pennisetis</i>		P3	
191.	17614 <i>Schoenus plumosus</i>			
192.	1011 <i>Schoenus rigens</i>			
193.	17731 <i>Schoenus</i> sp. <i>Waroona</i> (G.J. Keighery 12235)		P3	
194.	<i>Schoenus</i> sp. aff. <i>breviculmis</i> sthct			Y
195.	1016 <i>Schoenus subbarbatus</i> (Bearded Bog-rush)			
196.	1017 <i>Schoenus subbulbosus</i>			
197.	1019 <i>Schoenus subflavus</i> (Yellow Bog-rush)			
198.	1020 <i>Schoenus sublateralis</i>			
199.	1023 <i>Schoenus tenellus</i>			
200.	1026 <i>Schoenus unispiculatus</i>			
201.	1033 <i>Tetraria australiensis</i>		T	
202.	1034 <i>Tetraria capillaris</i> (Hair Sedge)			
203.	1036 <i>Tetraria octandra</i>			
204.	1038 <i>Tricostularia neesii</i>			
<b>Dasypogonaceae</b>				
205.	1213 <i>Calectasia cyanea</i> (Blue Tinsel Lily)		T	
206.	1214 <i>Calectasia grandiflora</i> (Blue Tinsel Lily)			
207.	19309 <i>Calectasia narragara</i>			
208.	1218 <i>Dasypogon bromeliifolius</i> (Pineapple Bush)			
209.	1220 <i>Dasypogon obliquifolius</i>			
210.	1221 <i>Kingia australis</i> (Kingia, Pulonok)			
<b>Dilleniaceae</b>				
211.	5108 <i>Hibbertia acerosa</i> (Needle Leaved Guinea Flower)			
212.	5114 <i>Hibbertia commutata</i>			
213.	20051 <i>Hibbertia diamesogenos</i>			
214.	5129 <i>Hibbertia glomerata</i>			
215.	5134 <i>Hibbertia huegelii</i>			
216.	5135 <i>Hibbertia hypericoides</i> (Yellow Buttercups)			
217.	45534 <i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i>			
218.	11481 <i>Hibbertia spicata</i> subsp. <i>spicata</i>			
219.	48381 <i>Hibbertia striata</i>			
220.	5176 <i>Hibbertia vaginata</i>			
<b>Dioscoreaceae</b>				
221.	1509 <i>Dioscorea hastifolia</i> (Warrine, Warrarn)			
<b>Droseraceae</b>				
222.	3092 <i>Drosera bulbosa</i> (Red-leaved Sundew)			
223.	48751 <i>Drosera drummondii</i>			
224.	3095 <i>Drosera erythrorhiza</i> (Red Ink Sundew)			
225.	3097 <i>Drosera gigantea</i> (Giant Sundew)			
226.	3098 <i>Drosera glanduligera</i> (Pimpernel Sundew)			
227.	3101 <i>Drosera heterophylla</i> (Swamp Rainbow)			
228.	48769 <i>Drosera indumenta</i>			
229.	3106 <i>Drosera macrantha</i> (Bridal Rainbow)			
230.	3109 <i>Drosera menziesii</i> (Pink Rainbow)			
231.	3114 <i>Drosera nitidula</i> (Shining Sundew)			
232.	3115 <i>Drosera occidentalis</i> (Western Sundew)		P4	
233.	13189 <i>Drosera oreopodium</i>			
234.	3118 <i>Drosera pallida</i> (Pale Rainbow)			
235.	29178 <i>Drosera porrecta</i>			
236.	8911 <i>Drosera rosulata</i>			
237.	49090 <i>Drosera</i> sp. <i>Branched styles</i> (S.C. Coffey 193)			

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238.	13185 <i>Drosera spilos</i>			
239.	3131 <i>Drosera stolonifera</i> (Leafy Sundew)			
240.	3133 <i>Drosera subhirtella</i> (Sunny Rainbow)			
<b>Elaeocarpaceae</b>				
241.	4535 <i>Tetradthea hirsuta</i> (Black Eyed Susan)			
242.	48342 <i>Tetradthea hirsuta</i> subsp. <i>hirsuta</i>			
243.	48341 <i>Tetradthea hirsuta</i> subsp. <i>viminea</i>			
244.	4537 <i>Tetradthea nuda</i>			
<b>Ericaceae</b>				
245.	6300 <i>Andersonia aristata</i> (Rice Flower)			
246.	6314 <i>Andersonia lehmanniana</i>			
247.	6334 <i>Astroloma pallidum</i> (Kick Bush)			
248.	6337 <i>Astroloma stomarrhena</i> (Red Swamp Cranberry)			
249.	6348 <i>Conostephium pendulum</i> (Pearl Flower)			
250.	6349 <i>Conostephium preissii</i>			
251.	6367 <i>Leucopogon capitellatus</i>			
252.	6439 <i>Leucopogon pulchellus</i> (Beard-heath)			
253.	28302 <i>Leucopogon</i> sp. <i>Parkerville</i> (A. Meebold 11654)			
254.	6445 <i>Leucopogon squarrosus</i>			
255.	6454 <i>Leucopogon verticillatus</i> (Tassel Flower)			
256.	6456 <i>Lysinema ciliatum</i> (Curry Flower)			
257.	6458 <i>Lysinema elegans</i>			
258.	6476 <i>Styphelia tenuiflora</i> (Common Pinheath)			
<b>Euphorbiaceae</b>				
259.	13753 <i>Euphorbia dallachyana</i>			
260.	29940 <i>Euphorbia maculata</i>	Y		
261.	34757 <i>Euphorbia prostrata</i>	Y		
262.	4662 <i>Monotaxis grandiflora</i> (Diamond of the Desert)			
263.	19585 <i>Monotaxis grandiflora</i> var. <i>grandiflora</i>			
264.	4666 <i>Monotaxis occidentalis</i>			
265.	4716 <i>Stachystemon vermicularis</i>			
<b>Fabaceae</b>				
266.	15429 <i>Acacia alata</i> var. <i>alata</i>			
267.	15466 <i>Acacia applanata</i>			
268.	15469 <i>Acacia barbinervis</i> subsp. <i>barbinervis</i>			
269.	3294 <i>Acacia dentifera</i>			
270.	3307 <i>Acacia divergens</i>			
271.	3310 <i>Acacia drewiana</i>			
272.	11926 <i>Acacia drewiana</i> subsp. <i>drewiana</i>			
273.	3374 <i>Acacia huegelii</i>			
274.	3409 <i>Acacia lasiocarpa</i> (Panjang)			
275.	11519 <i>Acacia lasiocarpa</i> var. <i>bracteolata</i>			
276.	3410 <i>Acacia lateriticola</i>			
277.	3442 <i>Acacia microbotrya</i> (Manna Wattle, Kalyang)			
278.	14131 <i>Acacia oncinophylla</i> subsp. <i>patulifolia</i>		P4	
279.	3502 <i>Acacia pulchella</i> (Prickly Moses)			
280.	15481 <i>Acacia pulchella</i> var. <i>glaberrima</i>			
281.	15483 <i>Acacia pulchella</i> var. <i>pulchella</i>			
282.	15480 <i>Acacia pulchella</i> var. <i>reflexa</i>			
283.	3541 <i>Acacia sessilis</i>			
284.	<i>Acacia</i> sp.			
285.	3557 <i>Acacia stenoptera</i> (Narrow Winged Wattle)			
286.	3574 <i>Acacia teretifolia</i>			
287.	3591 <i>Acacia urophylla</i>			
288.	3602 <i>Acacia willdenowiana</i> (Grass Wattle)			
289.	3686 <i>Aotus cordifolia</i>			
290.	3692 <i>Aotus procumbens</i>			
291.	48782 <i>Bossiaea angustifolia</i>			
292.	3710 <i>Bossiaea eriocarpa</i> (Common Brown Pea)			
293.	3714 <i>Bossiaea ornata</i> (Broad Leaved Brown Pea)			
294.	18156 <i>Chamaecytisus palmensis</i> (Tagasaste)	Y		
295.	8971 <i>Chorizema cordatum</i>			
296.	3753 <i>Chorizema dicksonii</i> (Yellow-eyed Flame Pea)			
297.	3761 <i>Chorizema rhombeum</i>			
298.	35838 <i>Cristonia biloba</i> subsp. <i>biloba</i>			
299.	3805 <i>Daviesia decurrens</i> (Prickly Bitter-pea)			
300.	19747 <i>Daviesia decurrens</i> subsp. <i>decurrens</i>			
301.	3815 <i>Daviesia horrida</i> (Prickly Bitter-pea)			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
302.	16585 <i>Daviesia nudiflora</i> subsp. <i>nudiflora</i>			
303.	3832 <i>Daviesia physodes</i>			
304.	3835 <i>Daviesia preissii</i>			
305.	3845 <i>Daviesia triflora</i>			
306.	3880 <i>Eutaxia virgata</i>			
307.	20475 <i>Gastrolobium capitatum</i>			
308.	20473 <i>Gastrolobium ebracteolatum</i>			
309.	3924 <i>Gastrolobium spinosum</i> (Prickly Poison)			
310.	3945 <i>Gompholobium aristatum</i>			
311.	10909 <i>Gompholobium confertum</i>			
312.	3950 <i>Gompholobium knightianum</i>			
313.	3951 <i>Gompholobium marginatum</i>			
314.	3954 <i>Gompholobium polymorphum</i>			
315.	3955 <i>Gompholobium preissii</i>			
316.	3957 <i>Gompholobium tomentosum</i> (Hairy Yellow Pea)			
317.	3964 <i>Hovea chorizemifolia</i> (Holly-leaved Hovea)			
318.	3968 <i>Hovea trisperma</i> (Common Hovea)			
319.	12859 <i>Hovea trisperma</i> var. <i>trisperma</i>			
320.	3992 <i>Isotropis cuneifolia</i> (Granny Bonnets)			
321.	3997 <i>Jacksonia alata</i>			
322.	20462 <i>Jacksonia gracillima</i>		P3	
323.	4018 <i>Jacksonia lehmannii</i>			
324.	4029 <i>Jacksonia sternbergiana</i> (Stinkwood, Kapur)			
325.	4037 <i>Kennedia coccinea</i> (Coral Vine)			
326.	4041 <i>Kennedia microphylla</i>			
327.	4044 <i>Kennedia prostrata</i> (Scarlet Runner)			
328.	3669 <i>Labichea punctata</i> (Lance-leaved Cassia)			
329.	4059 <i>Lotus angustissimus</i> (Narrowleaf Trefoil)	Y		
330.	8564 <i>Lotus subbiflorus</i>	Y		
331.	4090 <i>Mirbelia dilatata</i> (Holly-leaved Mirbelia)			
332.	4100 <i>Mirbelia spinosa</i>			
333.	4113 <i>Ornithopus compressus</i> (Yellow Serradella)	Y		
334.	4114 <i>Ornithopus pinnatus</i> (Slender Serradella)	Y		
335.	17114 <i>Paraserianthes lophantha</i> subsp. <i>lophantha</i>			
336.	4141 <i>Phyllota gracilis</i>			
337.	4207 <i>Sphaerolobium medium</i>			
338.	4211 <i>Sphaerolobium vimineum</i> (Leafless Globe Pea)			
339.	4289 <i>Trifolium angustifolium</i> (Narrowleaf Clover)	Y		
340.	4291 <i>Trifolium arvense</i> (Hare's Foot Clover)	Y		
341.	4292 <i>Trifolium campestre</i> (Hop Clover)	Y		
342.	17763 <i>Trifolium campestre</i> var. <i>campestre</i> (Hop Clover)	Y		
343.	4293 <i>Trifolium cernuum</i> (Drooping Flower Clover)	Y		
344.	4295 <i>Trifolium dubium</i> (Suckling Clover)	Y		
345.	17541 <i>Trifolium incarnatum</i> var. <i>incarnatum</i>	Y		
346.	4313 <i>Trifolium subterraneum</i> (Subterranean Clover)	Y		
347.	4320 <i>Vicia hirsuta</i> (Hairy Vetch)	Y		
348.	12070 <i>Vicia sativa</i> subsp. <i>sativa</i>	Y		
349.	4325 <i>Viminaria juncea</i> (Swishbush, Koweda)			
<b>Gentianaceae</b>				
350.	6539 <i>Centaurium erythraea</i> (Common Centaury)	Y		
351.	6543 <i>Cicendia filiformis</i> (Slender Cicendia)	Y		
<b>Geraniaceae</b>				
352.	4332 <i>Erodium botrys</i> (Long Storksbill)	Y		
353.	4335 <i>Erodium cygnorum</i> (Blue Heronsbill)			
354.	4346 <i>Pelargonium littorale</i>			
<b>Goodeniaceae</b>				
355.	7411 <i>Anthotium humile</i> (Dwarf Anthotium)			
356.	12724 <i>Anthotium junciforme</i>			
357.	7420 <i>Dampiera alata</i> (Winged-stem Dampiera)			
358.	7454 <i>Dampiera linearis</i> (Common Dampiera)			
359.	7462 <i>Dampiera pedunculata</i>			
360.	29362 <i>Goodenia coerulea</i>			
361.	12551 <i>Goodenia micrantha</i>			
362.	7538 <i>Goodenia pulchella</i>			
363.	7568 <i>Lechenaultia biloba</i> (Blue Leschenaultia)			
364.	7572 <i>Lechenaultia expansa</i>			
365.	7574 <i>Lechenaultia floribunda</i> (Free-flowering Leschenaultia)			
366.	7602 <i>Scaevola calliptera</i>			
367.	7613 <i>Scaevola glandulifera</i> (Viscid Hand-flower)			



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368.	7619 <i>Scaevola lanceolata</i> (Long-leaved Scaevola)			
369.	7635 <i>Scaevola pilosa</i> (Hairy Fan-flower)			
370.	13182 <i>Scaevola repens</i> var. <i>repens</i>			
371.	7665 <i>Velleia trinervis</i>			
<b>Haemodoraceae</b>				
372.	1409 <i>Anigozanthos humilis</i> (Catspaw)			
373.	1411 <i>Anigozanthos manglesii</i> (Mangles Kangaroo Paw, Kurulbrang)			
374.	11261 <i>Anigozanthos manglesii</i> subsp. <i>manglesii</i>			
375.	1416 <i>Anigozanthos viridis</i> (Green Kangaroo Paw, Kurulbardang)			
376.	11566 <i>Anigozanthos viridis</i> subsp. <i>viridis</i>			
377.	1418 <i>Conostylis aculeata</i> (Prickly Conostylis)			
378.	12109 <i>Conostylis aculeata</i> subsp. <i>preissii</i>			
379.	1420 <i>Conostylis androstemma</i> (Trumpets)			
380.	1423 <i>Conostylis aurea</i> (Golden Conostylis)			
381.	1429 <i>Conostylis caricina</i>			
382.	1436 <i>Conostylis juncea</i>			
383.	1454 <i>Conostylis setigera</i> (Bristly Cottonhead)			
384.	11597 <i>Conostylis setigera</i> subsp. <i>setigera</i>			
385.	1455 <i>Conostylis setosa</i> (White Cottonhead)			
386.	1464 <i>Haemodorum brevisepalum</i>			
387.	1465 <i>Haemodorum discolor</i>			
388.	1468 <i>Haemodorum laxum</i>			
389.	1472 <i>Haemodorum simplex</i>			
390.	1474 <i>Haemodorum sparsiflorum</i>			
391.	1475 <i>Haemodorum spicatum</i> (Mardja)			
392.	1478 <i>Phlebocarya ciliata</i>			
393.	1479 <i>Phlebocarya filifolia</i>			
394.	1481 <i>Tribonanthes australis</i> (Southern Tiurmdin)			
395.	1482 <i>Tribonanthes brachypetala</i> (Nodding Tiurmdin)			
396.	1483 <i>Tribonanthes longipetala</i> (Branching Tiurmdin)			
397.	1485 <i>Tribonanthes violacea</i> (Violet Tiurmdin)			
<b>Haloragaceae</b>				
398.	16746 <i>Gonocarpus benthamii</i> subsp. <i>benthamii</i>			
399.	6149 <i>Gonocarpus cordiger</i>			
400.	6160 <i>Gonocarpus paniculatus</i>			
<b>Hemerocallidaceae</b>				
401.	23474 <i>Agrostocrinum hirsutum</i>			
402.	1261 <i>Agrostocrinum scabrum</i> (Blue Grass Lily)			
403.	1264 <i>Arnocrinum preissii</i>			
404.	1276 <i>Caesia micrantha</i> (Pale Grass Lily)			
405.	1277 <i>Caesia occidentalis</i>			
406.	1259 <i>Dianella revoluta</i> (Blueberry Lily)			
407.	1298 <i>Johnsonia pubescens</i> (Pipe Lily)			
408.	19272 <i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>		P2	
409.	19632 <i>Johnsonia pubescens</i> subsp. <i>pubescens</i>			
410.	1260 <i>Styandra glauca</i> (Blind Grass)			
411.	1361 <i>Tricoryne elatior</i> (Yellow Autumn Lily)			
412.	1362 <i>Tricoryne humilis</i>			
<b>Hydatellaceae</b>				
413.	1139 <i>Trithuria bibracteata</i>			
414.	1141 <i>Trithuria submersa</i>			
<b>Hypoxidaceae</b>				
415.	43760 <i>Pauridia occidentalis</i>			
<b>Iridaceae</b>				
416.	18279 <i>Babiana angustifolia</i>	Y		
417.	18392 <i>Freesia alba</i> x <i>leichtlinii</i>	Y		
418.	1518 <i>Gladiolus angustus</i> (Long Tubed Painted Lady)	Y		
419.	1520 <i>Gladiolus caryophyllaceus</i> (Wild Gladiolus)	Y		
420.	1534 <i>Ixia polystachya</i> (Variable Ixia)	Y		
421.	19179 <i>Moraea flaccida</i> (One-leaf Cape Tulip)	Y		
422.	1546 <i>Patersonia juncea</i> (Rush Leaved Patersonia)			
423.	1550 <i>Patersonia occidentalis</i> (Purple Flag, Koma)			
424.	30476 <i>Patersonia occidentalis</i> var. <i>latifolia</i>			
425.	1551 <i>Patersonia pygmaea</i> (Pygmy Patersonia)			
426.	1556 <i>Romulea rosea</i> (Guildford Grass)	Y		
427.	1558 <i>Sparaxis bulbifera</i>	Y		
428.	13103 <i>Watsonia borbonica</i>	Y		

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429.	1566 <i>Watsonia marginata</i>	Y		
430.	1567 <i>Watsonia meriana</i> (Bulbil <i>Watsonia</i> )	Y		
431.	18108 <i>Watsonia meriana</i> var. <i>bulbillifera</i>	Y		
432.	18118 <i>Watsonia meriana</i> var. <i>meriana</i>	Y		
433.	<i>Watsonia</i> sp. <i>Mud09</i>			Y
<b>Isoetaceae</b>				
434.	11 <i>Isoetes drummondii</i> (Quillwort)			
<b>Juncaceae</b>				
435.	1178 <i>Juncus bufonius</i> (Toad Rush)	Y		
436.	1180 <i>Juncus capitatus</i> (Capitate Rush)	Y		
437.	1184 <i>Juncus holoschoenus</i> (Jointleaf Rush)			
438.	1186 <i>Juncus microcephalus</i>	Y		
439.	1188 <i>Juncus pallidus</i> (Pale Rush)			
440.	1195 <i>Juncus subsecundus</i> (Finger Rush)			
<b>Juncaginaceae</b>				
441.	40661 <i>Cycnogeton lineare</i>			
442.	18587 <i>Triglochin nana</i>			
<b>Lamiaceae</b>				
443.	6856 <i>Hemigenia incana</i> (Silky Hemigenia)			
<b>Lauraceae</b>				
444.	2951 <i>Cassytha flava</i> (Dodder Laurel)			
445.	2952 <i>Cassytha glabella</i> (Tangled Dodder Laurel)			
446.	2956 <i>Cassytha pomiformis</i> (Dodder Laurel)			
447.	2957 <i>Cassytha racemosa</i> (Dodder Laurel)			
<b>Lentibulariaceae</b>				
448.	<i>Polypompholyx tenella</i> <i>scps</i>			
449.	7153 <i>Utricularia tenella</i>			
450.	7157 <i>Utricularia violacea</i> (Violet Bladderwort)			
<b>Linaceae</b>				
451.	4363 <i>Linum trigynum</i> (French Flax)	Y		
<b>Loganiaceae</b>				
452.	16825 <i>Phyllangium divergens</i>			
453.	16177 <i>Phyllangium paradoxum</i>			
<b>Loranthaceae</b>				
454.	13267 <i>Amyema linophylla</i> subsp. <i>linophylla</i>			
455.	2380 <i>Amyema miquelii</i> (Stalked Mistletoe)			
456.	2401 <i>Nuytsia floribunda</i> (Christmas Tree, Mudja)			
<b>Macarthuriaceae</b>				
457.	2839 <i>Macarthuria australis</i>			
<b>Malvaceae</b>				
458.	10915 <i>Brachychiton populneus</i> (Kurrajong)	Y		
459.	5033 <i>Lasiopetalum floribundum</i> (Free Flowering Lasiopetalum)			
460.	5080 <i>Thomasia foliosa</i>			
<b>Montiaceae</b>				
461.	2854 <i>Calandrinia granulifera</i> (Pygmy Purslane)			
<b>Myrtaceae</b>				
462.	<i>Astartea</i> aff. <i>fascicularis</i> <i>sthcst</i>			
463.	20350 <i>Astartea affinis</i> (West-coast <i>Astartea</i> )			
464.	36441 <i>Babingtonia camphorosmae</i> (Camphor Myrtle)			
465.	45402 <i>Babingtonia urbana</i> (Coastal Plain <i>Babingtonia</i> )		P3	
466.	5387 <i>Beaufortia macrostemon</i> (Darling Range <i>Beaufortia</i> )			
467.	5411 <i>Calothamnus hirsutus</i>			
468.	35816 <i>Calothamnus quadrifidus</i> subsp. <i>quadrifidus</i>			
469.	5439 <i>Calytrix angulata</i> (Yellow Starflower)			
470.	5441 <i>Calytrix aurea</i>			
471.	5458 <i>Calytrix flavescens</i> (Summer Starflower)			
472.	5460 <i>Calytrix fraseri</i> (Pink Summer <i>Calytrix</i> )			
473.	5498 <i>Chamelaucium uncinatum</i> (Geraldton Wax)			
474.	17104 <i>Corymbia calophylla</i> (Marri)			
475.	5508 <i>Darwinia citriodora</i> (Lemon-scented <i>Darwinia</i> )			
476.	5531 <i>Darwinia thymoides</i>			
477.	18193 <i>Darwinia thymoides</i> subsp. <i>thymoides</i>			
478.	13950 <i>Eremaea asterocarpa</i> subsp. <i>asterocarpa</i>			
479.	5541 <i>Eremaea pauciflora</i>			

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480.	14104 <i>Eremaea pauciflora</i> var. <i>pauciflora</i>			
481.	5688 <i>Eucalyptus laeliae</i> (Darling Range Ghost Gum)			
482.	5690 <i>Eucalyptus lane-poolei</i> (Salmon White Gum)			
483.	5708 <i>Eucalyptus marginata</i> (Jarrah, Djara)			
484.	13547 <i>Eucalyptus marginata</i> subsp. <i>marginata</i> (Jarrah)			
485.	13548 <i>Eucalyptus marginata</i> subsp. <i>thalassica</i> (Blue-leaved Jarrah)			
486.	5739 <i>Eucalyptus patens</i> (Swan River Blackbutt, Dwuda)			
487.	13511 <i>Eucalyptus rudis</i> subsp. <i>rudis</i>			
488.	5797 <i>Eucalyptus wandoo</i> (Wandoo, Wondu)			
489.	12906 <i>Eucalyptus wandoo</i> subsp. <i>wandoo</i>			
490.	13090 <i>Eucalyptus x balanites</i> (Cadda Road Mallee)		T	
491.	5817 <i>Hypocalymma angustifolium</i> (White Myrtle, Kudjid)			
492.	5825 <i>Hypocalymma robustum</i> (Swan River Myrtle)			
493.	5835 <i>Kunzea micrantha</i>			
494.	17461 <i>Kunzea micrantha</i> subsp. <i>micrantha</i>			
495.	5841 <i>Kunzea recurva</i>			
496.	37580 <i>Melaleuca acutifolia</i>			
497.	36296 <i>Melaleuca armillaris</i> subsp. <i>armillaris</i>	Y		
498.	5925 <i>Melaleuca lateriflora</i> (Gorada)			
499.	5926 <i>Melaleuca lateritia</i> (Robin Redbreast Bush)			
500.	20297 <i>Melaleuca osullivanii</i>			
501.	5946 <i>Melaleuca pauciflora</i>			
502.	5952 <i>Melaleuca preissiana</i> (Moonah)			
503.	5958 <i>Melaleuca radula</i> (Graceful Honey Myrtle)			
504.	5978 <i>Melaleuca teretifolia</i> (Banbar)			
505.	5980 <i>Melaleuca thymoides</i>			
506.	5984 <i>Melaleuca uncinata</i> (Broom Bush, Kwidjard)			
507.	5987 <i>Melaleuca viminea</i> (Mohan)			
508.	13280 <i>Melaleuca viminea</i> subsp. <i>viminea</i>			
509.	6006 <i>Pericalymma ellipticum</i> (Swamp Teatree)			
510.	16478 <i>Pericalymma ellipticum</i> var. <i>floridum</i>			
511.	15501 <i>Pericalymma spongiocaula</i>			
512.	6012 <i>Regelia ciliata</i>			
513.	6033 <i>Scholtzia involucrata</i> (Spiked Scholtzia)			
514.	20135 <i>Taxandria linearifolia</i>			
515.	6070 <i>Verticordia acerosa</i>			
516.	15431 <i>Verticordia acerosa</i> var. <i>acerosa</i>			
517.	12388 <i>Verticordia acerosa</i> var. <i>preissii</i>			
518.	6076 <i>Verticordia densiflora</i> (Compacted Featherflower)			
519.	15432 <i>Verticordia densiflora</i> var. <i>densiflora</i>			
520.	6088 <i>Verticordia huegelii</i> (Variegated Featherflower)			
521.	15433 <i>Verticordia huegelii</i> var. <i>huegelii</i>			
522.	12430 <i>Verticordia huegelii</i> var. <i>stylosa</i>			
523.	14714 <i>Verticordia lindleyi</i> subsp. <i>lindleyi</i>		P4	
524.	6107 <i>Verticordia pennigera</i>			
525.	6110 <i>Verticordia plumosa</i> (Plumed Featherflower)			
526.	12449 <i>Verticordia plumosa</i> var. <i>brachyphylla</i>			
<b>Olacaceae</b>				
527.	2365 <i>Olax benthamiana</i>			
<b>Onagraceae</b>				
528.	6137 <i>Oenothera affinis</i> (Longflower Evening Primrose)	Y		
529.	6140 <i>Oenothera mollissima</i>	Y		
530.	14292 <i>Oenothera stricta</i> subsp. <i>stricta</i>	Y		
<b>Orchidaceae</b>				
531.	1586 <i>Caladenia discoidea</i> (Dancing Orchid)			
532.	1592 <i>Caladenia flava</i> (Cowslip Orchid)			
533.	15348 <i>Caladenia flava</i> subsp. <i>flava</i>			
534.	1602 <i>Caladenia longicauda</i> (Common White Spider Orchid)			
535.	15365 <i>Caladenia longicauda</i> subsp. <i>longicauda</i>			
536.	1605 <i>Caladenia marginata</i> (White Fairy Orchid)			
537.	1613 <i>Caladenia reptans</i> (Little Pink Fairy Orchid)			
538.	15379 <i>Caladenia serotina</i>			
539.	19649 <i>Disa bracteata</i>	Y		
540.	12943 <i>Diuris brumalis</i>			
541.	10791 <i>Diuris carinata</i> (Bee Orchid)			
542.	11049 <i>Diuris corymbosa</i>			
543.	1632 <i>Diuris emarginata</i> (Tall Donkey Orchid)			
544.	1634 <i>Diuris laxiflora</i> (Bee Orchid)			
545.	1635 <i>Diuris longifolia</i> (Common Donkey Orchid)			

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546.	12939 <i>Diuris magnifica</i>			
547.	46859 <i>Diuris ostrina</i>			
548.	1637 <i>Diuris purdiei</i> (Purdie's Donkey Orchid)		T	
549.	1639 <i>Drakaea elastica</i> (Glossy-leaved Hammer Orchid)		T	
550.	1640 <i>Drakaea glyptodon</i> (King-in-his-carriage)			
551.	11156 <i>Drakaea livida</i>			
552.	1646 <i>Eriochilus dilatatus</i> (White Bunny Orchid)			
553.	15413 <i>Eriochilus dilatatus</i> subsp. <i>undulatus</i>			
554.	1653 <i>Leporella fimbriata</i> (Hare Orchid)			
555.	1658 <i>Microtis atrata</i> (Swamp Mignonette Orchid)			
556.	1669 <i>Prasophyllum cyphochilum</i> (Pouched Leek Orchid)			
557.	1670 <i>Prasophyllum drummondii</i> (Swamp Leek Orchid)			
558.	1672 <i>Prasophyllum fimbria</i> (Fringed Leek Orchid)			
559.	1680 <i>Prasophyllum parvifolium</i> (Autumn Leek Orchid)			
560.	48675 <i>Pterostylis atrosanguinea</i>			
561.	1693 <i>Pterostylis recurva</i> (Jug Orchid)			
562.	12217 <i>Pterostylis sanguinea</i>			
563.	1698 <i>Pterostylis vittata</i> (Banded Greenhood)			
564.	1701 <i>Thelymitra antennifera</i> (Vanilla Orchid)			
565.	1705 <i>Thelymitra crinita</i> (Blue Lady Orchid)			
566.	11053 <i>Thelymitra macrophylla</i>			
<b>Orobanchaceae</b>				
567.	7046 <i>Bellardia trixago</i> (Bellardia)	Y		
568.	48868 <i>Bellardia viscosa</i>	Y		
569.	7089 <i>Parentucellia latifolia</i> (Common Bartsia)	Y		
<b>Oxalidaceae</b>				
570.	4352 <i>Oxalis glabra</i>	Y		
571.	4355 <i>Oxalis perennans</i>			
572.	4356 <i>Oxalis pes-caprae</i> (Soursob)	Y		
<b>Papaveraceae</b>				
573.	2969 <i>Fumaria capreolata</i> (Whiteflower Fumitory)	Y		
<b>Philydraceae</b>				
574.	1172 <i>Philydrella drummondii</i>			
575.	1173 <i>Philydrella pygmaea</i> (Butterfly Flowers)			
576.	14306 <i>Philydrella pygmaea</i> subsp. <i>pygmaea</i>			
<b>Phyllanthaceae</b>				
577.	4675 <i>Phyllanthus calycinus</i> (False Boronia)			
578.	4691 <i>Poranthera microphylla</i> (Small Poranthera)			
<b>Pittosporaceae</b>				
579.	25788 <i>Billardiera fraseri</i> (Elegant Pronaya)			
580.	17637 <i>Marianthus candidus</i> (White Marianthus)			
581.	17630 <i>Marianthus tenuis</i>			
<b>Plantaginaceae</b>				
582.	4717 <i>Callitriche stagnalis</i> (Common Starwort)	Y		
583.	14282 <i>Gratiola pubescens</i>			
584.	7085 <i>Misopates orontium</i> (Lesser Snapdragon)	Y		
<b>Poaceae</b>				
585.	184 <i>Aira caryophyllea</i> (Silvery Hairgrass)	Y		
586.	185 <i>Aira cupaniana</i> (Silvery Hairgrass)	Y		
587.	197 <i>Amphipogon debilis</i>			
588.	198 <i>Amphipogon laguroides</i>			
589.	199 <i>Amphipogon strictus</i> (Greybeard Grass)			
590.	200 <i>Amphipogon turbinatus</i>			
591.	207 <i>Aristida contorta</i> (Bunched Kerosene Grass)			
592.	210 <i>Aristida holathera</i>			
593.	17233 <i>Austrostipa campylachne</i>			
594.	17234 <i>Austrostipa compressa</i>			
595.	17237 <i>Austrostipa elegantissima</i>			
596.	<i>Austrostipa semibarbata/campylachne</i>			Y
597.	17257 <i>Austrostipa variabilis</i>			
598.	233 <i>Avena barbata</i> (Bearded Oat)	Y		
599.	8661 <i>Brachypodium distachyon</i> (False Brome)	Y		
600.	244 <i>Briza maxima</i> (Blowfly Grass)	Y		
601.	245 <i>Briza minor</i> (Shivery Grass)	Y		
602.	249 <i>Bromus diandrus</i> (Great Brome)	Y		
603.	267 <i>Chloris gayana</i> (Rhodes Grass)	Y		

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
604.	283 <i>Cynodon dactylon</i> (Couch)	Y		
605.	306 <i>Dichelachne crinita</i> (Longhair Plumegrass)			
606.	347 <i>Ehrharta calycina</i> (Perennial Veldt Grass)	Y		
607.	349 <i>Ehrharta longiflora</i> (Annual Grass)	Y		
608.	376 <i>Eragrostis curvula</i> (African Lovegrass)	Y		
609.	379 <i>Eragrostis elongata</i> (Clustered Lovegrass)			
610.	434 <i>Gastridium phleoides</i> (Nitgrass)	Y		
611.	438 <i>Hainardia cylindrica</i> (Common Barbgrass)	Y		
612.	450 <i>Hordeum marinum</i>	Y		
613.	19955 <i>Lachnagrostis plebeia</i>			
614.	476 <i>Lolium perenne</i> (Perennial Ryegrass)	Y		
615.	478 <i>Lolium rigidum</i> (Wimmera Ryegrass)	Y		
616.	<i>Lolium</i> sp.			
617.	14985 <i>Melinis repens</i>	Y		
618.	485 <i>Microlaena stipoides</i> (Weeping Grass)			
619.	492 <i>Neurachne alopecuroidea</i> (Foxtail Mulga Grass)			
620.	40424 <i>Pentameris airoides</i> subsp. <i>airoides</i>	Y		
621.	554 <i>Phleum pratense</i> (Timothy)	Y		
622.	571 <i>Poa annua</i> (Winter Grass)	Y		
623.	582 <i>Polypogon monspeliensis</i> (Annual Beardgrass)	Y		
624.	583 <i>Polypogon tenellus</i>			
625.	40431 <i>Rytidosperma acerosum</i>			
626.	40425 <i>Rytidosperma caespitosum</i>			
627.	40426 <i>Rytidosperma occidentale</i>			
628.	40427 <i>Rytidosperma setaceum</i>			
629.	613 <i>Setaria verticillata</i> (Whorled Pigeon Grass)	Y		
630.	667 <i>Tetrarrhena laevis</i> (Forest Ricegrass)			
631.	673 <i>Themeda triandra</i>			
632.	722 <i>Vulpia bromoides</i> (Squirrel Tail Fescue)	Y		
633.	724 <i>Vulpia myuros</i> (Rat's Tail Fescue)	Y		
634.	33101 <i>Vulpia myuros</i> forma <i>myuros</i>	Y		
<b>Polygalaceae</b>				
635.	4550 <i>Comesperma calymega</i> (Blue-spike Milkwort)			
636.	4551 <i>Comesperma ciliatum</i>			
637.	4564 <i>Comesperma virgatum</i> (Milkwort)			
<b>Polygonaceae</b>				
638.	2419 <i>Polygonum aviculare</i> (Wireweed)	Y		
639.	2429 <i>Rumex acetosella</i> (Sorrel)	Y		
<b>Potamogetonaceae</b>				
640.	111 <i>Potamogeton ochreateus</i> (Blunt Pondweed)			
<b>Pottiaceae</b>				
641.	32439 <i>Syntrichia papillosa</i>			
<b>Primulaceae</b>				
642.	36375 <i>Lysimachia arvensis</i> (Pimpernel)	Y		
643.	36373 <i>Lysimachia minima</i>	Y		
<b>Proteaceae</b>				
644.	1790 <i>Adenanthos meisneri</i>			
645.	1791 <i>Adenanthos obovatus</i> (Basket Flower)			
646.	32682 <i>Banksia armata</i> var. <i>armata</i>			
647.	1800 <i>Banksia attenuata</i> (Slender Banksia, Piara)			
648.	32678 <i>Banksia bipinnatifida</i> subsp. <i>bipinnatifida</i>			
649.	32576 <i>Banksia dallanneyi</i> (Couch Honeypot)			
650.	32580 <i>Banksia dallanneyi</i> subsp. <i>dallanneyi</i> var. <i>dallanneyi</i>			
651.	1819 <i>Banksia grandis</i> (Bull Banksia, Pulgarla)			
652.	32214 <i>Banksia kippistiana</i>			
653.	32216 <i>Banksia kippistiana</i> var. <i>paenepeccata</i>		P3	
654.	1834 <i>Banksia menziesii</i> (Firewood Banksia)			
655.	32202 <i>Banksia nivea</i> (Honeypot Dryandra, Pudjarn)			
656.	32053 <i>Banksia undata</i> (Urchin Dryandra)			
657.	1882 <i>Conospermum stoechadis</i> (Common Smokebush)			
658.	15611 <i>Conospermum stoechadis</i> subsp. <i>stoechadis</i> (Common Smokebush)			
659.	1964 <i>Grevillea bipinnatifida</i> (Fuchsia Grevillea)			
660.	19628 <i>Grevillea bipinnatifida</i> subsp. <i>bipinnatifida</i>			
661.	1997 <i>Grevillea endlicheriana</i> (Spindly Grevillea)			
662.	2066 <i>Grevillea pilulifera</i> (Woolly-flowered Grevillea)			
663.	2080 <i>Grevillea quercifolia</i> (Oak-leaf Grevillea)			
664.	2102 <i>Grevillea tenuiflora</i> (Tassel Grevillea)			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
665.	2122 <i>Grevillea wilsonii</i> (Native Fuchsia)			
666.	2131 <i>Hakea auriculata</i>			
667.	2137 <i>Hakea ceratophylla</i> (Horned Leaf Hakea)			
668.	2152 <i>Hakea cyclocarpa</i> (Ramshorn)			
669.	2166 <i>Hakea incrassata</i> (Marble Hakea)			
670.	2175 <i>Hakea lissocarpha</i> (Honey Bush)			
671.	2179 <i>Hakea marginata</i>			
672.	45333 <i>Hakea neospathulata</i>			
673.	2197 <i>Hakea prostrata</i> (Harsh Hakea)			
674.	2203 <i>Hakea ruscifolia</i> (Candle Hakea)			
675.	2206 <i>Hakea stenocarpa</i> (Narrow-fruited Hakea)			
676.	2212 <i>Hakea sulcata</i> (Furrowed Hakea)			
677.	2214 <i>Hakea trifurcata</i> (Two-leaf Hakea)			
678.	2215 <i>Hakea undulata</i> (Wavy-leaved Hakea)			
679.	2216 <i>Hakea varia</i> (Variable-leaved Hakea)			
680.	2221 <i>Isopogon asper</i>			
681.	2237 <i>Isopogon sphaerocephalus</i> (Drumstick Isopogon)			
682.	14083 <i>Lambertia multiflora</i> var. <i>darlingensis</i>			
683.	2273 <i>Persoonia saccata</i> (Snottygobble)			
684.	20391 <i>Petrophile juncifolia</i>			
685.	2299 <i>Petrophile linearis</i> (Pixie Mops)			
686.	2301 <i>Petrophile macrostachya</i>			
687.	2308 <i>Petrophile seminuda</i>			
688.	2311 <i>Petrophile squamata</i>			
689.	2312 <i>Petrophile striata</i>			
690.	2316 <i>Stirlingia latifolia</i> (Blueboy)			
691.	2321 <i>Synaphea acutiloba</i> (Granite Synaphea)			
692.	2323 <i>Synaphea gracillima</i>			
693.	2324 <i>Synaphea petiolaris</i> (Synaphea)			
694.	16864 <i>Synaphea petiolaris</i> subsp. <i>petiolaris</i>			
695.	30751 <i>Synaphea</i> sp. <i>Pinjarra Plain</i> (A.S. George 17182)		T	
696.	28354 <i>Synaphea</i> sp. <i>Serpentine</i> (G.R. Brand 103)		T	
697.	29186 <i>Synaphea</i> sp. <i>Udumung</i> (A.S. George 17058)			
698.	2331 <i>Xylomelum occidentale</i> (Woody Pear, Djandin)			

#### Pteridaceae

699.	25 <i>Adiantum aethiopicum</i> (Common Maidenhair)			
700.	31 <i>Cheilanthes austrotenuifolia</i>			
701.	12818 <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>			

#### Ranunculaceae

702.	2938 <i>Ranunculus trilobus</i> (Buttercup)	Y		
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#### Restionaceae

703.	17845 <i>Apodasmia ceramophila</i>			
704.	17685 <i>Chaetanthus aristatus</i>			
705.	17706 <i>Chordifex sinuosus</i>			
706.	17663 <i>Desmocladus asper</i>			
707.	17691 <i>Desmocladus fasciculatus</i>			
708.	16595 <i>Desmocladus flexuosus</i>			
709.	46362 <i>Desmocladus lateriflorus</i>			
710.	1070 <i>Hypolaena exsulca</i>			
711.	1071 <i>Hypolaena fastigiata</i>			
712.	1075 <i>Lepidobolus preissianus</i>			
713.	18074 <i>Lepidobolus preissianus</i> subsp. <i>preissianus</i>			
714.	1077 <i>Leptocarpus canus</i> (Hoary Twine-rush)			
715.	1078 <i>Leptocarpus coangustatus</i>			
716.	46375 <i>Leptocarpus decipiens</i>			
717.	46380 <i>Leptocarpus kraussii</i>			
718.	1088 <i>Lepyrodia macra</i> (Large Scale Rush)			
719.	1090 <i>Lepyrodia muirii</i>			
720.	1092 <i>Loxocarya cinerea</i>			

#### Rhamnaceae

721.	4792 <i>Cryptandra arbutiflora</i> (Waxy Cryptandra)			
722.	33418 <i>Trymalium odoratissimum</i> subsp. <i>odoratissimum</i>			

#### Rosaceae

723.	3191 <i>Rubus ulmifolius</i> (Blackberry)	Y		
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#### Rubiaceae

724.	7321 <i>Galium divaricatum</i>	Y		
725.	18254 <i>Opercularia apiciflora</i>			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
726.	7346 <i>Opercularia echinocephala</i> (Bristly Headed Stink Weed)			
727.	18255 <i>Opercularia vaginata</i> (Dog Weed)			
<b>Rutaceae</b>				
728.	11503 <i>Boronia crenulata</i> subsp. <i>crenulata</i> var. <i>crenulata</i>			
729.	4420 <i>Boronia fastigiata</i> (Bushy Boronia)			
730.	4429 <i>Boronia molloyae</i> (Tall Boronia)			
731.	18529 <i>Philotheca spicata</i> (Pepper and Salt)			
<b>Santalaceae</b>				
732.	2342 <i>Leptomeria cunninghamii</i>			
<b>Scrophulariaceae</b>				
733.	7055 <i>Dischisma capitatum</i> (Woolly-headed Dischisma)	Y		
734.	7189 <i>Eremophila clarkei</i> (Turpentine Bush)			
735.	<i>Eremophila</i> sp.			
736.	7107 <i>Verbascum virgatum</i> (Twiggy Mullein)	Y		
<b>Solanaceae</b>				
737.	7020 <i>Solanum linnaeanum</i> (Apple of Sodom)	Y		
738.	7022 <i>Solanum nigrum</i> (Black Berry Nightshade)	Y		
<b>Stylidiaceae</b>				
739.	7675 <i>Levenhookia pulcherrima</i> (Beautiful Stylewort)		P2	
740.	7676 <i>Levenhookia pusilla</i> (Midget Stylewort)			
741.	7677 <i>Levenhookia stipitata</i> (Common Stylewort)			
742.	18564 <i>Stylidium aceratum</i>		P3	
743.	7684 <i>Stylidium amoenum</i> (Lovely Triggerplant)			
744.	30278 <i>Stylidium androsaceum</i>			
745.	7693 <i>Stylidium brunonianum</i> (Pink Fountain Triggerplant)			
746.	7694 <i>Stylidium bulbiferum</i> (Circus Triggerplant)			
747.	7696 <i>Stylidium calcaratum</i> (Book Triggerplant)			
748.	7699 <i>Stylidium carnosum</i> (Fleshy-leaved Triggerplant)			
749.	7702 <i>Stylidium ciliatum</i> (Golden Triggerplant)			
750.	7712 <i>Stylidium despectum</i> (Dwarf Triggerplant)			
751.	7713 <i>Stylidium dichotomum</i> (Pins-and-needles)			
752.	7716 <i>Stylidium diuroides</i> (Donkey Triggerplant)			
753.	7717 <i>Stylidium divaricatum</i> (Daddy-long-legs)			
754.	7718 <i>Stylidium diversifolium</i> (Touch-me-not)			
755.	7719 <i>Stylidium ecome</i> (Foot Triggerplant)			
756.	7736 <i>Stylidium hispidum</i> (White Butterfly Triggerplant)			
757.	7742 <i>Stylidium inundatum</i> (Hundreds and Thousands)			
758.	7749 <i>Stylidium leptophyllum</i> (Needle-leaved Triggerplant)			
759.	7752 <i>Stylidium lineatum</i> (Sunny Triggerplant)			
760.	25829 <i>Stylidium neurophyllum</i> (Coastal Plain Triggerplant)			
761.	7768 <i>Stylidium obtusatum</i> (Pinafore Triggerplant)			
762.	7773 <i>Stylidium petiolare</i> (Horn Triggerplant)			
763.	7774 <i>Stylidium piliferum</i> (Common Butterfly Triggerplant)			
764.	7782 <i>Stylidium pulchellum</i> (Thumbelina Triggerplant)			
765.	33106 <i>Stylidium recurvum</i>			
766.	7785 <i>Stylidium repens</i> (Matted Triggerplant)			
767.	<i>Stylidium roseo-alatum</i>			
768.	7790 <i>Stylidium roseoalatum</i> (Pink-wing Triggerplant)			
769.	7798 <i>Stylidium schoenoides</i> (Cow Kicks)			
770.	<i>Stylidium</i> sp.			
771.	45594 <i>Stylidium tenue</i> subsp. <i>majusculum</i> (Showy Fountain Triggerplant)			
772.	23511 <i>Stylidium thesioides</i> (Delicate Triggerplant)			
773.	7806 <i>Stylidium utricularioides</i> (Pink Fan Triggerplant)			
<b>Thymelaeaceae</b>				
774.	11404 <i>Pimelea imbricata</i> var. <i>major</i>			
775.	11402 <i>Pimelea imbricata</i> var. <i>piligera</i>			
776.	5266 <i>Pimelea suaveolens</i> (Scented Banjine)			
777.	12041 <i>Pimelea suaveolens</i> subsp. <i>suaveolens</i>			
778.	5269 <i>Pimelea sylvestris</i>			
<b>Violaceae</b>				
779.	5216 <i>Hybanthus calycinus</i> (Wild Violet)			
780.	5221 <i>Hybanthus floribundus</i>			
<b>Xanthorrhoeaceae</b>				
781.	1280 <i>Chamaescilla corymbosa</i> (Blue Squill)			
782.	11299 <i>Chamaescilla corymbosa</i> var. <i>corymbosa</i>			
783.	8788 <i>Chamaescilla versicolor</i>			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
784.	1253 <i>Xanthorrhoea gracilis</i> (Graceful Grass Tree, Mimidi)			
785.	1256 <i>Xanthorrhoea preissii</i> (Grass tree, Palga)			
<b>Xyridaceae</b>				
786.	15819 <i>Xyris atrovirida</i>			
<b>Zamiaceae</b>				
787.	85 <i>Macrozamia riedlei</i> (Zamia, Djiridji)			

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

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





# EPBC Act Protected Matters Report

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

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

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

Report created: 13/07/21 15:54:45

[Summary](#)

[Details](#)

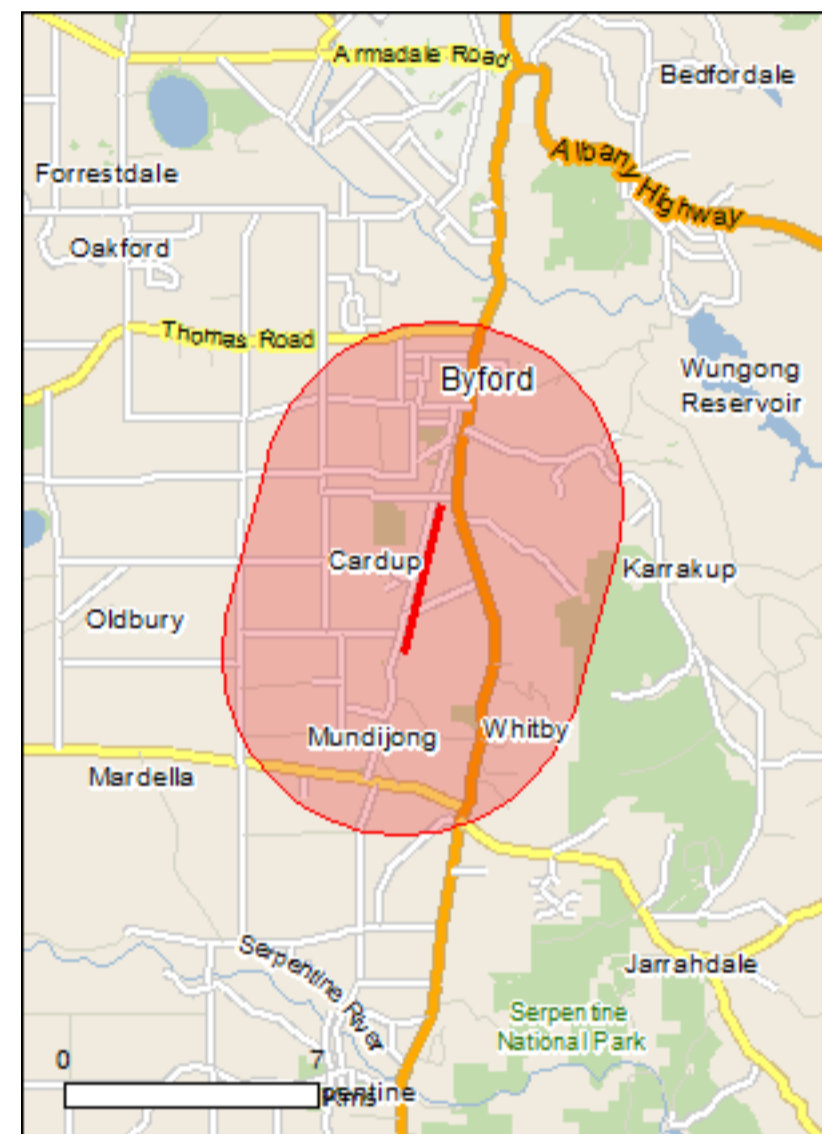
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

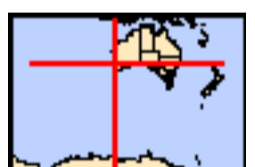
[Acknowledgements](#)



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Buffer: 5.0Km



# Summary

## Matters of National Environmental Significance

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

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	None
<a href="#">Wetlands of International Importance:</a>	2
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Area:</a>	None
<a href="#">Listed Threatened Ecological Communities:</a>	5
<a href="#">Listed Threatened Species:</a>	29
<a href="#">Listed Migratory Species:</a>	8

## Other Matters Protected by the EPBC Act

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

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

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

<a href="#">Commonwealth Land:</a>	1
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	12
<a href="#">Whales and Other Cetaceans:</a>	None
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Australian Marine Parks:</a>	None

## Extra Information

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

<a href="#">State and Territory Reserves:</a>	4
<a href="#">Regional Forest Agreements:</a>	1
<a href="#">Invasive Species:</a>	38
<a href="#">Nationally Important Wetlands:</a>	None
<a href="#">Key Ecological Features (Marine)</a>	None

# Details

## Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)	[ Resource Information ]
Name	Proximity
<a href="#">Forrestdale and thomsons lakes</a>	Within 10km of Ramsar
<a href="#">Peel-yalgorup system</a>	30 - 40km upstream

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

Name	Status	Type of Presence
<a href="#">Banksia Woodlands of the Swan Coastal Plain ecological community</a>	Endangered	Community likely to occur within area
<a href="#">Clay Pans of the Swan Coastal Plain</a>	Critically Endangered	Community likely to occur within area
<a href="#">Corymbia calophylla - Kingia australis woodlands on heavy soils of the Swan Coastal Plain</a>	Endangered	Community known to occur within area
<a href="#">Corymbia calophylla - Xanthorrhoea preissii woodlands and shrublands of the Swan Coastal Plain</a>	Endangered	Community known to occur within area
<a href="#">Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain ecological community</a>	Critically Endangered	Community may occur within area

Listed Threatened Species	[ Resource Information ]	
Name	Status	Type of Presence
<b>Birds</b>		
<a href="#">Botaurus poiciloptilus</a> Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calyptorhynchus banksii naso</a> Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Calyptorhynchus baudinii</a> Baudin's Cockatoo, Long-billed Black-Cockatoo [769]	Endangered	Roosting known to occur within area
<a href="#">Calyptorhynchus latirostris</a> Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area
<a href="#">Leipoa ocellata</a> Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Rostratula australis</a> Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur

Name	Status	Type of Presence within area
<a href="#">Sternula nereis nereis</a> Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area
<b>Mammals</b>		
<a href="#">Bettongia penicillata ogilbyi</a> Woylie [66844]	Endangered	Species or species habitat known to occur within area
<a href="#">Dasyurus geoffroii</a> Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Pseudocheirus occidentalis</a> Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Setonix brachyurus</a> Quokka [229]	Vulnerable	Species or species habitat likely to occur within area
<b>Plants</b>		
<a href="#">Andersonia gracilis</a> Slender Andersonia [14470]	Endangered	Species or species habitat may occur within area
<a href="#">Anthocercis gracilis</a> Slender Tailflower [11103]	Vulnerable	Species or species habitat may occur within area
<a href="#">Diuris micrantha</a> Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Diuris purdiei</a> Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat likely to occur within area
<a href="#">Drakaea elastica</a> Glossy-leaved Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat known to occur within area
<a href="#">Drakaea micrantha</a> Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Eleocharis keigheryi</a> Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat may occur within area
<a href="#">Eucalyptus x balanites</a> Cadda Road Mallee, Cadda Mallee [87816]	Endangered	Species or species habitat likely to occur within area
<a href="#">Grevillea curviloba subsp. incurva</a> Narrow curved-leaf Grevillea [64909]	Endangered	Species or species habitat may occur within area
<a href="#">Lasiopetalum pterocarpum</a> Wing-fruited Lasiopetalum [64922]	Endangered	Species or species habitat likely to occur within area
<a href="#">Lepidosperma rostratum</a> Beaked Lepidosperma [14152]	Endangered	Species or species habitat known to occur within area
<a href="#">Synaphea sp. Fairbridge Farm (D. Papenfus 696)</a> Selena's Synaphea [82881]	Critically Endangered	Species or species habitat likely to occur within area
<a href="#">Synaphea sp. Pinjarra Plain (A.S. George 17182)</a> [86878]	Endangered	Species or species

Name	Status	Type of Presence
<a href="#">Synaphea sp. Serpentine (G.R. Brand 103)</a> [86879]	Critically Endangered	habitat known to occur within area Species or species habitat known to occur within area
<a href="#">Tetraria australiensis</a> Southern Tetraria [10137]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Thelymitra stellata</a> Star Sun-orchid [7060]	Endangered	Species or species habitat likely to occur within area

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

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

Name	Threatened	Type of Presence
<b>Migratory Marine Birds</b>		
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<b>Migratory Terrestrial Species</b>		
<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within area
<b>Migratory Wetlands Species</b>		
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat may occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat may occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Species or species habitat may occur within area

### Other Matters Protected by the EPBC Act

#### Commonwealth Land [\[ Resource Information \]](#)

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

Name
Commonwealth Land -

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

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

Name	Threatened	Type of Presence
<b>Birds</b>		

Name	Threatened	Type of Presence
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat may occur within area
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<a href="#">Ardea ibis</a> Cattle Egret [59542]		Species or species habitat may occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat may occur within area
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area
<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Species or species habitat may occur within area
<a href="#">Rostratula benghalensis (sensu lato)</a> Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area

## Extra Information

### State and Territory Reserves [\[ Resource Information \]](#)

Name	State
Cardup	WA
Unnamed WA46818	WA
Unnamed WA51963	WA
Watkins Road	WA

### Regional Forest Agreements [\[ Resource Information \]](#)

Note that all areas with completed RFAs have been included.

Name	State
<a href="#">South West WA RFA</a>	Western Australia

## Invasive Species

[ [Resource Information](#) ]

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

Name	Status	Type of Presence
<b>Birds</b>		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
<b>Mammals</b>		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Funambulus pennantii Northern Palm Squirrel, Five-striped Palm Squirrel [129]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
<b>Plants</b>		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Brachiaria mutica Para Grass [5879]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur



Name	Status	Type of Presence within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Solanum elaeagnifolium Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area
<b>Reptiles</b>		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area

# Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

# Coordinates

-32.241455 116.001904,-32.273247 115.99212,-32.273247 115.99212

# Acknowledgements

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

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

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

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

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# Appendix 3

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## Vegetation Structural Classification and Condition Ranking





**Vegetation Structural Classes\***

Stratum	Canopy Cover (%)				
	70-100%	30-70%	10-30%	2-10%	<2%
Trees over 30 m	Tall closed forest	Tall open forest	Tall woodland	Tall open woodland	Scattered tall trees
Trees 10-30 m	Closed forest	Open forest	Woodland	Open woodland	Scattered trees
Trees under 10 m	Low closed forest	Low open forest	Low woodland	Low open woodland	Scattered low trees
Tree Mallee	Closed tree mallee	Tree mallee	Open tree mallee	Very open tree mallee	Scattered tree mallee
Shrub Mallee	Closed shrub mallee	Shrub mallee	Open shrub mallee	Very open shrub mallee	Scattered shrub mallee
Shrubs over 2 m	Tall closed scrub	Tall open scrub	Tall shrubland	Tall open shrubland	Scattered tall shrubs
Shrubs 1-2 m	Closed heath	Open heath	Shrubland	Open shrubland	Scattered shrubs
Shrubs under 1 m	Low closed heath	Low open heath	Low shrubland	Low open shrubland	Scattered low shrubs
Hummock grasses	Closed hummock grassland	Hummock grassland	Open hummock grassland	Very open hummock grassland	Scattered hummock grasses
Grasses, Sedges, Herbs	Closed tussock grassland / bunch grassland / sedgeland / herbland	Tussock grassland / bunch grassland / sedgeland / herbland	Open tussock grassland / bunch grassland / sedgeland / herbland	Very open tussock grassland / bunch grassland / sedgeland / herbland	Scattered tussock grasses / bunch grasses / sedges / herbs

- Based on Keighery (1994), adapted from Muir (1977), and Aplin's (1979) modification of the vegetation classification system of Specht (1970):
  - Keighery B.J. (1994). *Bushland Plant Survey: A Guide for Community Surveys*. Wildflower Society of Western Australia, Perth WA;
  - Aplin T.E.H. (1979). The Flora. Chapter 3 In O'Brien, B.J. (ed.) (1979). *Environment and Science*. University of Western Australia Press;
  - Muir B.G. (1977). Biological Survey of the Western Australian Wheatbelt. Part II: Vegetation and habitat of Bending Reserve. *Records of the Western Australian Museum, Suppl. No. 3*;
  - Specht R.L. (1970). Vegetation. In *The Australian Environment*. 4th edn (Ed. G.W. Leeper). Melbourne.

**Extracts from the NVIS framework (see NVIS Technical Working Group 2017) of relevance to the current study.**

**Table 1: The NVIS Information Hierarchy.**

Hierarchical Level	Description	NVIS structural/floristic components required
I	<b>Class*</b>	Dominant growth form for the ecologically or structurally dominant stratum
II	<b>Structural Formation*</b>	Dominant growth form, cover and height for the ecologically or structurally dominant stratum.
III	<b>Broad Floristic Formation**</b>	Dominant growth form, cover, height and dominant land cover genus for the upper most or the ecologically or structurally dominant stratum.
IV	<b>Sub-Formation**</b>	Dominant growth form, cover, height and dominant genus for each of the three traditional strata. (i.e. Upper, Mid and Ground)
V	<b>Association**</b>	Dominant growth form, height, cover and species (3 species) for the three traditional strata. (i.e. Upper, Mid and Ground)
VI	<b>Sub-Association**</b>	Dominant growth form, height, cover and species (5 species) for all layers/sub-strata.

\* Walker & Hopkins (1990)

\*\* NVIS (defined for the NVIS Information Hierarchy)

**Table 4: NVIS structural Formation Terminology.**

		Cover Characteristics						
	Foliage cover *	70-100	30-70	10-30		» 0	0-5	unknown
	Crown cover **	>80	50-80	20-50	0.25-20		0-5	unknown
	% Cover ***	>80	50-80	20-50	0.25-20		0-5	unknown
	Cover code	d	c	i	r	bi	bc	unknown
Growth Form		Height Ranges (m)		Structural Formation Classes				
tree, palm	30	closed forest	open forest	woodland	open woodland	isolated trees	isolated clumps of trees	trees
shrub, cycad, grass-tree, tree-fern	2	closed shrubland	shrubland	open shrubland	sparse shrubland	isolated shrubs	isolated clumps of shrubs	shrubs
heath shrub	2	closed heathland	heathland	open heathland	sparse heathland	isolated heath shrubs	isolated clumps of heath shrubs	heath shrubs
tussock grass	0.5	closed tussock grassland	tussock grassland	open tussock grassland	sparse tussock grassland	isolated tussock grasses	isolated clumps of tussock grasses	tussock grasses
other grass	0.5	closed grassland	grassland	open grassland	sparse grassland	isolated grasses	isolated clumps of grasses	other grasses
sedge	0.5	closed sedgeland	sedgeland	open sedgeland	sparse sedgeland	isolated sedges	isolated clumps of sedges	sedges
rush	0.5	closed rushland	rushland	open rushland	sparse rushland	isolated rushes	isolated clumps of rushes	rushes
forb	0.5	closed forbland	forbland	open forbland	sparse forbland	isolated forbs	isolated clumps of forbs	forbs
fern	2	closed fernland	fernland	open fernland	sparse fernland	isolated ferns	isolated clumps of ferns	ferns
vine	30	closed vineland	vineland	open vineland	sparse vineland	isolated vines	isolated clumps of vines	vines

\* Foliage Cover is defined for each stratum as 'the proportion of the ground that would be shaded if sunshine came from directly overhead'. It includes branches and leaves and is similar to the Crown type of Walker & Hopkins (1990) but is applied to a stratum or plot rather than an individual crown. It is generally not directly measured in the field for the upper stratum, although it can be



measured by various line interception methods for ground layer vegetation. For the attribute COVER CODE in the Stratum table, the ground cover category refers to ground foliage cover not percentage cover.

\*\* Crown Cover (canopy cover) as per Walker & Hopkins (1990). Although relationships between the two are dependent on season, species, species age etc (Walker & Hopkins (1990), the crown cover category classes have been adopted as the defining measure.

\*\*\* The percentage cover is defined as the percentage of a strictly defined plot area, covered by vegetation. This can be an estimate and is a less precise measure than using, for example, a point intercept transect methods on ground layer, or overstorey vegetative cover. That is for precisely measured values (e.g. crown densitometer or point intercept transects) the value measured would be 'foliage' cover. Where less precise or qualitative measures are used these will most probably be recorded as 'percentage' cover.

**Table 6: Example usage of the NVIS Information Hierarchy (\*\*Note: For definitions of U, M, G, U1, U2, U3, M1, M2, M3, G1, and G2 refer to Table 1.)**

Level	Description	Species	Growth form	Cover	Height
I	<b>CLASS</b>	-	1 dominant growth form for the dominant stratum	-	-
	Example	<i>Tree</i>			
II	<b>STRUCTURAL FORMATION</b>	-	1 dominant growth form for the dominant stratum	1 cover class for the dominant stratum	1 height class for the dominant stratum
	Example	<i>Open woodland</i>			
III	<b>BROAD FLORISTIC FORMATION</b>	1 dominant genus name for the dominant stratum	1 dominant growth form for dominant stratum	1 cover class for dominant stratum	1 height class for dominant stratum
	Example	<i>Eucalyptus open woodland</i>			
IV	<b>SUB-FORMATION</b>	1 dominant genus name for each stratum ((max 3 strata; i.e. for U, M, G where substantially present)	1 dominant growth form for each stratum (max 3 strata)	1 cover class for each stratum (max 3 strata)	1 height class for each stratum (max 3 strata)
	Example	<i>+Eucalyptus open woodland\Acacia tall sparse shrubland\Aristida open tussock grassland</i>			
V	<b>ASSOCIATION</b>	Up to 3 dominant species for each stratum (max 3 strata; i.e. for U, M, G where present)	Up to 3 dominant growth forms for each stratum (max 3 strata; i.e. for U, M, G where present)	1 cover class code for each stratum (max 3 strata; i.e. for U, M, G where present)	1 height class code for each stratum (max 3 strata; i.e. for U, M, G where present)
	Example	<i>U+ ^Eucalyptus coolabah,Casuarina cristata,Flindersia maculosa\^tree\7\r;M ^Acacia salicina,Alectryon oleifolius,Acacia stenophylla\^shrub\4\r;G ^Aristida ramosa,Astrebla squarrosa,Bothriochloa decipiens\^tussock grass,forb,sedge\2\i</i>			
VI	<b>SUB-ASSOCIATION</b>	Up to 5 dominant species for each sub-stratum (i.e. for U1, U2, U3, M1, M2, M3, G1, G2 where present) <ul style="list-style-type: none"> <li>Indicate characteristic genus in each sub-stratum with an up arrow or hat "^". Must match characteristic growth form.</li> </ul>	Up to 5 dominant growth forms for each sub-stratum. <ul style="list-style-type: none"> <li>Indicate characteristic growth form with an up arrow or hat "^". Must match characteristic genus</li> </ul>	1 cover class code for each sub-stratum	1 height class code for each sub-stratum
	Example	<i>U1+ ^Eucalyptus coolabah,Casuarina cristata,Flindersia maculosa\Eucalyptus\^tree\7\r;M1 ^Acacia salicina,Alectryon oleifolius ,Acacia stenophylla,Acacia victoriae subsp. victoriae,Eremophila bignoniiflora\Acacia\^shrub\4\bi;M2 Eremophila longifolia,Muehlenbeckia florulenta\Eremophila\shrub\3\r;G1 ^Aristida ramosa,Astrebla squarrosa,Bothriochloa decipiens,Dichanthium sericeum,Enteropogon acicularis\Aristida\^tussock grass,forb,sedge\2\</i>			

Vegetation condition scale taken from EPA (2016a), based on scales developed by Keighery (1994) and Trudgen (1988).

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

## Appendix 4

### Likelihood of Significant Flora Occurring in the Survey Area





Taxon	Habitat <sup>a</sup>	Habitat <sup>a</sup>	Database Searches					Likelihood of Occurrence	
			NatureMap	WAHerb	TPFL	EPBC PMST	GHD 2021	Initial Ranking Based on Desktop Study	Final Ranking Including Results of 2021 Field Survey
<b>Threatened</b>									
<i>Andersonia gracilis</i>	Slender erect or open straggly shrub, 0.1-0.5 m high. Fl. White-pink-purple, Sep-Nov.	White/grey sand, sandy clay, gravelly loam. Winter-wet area, near swamps.				✓		Unlikely to occur, areas of suitable habitat present, however no records in close proximity.	Would not occur.
<i>Anthocercis gracilis</i>	Erect, spindly shrub to 0.6 m high. Fl. Yellow-green, Sep-Oct.	Sandy or loamy soils. Granite outcrops.				✓		Unlikely to occur; no suitable habitat and no records in close proximity.	Would not occur.
<i>Calectasia cyanea</i>	Rhizomatous, clump forming, woody perennial, herb 0.1-0.6 m high, to 0.3 m wide. Fl. Blue/purple, Jun-Oct.	White, grey or yellow sand, gravel.	✓					Unlikely to occur, out of distribution range and no records in close proximity.	Would not occur.
<i>Diuris micrantha</i>	Tuberous, perennial herb, 0.3-0.6 m high. Fl. Yellow & brown, Sep-Oct.	Brown loamy clay. Winter-wet swamps, in shallow water.				✓		Unlikely to occur; areas of suitable habitat present, however no records in close proximity.	Would not occur.
<i>Diuris purdiei</i>	Tuberous, perennial herb 0.15-0.35 m high. Fl. Yellow, Sep-Oct	Grey-black sand, moist. Winter-wet swamps.	✓	✓	✓	✓		Likely to occur, areas of suitable habitat. Record <5 km from survey area.	May potentially occur; areas of suitable habitat; records <5 km; orchids can stay dormant for up to 3 years.
<i>Drakaea elastica</i>	Tuberous, perennial herb, 0.12-0.3 m high. Fl. Red, green & yellow, Oct-Nov.	White or grey sand. Low-lying situations adjoining winter-wet swamps.	✓		✓	✓		Likely to occur, areas of suitable habitat. Record <2 km from survey area.	May potentially occur; areas of suitable habitat; records <2 km; orchids can stay dormant for up to 3 years.
<i>Drakaea micrantha</i>	Tuberous, perennial herb, 0.15-0.3 m high. Fl. Red & yellow, Sep-Oct.	White-grey sand.				✓		Unlikely to occur; areas of suitable habitat present, however no records in close proximity.	Would not occur.
<i>Eleocharis keigheryi</i>	Rhizomatous, clumped perennial, grass-like or herb (sedge) to 0.4 m high. Fl. Green, Aug-Nov.	Clay, sandy loam. Emergent in freshwater: creeks, claypans.				✓		Unlikely to occur; no suitable habitat and no records in close proximity.	Would not occur.
<i>Eucalyptus x balanites</i>	Mallee, to 5 m high, bark rough, flaky. Fl. White, Oct-Dec or Jan-Feb.	Sandy soils with lateritic gravel.	✓	✓	✓	✓	✓	Likely to occur, areas of suitable habitat. Records <5 km from survey area.	May potentially occur, areas of suitable habitat. Record <5 km from survey area.
<i>Grevillea curviloba</i> *	Prostrate to erect shrub, 0.1-2.5 m high. Fl. White-cream, Aug-Oct.	Grey sand, sandy loam. Winter-wet heath.				✓		Unlikely to occur; areas of suitable habitat present, however no records in close proximity.	Would not occur.
<i>Lasiopetalum pterocarpum</i>	Open, multi-stemmed shrub (distinctly winged fruit) to 1.2 m high. Fl. Pink, Aug-Oct.	Dark red-brown loam over clayey sand over granite. On sloping banks near creeklines.				✓		Unlikely to occur; no suitable habitat and no records in close proximity.	Would not occur.
<i>Lepidosperma rostratum</i>	Rhizomatous, tufted perennial, grass-like or herb (sedge), 0.5 m high. Fl. Brown.	Peaty sand, clay.	✓	✓	✓	✓		Unlikely to occur, no suitable habitat. Record within 5 km from survey area.	Unlikely to occur.
<i>Morelotia australiensis</i> <sup>®</sup>	Rhizomatous, tufted perennial, grass-like or herb (sedge), to 1 m high. Fl. Brown, Nov-Dec.	Grey sand over clay, winter-wet, swampy depressions, drainage lines or rises surrounding swamps. Also, in open forest of Marri woodland.	✓		✓	✓		Likely to occur, areas of suitable habitat. Record <2 km from survey area.	May potentially occur, areas of suitable habitat. Record <2 km from survey area.
<i>Synaphea</i> sp. Fairbridge Farm (D. Papenfus 696)	Dense, clumped shrub to 0.3 m high and to 0.4 m wide. Fl. Yellow, Oct.	Sandy with lateritic pebbles. Near winter-wet flats, in low woodland with weedy grasses.				✓		Unlikely to occur; areas of suitable habitat present, however no records in close proximity.	Would not occur.

Taxon	Habitat <sup>a</sup>	Habitat <sup>a</sup>	Database Searches					Likelihood of Occurrence	
			NatureMap	WAHerb	TPFL	EPBC PMST	GHD 2021	Initial Ranking Based on Desktop Study	Final Ranking Including Results of 2021 Field Survey
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Erect, clumped shrub (sub-shrub), to 0.8 m high. Fl. Yellow, Sep-Nov.	Grey sandy loam or clay, grey-brown clayey sand, brown clayey loam, laterite. Flats, seasonally wet areas, railroad reserves often with wet depressions/drains.	✓	✓	✓	✓		Likely to occur; Previously recorded within survey area.	Recorded.
<i>Synaphea</i> sp. Serpentine (G.R. Brand 103)	Perennial, erect, clumped shrub, to 0.6 m high by 0.5 m wide. Fl. Yellow, borne on long spikes well above the leaves, Aug-Nov.	Grey-brown, sandy-loam or clay in seasonally wet areas.	✓	✓	✓	✓		Likely to occur; Previously recorded within survey area.	May potentially occur; areas of suitable habitat present and previously recorded within survey area.
<b>Priority 1</b>									
<i>Acacia lasiocarpa</i> var. bracteolata long peduncle variant (G.J. Keighery 5206)	Shrub, 0.4-1.5 m high. Fl. Yellow, May or Aug.	Grey or black sand over clay. Swampy areas, winter-wet lowlands.		✓				May potentially occur; areas of suitable habitat present and records <5 km of survey area.	May potentially occur; areas of suitable habitat present and records <5 km of survey area.
<i>Drosera oreopodion</i>	Fibrous-rooted, rosetted perennial herb to 0.035 m high and to 0.015 m wide. Fl. White, Sep-Oct.	Clayey sand sometimes mixed with lateritic pebbles.		✓				Unlikely to occur; no suitable habitat. Record within 5 km from survey area.	Unlikely to occur.
<b>Priority 2</b>									
<i>Calectasia grandiflora</i>	Rhizomatous, perennial herb (or undershrub) to 0.65 m high, without stilt roots. Fl. Blue/purple, Jun-Nov.	White, grey or yellow sand, sandy clay, gravel, laterite, granite. Swampy areas, rock outcrops, flats, slopes, ridges.		✓				Likely to occur, suitable habitat. Record <5 km from survey area.	Recorded.
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Tufted perennial, herb, 0.15-0.25 m high. Fly. White-green, Sep.	Grey-white-yellow sand. Flats, seasonally wet sites.	✓	✓	✓		✓	Likely to occur, suitable habitat. Record <0.5 km from survey area.	Recorded.
<i>Levenhookia pulcherrima</i>	Annual (ephemeral) herb, 0.03-0.7 m high. Fl. Pink-red, Oct-Nov.	Sand.	✓					Unlikely to occur; suitable habitat, however no records in close proximity.	Would not occur.
<i>Millotia tenuifolia</i> var. <i>laevis</i>	Ascending to erect annual, herb, 0.02-0.1 m high. Fl. Yellow, Sep-Oct.	Granite or laterite soils.	✓	✓	✓			Unlikely to occur; no suitable habitat. Record within 5 km from survey area.	Unlikely to occur.
<b>Priority 3</b>									
<i>Angianthus drummondii</i>	Erect annual herb to 0.1 m high. Fl. Yellow, Oct-Dec.	Grey or brown clay soils, ironstone. Seasonally wet flats.	✓	✓				Unlikely to occur; no suitable habitat. Record within 5 km from survey area.	Unlikely to occur.
<i>Babingtonia urbana</i>	Erect, open straggly shrub, to 1.2 m high. Fl. Pink/white, Jan-Mar.	Orange sand, brown loam, white sandy clay. Low flats, winter-wet swamps, railway reserves.	✓	✓	✓			Likely to occur; Record <0.5 km from survey area.	May potentially occur; areas of suitable habitat present and records <5 km of survey area.
<i>Banksia kippistiana</i> var. <i>paenepeccata</i>	Erect, prickly, lignotuberous shrub, 0.3-1.2 m high. Fl. Yellow-cream, Oct-Nov.	Lateritic gravelly soils.	✓	✓				Unlikely to occur; no suitable habitat. Record within 5 km from survey area.	Unlikely to occur.
<i>Jacksonia gracillima</i>	Prostrate, spreading or scrambling, shrub, spindly shrub. Fl. Pink, Oct and Nov.	Banksia woodland (emergent <i>Corymbia</i> / <i>Eucalyptus</i> ) with occasional myrtaceous scrub.	✓	✓				Unlikely to occur; no suitable habitat. Record within 5 km from survey area.	Unlikely to occur.
<i>Pithocarpa corymbulosa</i>	Erect to scrambling perennial, herb, 0.5-1 m high. Fl. White, Jan-Apr.	Gravelly or sandy loam. Amongst granite outcrops.	✓	✓	✓			Unlikely to occur; no suitable habitat. Record within 5 km from survey area.	Unlikely to occur.

Taxon	Habit <sup>a</sup>	Habitat <sup>a</sup>	Database Searches					Likelihood of Occurrence	
			NatureMap	WAHerb	TPFL	EPBC PMST	GHD 2021	Initial Ranking Based on Desktop Study	Final Ranking Including Results of 2021 Field Survey
<i>Schoenus capillifolius</i>	Sem-aquatic tufted annual, grass-like or herb (sedge), 0.05m high. Fl. Green, Oct-Nov.	Brown mud, claypans.	✓	✓				Unlikely to occur; no suitable habitat. Record within 5 km from survey area.	Unlikely to occur.
<i>Schoenus pennisetis</i>	Tufted annual, grass-like or herb (sedge), 0.05-0.15 m high. Fl. Purple-black, Aug-Sep.	Grey or peaty sand, sandy clay. Swamps, winter-wet depressions.	✓	✓	✓			Likely to occur; Record <0.5 km from survey area.	May potentially occur; areas of suitable habitat present and records <5 km of survey area.
<i>Schoenus</i> sp. Waroona (G.J. Keighery 12235)	Tufted annual, grass-like or herb (sedge), 0.02-0.06 m high. Fl. Brown-red-green, Oct-Nov.	Clay or sandy clay. Winter-wet flats.	✓	✓				Unlikely to occur; no suitable habitat. Record within 5 km from survey area.	Unlikely to occur.
<i>Stylidium aceratum</i>	Fibrous rooted annual herb, 0.05-0.09 m high, leave spatulate. Fl. Pink/white, Oct-Nov.	Sandy soils. Swamp heathland.	✓	✓				May potentially occur; areas of suitable habitat present and records within 5 km.	May potentially occur; areas of suitable habitat present and records within 5 km.
<b>Priority 4</b>									
<i>Acacia oncinophylla</i> subsp. <i>patulifolia</i>	Shrub, 0.5-2.5 m high, 'minni-ritchi' bark, phyllodes 4-9 cm x 3-6 cm. Fl. Yellow, Aug-Nov or Nov-Dec.	Granitic soils, occasionally on laterite.	✓					Unlikely to occur, no suitable habitat.	Would not occur.
<i>Drosera occidentalis</i>	Fibrous rooted, rosetted perennial, herb, to 0.025 m high. Fl. Pink/white, Oct-Dec or Jan.	Sandy & clayey soils. Swamps & wet depressions.	✓	✓	✓			Likely to occur; Record <0.5 km from survey area.	May potentially occur, however soil in survey area unsuitable; Recorded in Brickwood Reserve adjacent to survey area.
<i>Verticordia lindleyi</i> subsp. <i>lindleyi</i>	Erect shrub, 0.2-0.75 m high. Fl. Pink, May or Nov to Dec or Jan.	Sand, sandy clay. Winter-wet depressions.	✓	✓	✓			May potentially occur; areas of suitable habitat present and records within 5 km.	May potentially occur; areas of suitable habitat present and records within 5 km.

<sup>a</sup>All habit and habitat information taken from FloraBase (<http://florabase.dpaw.wa.gov.au>) unless referenced otherwise.

\*Previously named *Grevillea curviloba* subsp. *incurva*

\*Previously named *Tetraria australiensis*





# Appendix 5

## Raw Data and Photographs





**Soldiers Rd PSP Flora**

**Described by** SWMK **Date** 8/10/2021 **Type** Q **Site** SOL01  
**MGA Zone** 50 405233 **mE** 6429534 **mN** 115.993795E -32.266912 S  
**Habitat** Plain, road/rail verge  
**Soil** 5YR,4/1 dark grey loamy sand  
**Rock Type** None present.

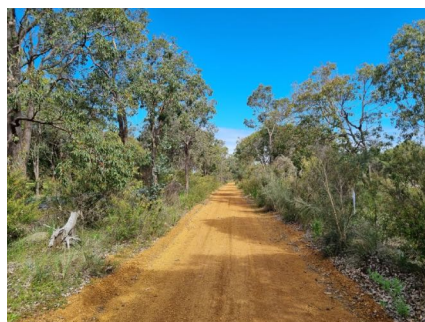
**Vegetation** *Corymbia calophylla* open forest over *Spyridium globulosum*, *Jacksonia sternbergiana* tall open shrubland over *Xanthorrhoea preissii* very open grass trees over *Cyathochaeta equitans* very open sedgeland over *Caesia micrantha* scattered herbs.

**Veg Condition** Very Good.

**Fire Age** No sign of recent fire

**Notes** High leaf litter; *Watsonia meriana* var. *bulbillifera*, *Kennedia prostrata*, *Patersonia occidentalis*, *Conostylis juncea* (SOL01-13) all nearby quadrat.

Name	Cover	Height (cm)	Specimen/Notes
<i>Acacia drewiana</i> subsp. <i>drewiana</i>	0.1	30	SOL01-14
<i>Adenanthos meisneri</i>	0.1	40	SOL01-08
<i>Aphelia cyperoides</i>	0.1	5	SOL01-06
<i>Austrostipa compressa</i>	0.1	15	SOL01-02
<i>Borya scirpoidea</i>	0.1	15	
* <i>Briza maxima</i>	0.1	30	
<i>Caesia micrantha</i>	1	30	
<i>Cassytha racemosa</i>	0.1	50	
* <i>Chamaescilla corymbosa</i>	0.1	5	
<i>Conostylis juncea</i>	0.1	15	SOL01-13
<i>Corymbia calophylla</i>	38	1150	
<i>Cyathochaeta equitans</i>	0.5	50	SOL01-07
<i>Cyathochaeta equitans</i>	8	40	SOL01-01
<i>Desmocladius fasciculatus</i>	0.1	15	
<i>Drosera erythrorhiza</i>	0.1	1	
<i>Drosera gigantea</i> subsp. <i>gigantea</i>	0.1	30	SWMK-03=
<i>Drosera glanduligera</i>	0.1	3	
* <i>Ehrharta calycina</i>	0.1	100	N=18
<i>Gompholobium marginatum</i>	0.1	15	
* <i>Hypochaeris glabra</i>	0.1	15	
<i>Jacksonia sternbergiana</i>	1.5	280	
<i>Kingia australis</i>	0.1	210	
<i>Lomandra suaveolens</i>	0.1	25	SOL01-12
<i>Mesomelaena tetragona</i>	0.1	60	SOL01-10
<i>Microtis media</i> subsp. <i>media</i>	0.1	25	SOL01-11
* <i>Moraea flaccida</i>	0.1	60	N=1
* <i>Oxalis glabra</i>	0.1	2	
<i>Philydrella pygmaea</i>	0.1	10	SOL01-09
<i>Quinetia urvillei</i>	0.1	10	SOL01-03
<i>Siloxerus multiflorus</i>	0.1	5	SOL01-05
<i>Spyridium globulosum</i>	4	220	
<i>Stylidium petiolare</i>	0.1	10	SW08=
<i>Synaphea petiolaris</i> subsp. <i>petiolaris</i>	0.1	40	SOL01-13
<i>Thysanotus patersonii/manglesianus</i>	0.1	60	
<i>Thysanotus tenellus</i>	0.1	20	SOL01-04
* <i>Ursinia anthemoides</i> subsp. <i>anthemoides</i>	0.1	10	
<i>Xanthorrhoea preissii</i>	3	150	



**Soldiers Rd PSP Flora**

**Described by** SWMK **Date** 8/10/2021 **Type** Q **Site** SOL02  
**MGA Zone** 50 405381 **mE** 6430112 **mN** 115.995428E -32.261715S  
**Habitat** Plain, road/rail verge  
**Soil** 10YR 4/2, dark greyish brown loamy sand  
**Rock Type** None present.  
**Vegetation** *Corymbia calophylla* low open forest over *Banksia sessilis* var. *sessilis* scattered tall shrubs over *Kingia australis*, *Xanthorrhoea preissii* open shrubland over *Cyathochaeta avenacea*, *C. equitans* very open sedgeland over *Neurachne alopecuroidea* scattered grass over *Lomandra preissii* scattered herbs  
**Veg Condition** Excellent/Very Good.  
**Fire Age** No sign of recent fire.  
**Notes** Medium-high leaf little content; no clay content-more sandy than SOL01.

Name	Cover	Height (cm)	Specimen/Notes
<i>Acacia appplanata</i>	0.1	20	SOL02-11
<i>Acacia drummondii</i> subsp. ? <i>drummondii</i>	0.1	50	SOL02-10
* <i>Aira caryophyllea</i>	0.1	10	
<i>Banksia sessilis</i> var. <i>sessilis</i>	1	320	SOL02-02
<i>Borya scirpoidea</i>	0.1	10	
* <i>Briza maxima</i>	0.1	20	
<i>Caesia micrantha</i>	0.1	60	
<i>Cassytha racemosa</i>	0.1	40	
* <i>Chamaescilla corymbosa</i>	0.1	15	
<i>Conostylis setigera</i> subsp. <i>setigera</i>	0.1	15	
<i>Corymbia calophylla</i>	35	900	
<i>Cyathochaeta avenacea</i>	2.5	150	SOL02-03
<i>Cyathochaeta equitans</i>	1.5	20	SOL01-07=
<i>Dasypogon bromeliifolius</i>	0.1	60	SOL02-17
<i>Desmocladius fasciculatus</i>	0.1	15	
* <i>Disa bracteata</i>	0.1	15	N=4
<i>Diuris</i> sp.	0.1	60	SOL02-14
<i>Drosera glanduligera</i>	0.1	3	
<i>Drosera menziesii</i>	0.1	40	SOL02-06
<i>Drosera micrantha</i>	0.1	6	
* <i>Ehrharta calycina</i>	0.1	100	N=10
<i>Gompholobium marginatum</i>	0.1	15	
<i>Gompholobium tomentosum</i>	0.1	45	
<i>Haemodorum discolor</i>	0.1	110	SOL02-08
<i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i>	0.1	100	
* <i>Hypochaeris glabra</i>	0.1	10	
* <i>Hypochaeris</i> sp.	0.1	3	SOL02-13
<i>Isolepis cernua</i>	0.1	5	
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	0.1	15	SWMK-06=; N=7
<i>Kingia australis</i>	3	180	
<i>Laxmannia squarrosa</i>	0.1	10	
<i>Lechenaultia floribunda</i>	0.1	30	SOL02-12
<i>Lepidosperma apricola</i>	0.1	50	SOL02-07
<i>Lomandra hermaphrodita</i>	0.1	20	
<i>Lomandra preissii</i>	0.5	30	SOL02-05
<i>Lomandra sonderi</i>	0.1	30	SOL02-04
<i>Mesomelaena tetragona</i>	0.1	50	SOL01-10=
<i>Neurachne alopecuroidea</i>	0.5	40	
* <i>Oxalis glabra</i>	0.1	3	
<i>Patersonia juncea</i>	0.1	20	SOL02-09
<i>Patersonia occidentalis</i> var. <i>occidentalis</i>	0.1	45	
<i>Ptilotus manglesii</i>	0.1	2	SOL02-06
* <i>Romulea rosea</i>	0.1	15	
<i>Synaphea petiolaris</i> subsp. <i>petiolaris</i>	0.1	30	
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	0.1	40	SOL02-01; N=1
<i>Styphelia pallida</i>	0.1	15	SOL02-16
<i>Thysanotus patersonii/manglesianus</i>	0.1	90	
<i>Thysanotus tenellus</i>	0.1	25	SOL01-04=
* <i>Ursinia anthemoides</i> subsp. <i>anthemoides</i>	0.1	8	
<i>Xanthorrhoea gracilis</i>	0.1	80	
<i>Xanthorrhoea preissii</i>	0.5	100	
<i>Xanthosia huegelii</i>	0.1	15	SOL02-15



**Soldiers Rd PSP Flora**

**Described by** SWMK **Date** 8/10/2021 **Type** Q **Site** SOL03  
**MGA Zone** 50 405716 **mE** 6431425 **mN** 115.999109E -32.249896S  
**Habitat** Slight SE sloping plain  
**Soil** 7.5YR 3/1, very dark grey Loamy sand  
**Rock Type** Coffee rock.  
**Vegetation** *Corymbia calophylla* woodland over *Kingia australis*, *Xanthorrhoea preissii* tall shrubland over *Cyathochaeta equitans*, *C. avenacea* very open sedgeland over *Stirlingia latifolia*, *Banksia nivea* subsp. *nivea* scattered low shrubs.  
**Veg Condition** Excellent.  
**Fire Age** No sign of recent fire.  
**Notes** High leaf litter cover; *Philotheca spicata* and *Eucalyptus marginata* subsp. *marginata* nearby quadrat.

Name	Cover	Height (cm)	Specimen/Notes
<i>Acacia applanata</i>	0.1	20	SOL02-11=
<i>Anigozanthos manglesii</i>	0.1	110	
<i>Babingtonia camphorosmae</i>	0.1	20	SOL03-16
<i>Banksia nivea</i> subsp. <i>nivea</i>	1.5	20	SOL03-06
* <i>Briza maxima</i>	0.1	40	
<i>Burchardia multiflora</i>	0.1	30	SOL03-04
<i>Caesia micrantha</i>	0.1	40	
* <i>Caryophyllaceae</i> sp.	0.1	4	SOL03-18
<i>Cassytha racemosa</i>	0.1	30	
<i>Centrolepis drummondiana</i>	0.1	3	
<i>Comesperma calymega</i>	0.1	20	SWMK=
<i>Conostylis setigera</i> subsp. <i>setigera</i>	0.1	10	
<i>Corymbia calophylla</i>	28	1400	
<i>Cyathochaeta avenacea</i>	1	100	SOL02-03=
<i>Cyathochaeta equitans</i>	3	40	SOL01-07=
<i>Darwinia thymoides</i> subsp. <i>thymoides</i>	0.1	15	SOL03-08
<i>Dasypogon bromeliifolius</i>	0.1	45	
<i>Daviesia preissii</i>	0.1	60	SOL03-05
<i>Desmocladus fasciculatus</i>	0.1	15	
<i>Drosera glanduligera</i>	0.1	1	
<i>Drosera menziesii</i>	0.1	20	SOL02=
<i>Drosera platystigma</i>	0.1	5	SOL03-15
* <i>Ehrharta calycina</i>	0.1	110	N=5
<i>Gompholobium marginatum</i>	0.1	15	
<i>Gompholobium polymorphum</i>	0.1	15	SOL03-03
<i>Goodenia micrantha</i>	0.1	8	SOL03-14
<i>Grevillea bipinnatifida</i> subsp. ? <i>pagna</i>	0.1	45	SOL03-10
<i>Haemodorum discolor</i>	0.1	30	SOL02-08=
<i>Haemodorum discolor</i>	0.1	140	
<i>Hovea trisperma</i>	0.1	15	
* <i>Hypochaeris glabra</i>	0.1	3	
<i>Hypolaena exsulca</i>	0.1	30	SOL03-02
<i>Isolepis marginata</i>	0.1	5	
<i>Kennedia prostrata</i>	0.1	10	
<i>Kingia australis</i>	8	250	
<i>Laxmannia squarrosa</i>	0.1	15	
<i>Lechenaultia floribunda</i>	0.1	15	SOL02-12=
<i>Lepidosperma apricola</i>	0.1	45	SOL03-11
<i>Levenhookia pusilla</i>	0.1	3	SOL03-12
<i>Lomandra odora</i>	0.1	20	SOL03-17
<i>Lomandra preissii</i>	0.1	40	SOL02-05=
<i>Mesomelaena tetragona</i>	0.1	80	SOL01-10=
<i>Neurachne alopecuroidea</i>	0.1	40	
<i>Patersonia juncea</i>	0.1	20	SOL02-09=
<i>Poranthera microphylla</i>	0.1	3	
<i>Quinetia urvillei</i>	0.1	10	SOL03-19
* <i>Romulea rosea</i>	0.1	15	
<i>Rytidosperma caespitosum</i>	0.1	30	SOL03-07
<i>Siloxerus multiflorus</i>	0.1	3	SOL01-05=
<i>Stirlingia latifolia</i>	0.5	50	
<i>Stylidium petiolare</i>	0.1	8	SW08=
<i>Stylidium repens</i>	0.1	5	
<i>Synaphea petiolaris</i> subsp. <i>petiolaris</i>	0.1	30	SOL03-13

<i>Thysanotus arbuscula</i>	0.1	70	SOL03-01
<i>Thysanotus triandrus</i>	0.1	25	SOL03-09
* <i>Ursinia anthemoides</i> subsp. <i>anthemoides</i>	0.1	15	
<i>Xanthorrhoea gracilis</i>	0.1	130	
<i>Xanthorrhoea preissii</i>	2.5	230	
<i>Xanthosia huegelii</i>	0.1	5	SOL02-15=



**Soldiers Rd PSP Flora**

**Described by** SWMK **Date** 8/10/2021 **Type** Q **Site** SOL04  
**MGA Zone** 50 406203 **mE** 6433364 **mN** 116.004471E -32.232447S  
**Habitat** Plain, road/rail verge  
**Soil** 10YR 3/1, very dark grey Loamy sand  
**Rock Type** None present.

**Vegetation** *Eucalyptus marginata* subsp. *marginata*, *Corymbia calophylla* open forest over *Hakea trifurcata* scattered tall shrubs over *Xanthorrhoea preissii* scattered shrubs over *Cyathochaeta equitans*, *C. avenacea*, *Mesomelaena tetragona* open sedgeland over *Banksia nivea* subsp. *nivea* scattered low shrubs over *Lomandra caespitosa* very open herbs.

**Veg Condition** Excellent.

**Fire Age** No sign of recent fire.

**Notes** Very high leaf litter content; *Anigozanthos manglesii*, *Ursinia anthemoides* subsp. *anthemoides*, *Neurachne alopecuroidea*, *Lechenaultia floribunda* nearby quadrat.

Name	Cover	Height (cm)	Specimen/Notes
<i>Acacia drewiana</i> subsp. <i>drewiana</i>	0.1	30	SOL04-08
<i>Agrostocrinum hirsutum</i>	0.1	40	
<i>Banksia nivea</i> subsp. <i>nivea</i>	1	20	SOL03-06=
* <i>Briza maxima</i>	0.1	30	
<i>Caesia micrantha</i>	0.1	50	
<i>Caladenia</i> ? <i>flava</i>	0.1	5	
<i>Calectasia narragara</i>	0.1	15	
<i>Conostylis juncea</i>	0.1	15	SOL01-13=
<i>Conostylis setigera</i> subsp. <i>setigera</i>	0.1	10	
<i>Corymbia calophylla</i>	25	1700	
<i>Cyathochaeta avenacea</i>	4	50	SOL02-03=
<i>Cyathochaeta equitans</i>	8	45	SOL01-07=
<i>Dampiera linearis</i>	0.1	20	
<i>Dasypogon bromeliifolius</i>	2.5	60	
<i>Daviesia decurrens</i>	0.1	20	SOL04-03
<i>Desmocladius fasciculatus</i>	0.1	10	
<i>Drosera porrecta</i>	0.1	25	SOL04-01
* <i>Ehrharta calycina</i>	0.1	45	N=4
<i>Eucalyptus marginata</i> subsp. <i>marginata</i>	40	1500	
<i>Haemodorum</i> sp.	0.1	50	
<i>Hakea trifurcata</i>	1	400	SOL04-06
<i>Hovea trisperma</i>	0.1	15	
<i>Hypolaena exsulca</i>	0.1	40	SOL03-02=
<i>Kennedia prostrata</i>	0.1	10	
<i>Kingia australis</i>	0.1	80	
<i>Laxmannia squarrosa</i>	0.1	10	
<i>Lepidosperma apricola</i>	0.1	45	SOL04-07
<i>Lomandra caespitosa</i>	3	30	SOL04-02
<i>Lomandra hermaphrodita</i>	0.1	30	
<i>Mesomelaena tetragona</i>	6	45	SOL01-10=
<i>Microtis media</i> subsp. <i>media</i>	0.1	30	SOL01-11=
* <i>Oxalis glabra</i>	0.1	2	
<i>Sphaerolobium medium</i>	0.1	40	SOL04-09
<i>Stirlingia latifolia</i>	0.1	20	
<i>Thysanotus thyrsoides</i>	0.1	60	SOL04-05
<i>Tricoryne tenella</i>	0.1	30	SOL04-04
<i>Xanthorrhoea gracilis</i>	0.1	80	
<i>Xanthorrhoea preissii</i>	1.5	200	





## Appendix 6

### Selected PATN Inputs and Outputs





**Table 1: List of taxa that were omitted or treated as other taxa for the purposes of the floristic analysis.**

<b>Taxon</b>	<b>Name Referred to for Analysis</b>
<i>Acacia alata</i> var. <i>alata</i>	<i>Acacia</i> aff. <i>alata</i> scps ( <i>alata</i> var. <i>tetrantha</i> Ms)
<i>Acacia iteaphylla</i>	omitted; singleton
<i>Acacia lasiocarpa</i> var. <i>lasiocarpa</i>	<i>Acacia lasiocarpa</i>
<i>Acacia pulchella</i>	<i>Acacia pulchella</i>
<i>Acacia pulchella</i> var. <i>glaberrima</i>	<i>Acacia pulchella</i>
<i>Acacia pulchella</i> var. <i>pulchella</i>	<i>Acacia pulchella</i>
<i>Acacia</i> sp.	omitted; genera
<i>Adenanthos cygnorum</i> subsp. <i>cygnorum</i>	<i>Adenanthos cygnorum</i>
<i>Adenanthos obovatus</i>	omitted; singleton
<i>Agonis flexuosa</i>	omitted; singleton
<i>Aira cupaniana</i>	<i>Aira caryophyllea</i>
<i>Allocasuarina</i> sp.	omitted; singleton; genera
<i>Amyema miquelii</i>	omitted; opportunistic collection
<i>Anigozanthos flavidus</i>	omitted; singleton
<i>Anigozanthos humilis</i> subsp. <i>humilis</i>	omitted; singleton
<i>Anigozanthos manglesii</i> subsp. <i>manglesii</i>	<i>Anigozanthos manglesii</i>
<i>Anigozanthos</i> sp.	omitted; genera
<i>Arctotheca calendula</i> x <i>populifolia</i>	<i>Arctotheca calendula</i>
<i>Astartea scoparia</i>	<i>Astartea</i> aff. <i>fascicularis</i> sthct
Asteraceae sp.	omitted; singleton; genera
<i>Austrostipa campylachne</i>	omitted; singleton
<i>Austrostipa compressa</i>	<i>Stipa compressa</i>
<i>Austrostipa elegantissima</i>	<i>Stipa elegantissima</i>
<i>Austrostipa semibarbata</i>	omitted; opportunistic collection
<i>Austrostipa</i> sp.	omitted; genera
<i>Avellinia michelii</i>	omitted; singleton
<i>Avena barbata</i>	<i>Avena fatua</i>
<i>Banksia littoralis</i>	omitted; opportunistic collection
<i>Banksia sessilis</i>	<i>Dryandra sessilis</i>
<i>Banksia</i> sp.	omitted; genera
<i>Boronia crenulata</i> subsp. <i>viminea</i>	omitted; singleton
<i>Brachyscome iberidifolia</i>	omitted; opportunistic collection
<i>Burchardia congesta</i>	<i>Burchardia umbellata</i>
<i>Caesia occidentalis</i>	omitted; singleton
<i>Caesia</i> sp.	omitted; genera
<i>Caladenia</i> ? <i>arenicola</i>	omitted; opportunistic collection
<i>Caladenia arenicola/georgei</i>	omitted; opportunistic collection
<i>Caladenia flava</i> subsp. <i>flava</i>	<i>Caladenia flava</i>
<i>Caladenia georgei</i>	omitted; opportunistic collection
<i>Caladenia latifolia</i>	omitted; opportunistic collection
<i>Caladenia longicauda</i> subsp. <i>calcigena</i>	omitted; opportunistic collection
<i>Caladenia longicauda</i> subsp. <i>clivicola</i>	omitted; opportunistic collection
<i>Caladenia longicauda</i> subsp. <i>longicauda</i>	omitted; opportunistic collection
<i>Caladenia longicauda/splendens</i>	omitted; opportunistic collection
<i>Caladenia paludosa</i>	omitted; singleton
<i>Caladenia paludosa/ferruginea</i>	omitted; opportunistic collection
<i>Caladenia serotina</i>	omitted; opportunistic collection
<i>Caladenia</i> sp.	omitted; genera

<i>Caladenia speciosa</i>	omitted; opportunistic collection
<i>Calectasia narragara</i>	omitted; opportunistic collection
<i>Calothamnus quadrifidus</i> subsp. <i>quadrifidus</i>	<i>Calothamnus quadrifidus</i>
<i>Calothamnus quadrifidus</i> subsp. <i>teretifolius</i>	<i>Calothamnus quadrifidus</i>
<i>Calothamnus sanguineus</i>	omitted; singleton
<i>Calytrix</i> sp.	omitted; singleton; genera
Campanulaceae sp.	omitted; singleton; genera
<i>Carduus pycnocephalus</i>	omitted; singleton
<i>Carpobrotus</i> sp.	omitted; singleton; genera
<i>Cartonema philydroides</i>	omitted; singleton
<i>Cassytha flava</i> /pomiformis	omitted; genera
<i>Cassytha glabella</i>	omitted; singleton
<i>Cassytha racemosa</i> forma <i>racemosa</i>	<i>Cassytha racemosa</i>
<i>Centrolepis inconspicua</i>	omitted; singleton
<i>Centrolepis polygyna</i>	omitted; singleton
<i>Chaetospora curvifolia</i>	<i>Schoenus curvifolius</i>
<i>Chamaescilla corymbosa</i> var. <i>corymbosa</i>	<i>Chamaescilla corymbosa</i>
<i>Clematis linearifolia</i>	<i>Clematis microphylla</i>
<i>Clematis pubescens</i>	omitted; singleton
<i>Comesperma calymega</i>	omitted; singleton
<i>Conostephium preissii</i>	omitted; singleton
<i>Conostylis aculeata</i> subsp. <i>aculeata</i>	<i>Conostylis aculeata</i>
<i>Conostylis aculeata</i> subsp. <i>preissii</i>	<i>Conostylis aculeata</i>
<i>Conostylis candicans</i> subsp. <i>candicans</i>	<i>Conostylis candicans</i>
<i>Conostylis setigera</i> subsp. <i>setigera</i>	<i>Conostylis setigera</i>
<i>Conyza</i> sp.	omitted; genera
<i>Cortaderia selloana</i>	omitted; opportunistic collection
<i>Corybas</i> sp.	omitted; singleton; genera
<i>Corymbia calophylla</i>	omitted; singleton
<i>Corynotheca micrantha</i> var. <i>micrantha</i>	<i>Corynotheca micrantha</i>
<i>Crassula colorata</i> var. <i>acuminata</i>	<i>Crassula colorata</i>
<i>Crassula colorata</i> var. <i>colorata</i>	<i>Crassula colorata</i>
<i>Crassula decumbens</i> var. <i>decumbens</i>	<i>Crassula decumbens</i>
<i>Crassula</i> sp.	omitted; singleton; genera
<i>Cyrtostylis huegelii</i>	omitted; opportunistic collection
<i>Daviesia divaricata</i> subsp. <i>divaricata</i>	omitted; singleton
<i>Daviesia physodes</i>	omitted; opportunistic collection
<i>Desmocladus fasciculatus</i>	omitted; singleton
<i>Desmocladus flexuosus</i>	<i>Loxocarya flexuosa</i>
<i>Dianella revoluta</i> var. <i>revoluta</i>	<i>Dianella revoluta</i>
<i>Dielsia stenostachya</i>	omitted; singleton
<i>Disa bracteata</i>	<i>Monadenia bracteata</i>
<i>Diuris corymbosa</i>	omitted; opportunistic collection
<i>Diuris magnifica</i>	omitted; opportunistic collection
<i>Drosera drummondii</i>	<i>Drosera menziesii</i> subgenera <i>penicillaris</i>
<i>Drosera menziesii</i>	<i>Drosera menziesii</i> subgenera <i>menziesii</i>
<i>Drosera micrantha</i>	omitted; singleton
<i>Drosera porrecta</i>	<i>Drosera stolonifera</i>
<i>Drosera</i> sp.	omitted; genera
<i>Echium plantagineum</i>	omitted; opportunistic collection

<i>Elythranthera brunonis</i>	omitted; singleton
<i>Eremaea asterocarpa</i> subsp. <i>asterocarpa</i>	omitted; opportunistic collection
<i>Eremaea pauciflora</i> var. <i>pauciflora</i>	<i>Eremaea pauciflora</i>
<i>Erigeron</i> sp.	omitted; genera
<i>Erigeron sumatransis</i>	<i>Conyza bonariensis</i>
<i>Eriochilus dilatatus</i>	omitted; opportunistic collection
<i>Eryngium pinnatifidum</i>	omitted; singleton
<i>Eryngium pinnatifidum</i> subsp. <i>Palustre</i> (G.J. Keighery 13459) PN	omitted; singleton
<i>Eucalyptus decipiens</i>	omitted; singleton
<i>Eucalyptus erythrocorys</i>	omitted; opportunistic collection
<i>Eucalyptus grandis</i>	omitted; singleton
<i>Eucalyptus marginata</i> subsp. <i>marginata</i>	<i>Eucalyptus marginata</i>
<i>Eucalyptus rudis</i> subsp. <i>rudis</i>	omitted; singleton
<i>Eucalyptus</i> sp.	omitted; opportunistic collection; genera
<i>Eucalyptus utilis</i>	omitted; singleton
<i>Euchilopsis linearis</i>	omitted; opportunistic collection
<i>Euphorbia</i> sp.	omitted; singleton; genera
Fabaceae sp.	omitted; genera
<i>Foeniculum vulgare</i>	omitted; singleton
<i>Freesia alba</i> x <i>leichtlinii</i>	<i>Freesia</i> aff. <i>leichtlinii</i> FPR
<i>Fumaria muralis</i>	omitted; singleton
<i>Gastrolobium capitatum</i>	<i>Nemcia capitata</i>
<i>Gomphocarpus fruticosus</i>	omitted; singleton
<i>Gompholobium aristatum</i>	omitted; opportunistic collection
<i>Grevillea preissii</i> subsp. <i>preissii</i>	omitted; opportunistic collection
<i>Grevillea vestita</i> subsp. <i>vestita</i>	<i>Grevillea vestita</i>
<i>Haemodorum discolor</i>	omitted; singleton
<i>Haemodorum paniculatum</i>	omitted; singleton
<i>Haemodorum</i> sp.	omitted; genera
<i>Hakea prostrata</i>	omitted; singleton
<i>Hibbertia huegelii</i>	omitted; opportunistic collection
<i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i>	<i>Hibbertia hypericoides</i>
<i>Hibbertia racemosa</i>	omitted; singleton
<i>Hibbertia striata</i>	omitted; opportunistic collection
<i>Hovea pungens</i>	omitted; singleton
<i>Hovea trisperma</i> var. <i>trisperma</i>	<i>Hovea trisperma</i>
<i>Hybanthus</i> sp.	omitted; singleton; genera
<i>Hypocalymma angustifolium</i> subsp. Swan Coastal Plain (G.J. Keighery 16777)	<i>Hypocalymma angustifolium</i>
<i>Hypochaeris radicata</i>	<i>Hypochaeris glabra</i>
<i>Hypochaeris</i> sp.	omitted; genera
Iridaceae sp.	omitted; singleton; genera
<i>Isolepis cernua</i> var. <i>cernua</i>	<i>Isolepis cernua</i>
<i>Isotoma</i> sp.	omitted; singleton; genera
<i>Isotropis cuneifolia</i> subsp. <i>cuneifolia</i>	<i>Isotropis cuneifolia</i>
<i>Ixia maculata</i>	omitted; singleton
<i>Ixia</i> sp.	omitted; singleton; genera
<i>Jacksonia</i> sp.	omitted; singleton; genera
<i>Kennedia coccinea</i> subsp. <i>coccinea</i>	omitted; singleton
<i>Kunzea glabrescens</i>	<i>Kunzea ericifolia</i>
<i>Lachnagrostis</i> sp.	omitted; singleton; genera

<i>Lactuca serriola</i> forma <i>serriola</i>	<i>Lactuca serriola</i>
<i>Laxmannia ramosa</i> subsp. <i>ramosa</i>	<i>Laxmannia ramosa</i>
<i>Lechenaultia</i> sp.	omitted; genera
<i>Lepidosperma calcicola</i>	<i>Lepidosperma</i> coastal terete scps (BJK&NG 231)
<i>Lepidosperma</i> sp.	omitted; singleton; genera
<i>Leptocarpus roycei</i>	omitted; opportunistic collection
<i>Leucopogon parviflorus</i>	omitted; opportunistic collection
<i>Lobelia anceps</i>	<i>Lobelia alata</i>
<i>Lobelia</i> sp.	omitted; genera
<i>Lomandra nigricans</i>	omitted; singleton
<i>Lomandra purpurea</i>	omitted; singleton
<i>Lomandra</i> sp.	omitted; genera
<i>Lotus subbiflorus</i>	<i>Lotus suaveolens</i>
<i>Lupinus cosentinii</i>	omitted; singleton
<i>Lupinus</i> sp.	omitted; singleton; genera
<i>Luzula meridionalis</i>	omitted; singleton
<i>Lyginia imberbis</i>	<i>Lyginia barbata</i>
<i>Lysimachia arvensis</i>	<i>Anagallis arvensis</i>
<i>Lythrum hyssopifolia</i>	omitted; singleton
<i>Lythrum</i> sp.	omitted; singleton; genera
<i>Macarthuria apetala</i>	omitted; singleton
<i>Medicago polymorpha</i>	omitted; singleton
<i>Melaleuca huegelii</i> subsp. <i>huegelii</i>	omitted; singleton
<i>Melaleuca seriata</i>	omitted; singleton
<i>Melaleuca systema</i>	<i>Melaleuca acerosa</i>
<i>Melia azedarach</i>	omitted; opportunistic collection
<i>Melilotus indicus</i>	omitted; singleton
<i>Mesembryanthemum crystallinum</i>	omitted; singleton
<i>Mesomelaena stygia</i> subsp. <i>stygia</i>	<i>Mesomelaena stygia</i>
<i>Microtis media</i> subsp. <i>media</i>	<i>Microtis media</i>
<i>Millotia tenuifolia</i> var. <i>tenuifolia</i>	<i>Millotia tenuifolia</i>
<i>Monopsis debilis</i> var. <i>depressa</i>	<i>Monopsis debilis</i>
<i>Moraea flaccida</i>	<i>Homeria flaccida</i>
<i>Neurachne alopecuroidea</i>	omitted; singleton
<i>Nuytsia floribunda</i>	omitted; singleton
<i>Oenothera stricta</i> subsp. <i>stricta</i>	omitted; singleton
<i>Olearia axillaris</i>	omitted; opportunistic collection
Orchidaceae sp.	omitted; singleton; genera
<i>Ornithopus compressus</i>	omitted; opportunistic collection
<i>Orthrosanthus laxus</i>	omitted; opportunistic collection
<i>Oxalis purpurea</i>	omitted; singleton
<i>Paracaleana</i> sp.	omitted; singleton; genera
<i>Patersonia occidentalis</i> var. <i>occidentalis</i>	<i>Patersonia occidentalis</i>
<i>Pentameris airoides</i>	<i>Pentastichis airoides</i>
<i>Pericalymma ellipticum</i> var. <i>floridum</i>	omitted; opportunistic collection
<i>Petrorhagia dubia</i>	<i>Petrorhagia velutina</i>
<i>Philotheca spicata</i>	<i>Eriostemon spicatus</i>
<i>Phlebocarya filifolia</i>	omitted; singleton
<i>Phoenix canariensis</i>	omitted; opportunistic collection
<i>Phyllangium divergens</i>	<i>Mitrasacme paradoxa</i>

<i>Phyllangium paradoxum</i>	<i>Mitrasacme paradoxa</i>
<i>Pimelea rosea</i> subsp. <i>rosea</i>	omitted; opportunistic collection
<i>Poa drummondiana</i>	omitted; singleton
Poaceae sp.	omitted; genera
<i>Polygonum</i> sp.	omitted; singleton; genera
<i>Pterostylis ectypha</i>	omitted; opportunistic collection
<i>Pterostylis recurva</i>	omitted; opportunistic collection
<i>Pterostylis</i> sp.	omitted; genera
<i>Ptilotus drummondii</i>	omitted; singleton
<i>Ptilotus polystachyus</i>	omitted; singleton
<i>Pultenaea reticulata</i>	omitted; opportunistic collection
<i>Pyrorchis nigricans</i>	omitted; singleton
<i>Pyrorchis</i> sp.	omitted; genera
<i>Rhagodia baccata</i> subsp. <i>baccata</i>	<i>Rhagodia baccata</i>
<i>Rhamnus alaternus</i>	omitted; singleton
<i>Rhodanthe citrina</i>	<i>Waitzia citrina</i>
<i>Ricinus communis</i>	omitted; opportunistic collection
<i>Romulea rosea</i> var. <i>australis</i>	<i>Romulea rosea</i>
<i>Rubus ulmifolius</i>	omitted; opportunistic collection
<i>Rumex acetosella</i>	omitted; singleton
<i>Rytidosperma occidentale</i>	<i>Danthonia occidentalis</i>
<i>Senecio</i> sp.	omitted; singleton; genera
<i>Silene gallica</i> var. <i>gallica</i>	<i>Silene gallica</i>
<i>Siloxerus pygmaeus</i>	omitted; singleton
<i>Stylidium araeophyllum</i>	<i>Stylidium brunonianum</i>
<i>Stylidium carnosum</i>	omitted; singleton
<i>Stylidium</i> sp.	omitted; genera; opportunistic collection
<i>Styphelia conostephioides</i>	<i>Leucopogon conostephioides</i>
<i>Styphelia kingiana</i>	<i>Leucopogon kingianus</i>
<i>Styphelia propinqua</i>	<i>Leucopogon propinquus</i>
<i>Synaphea spinulosa</i> subsp. <i>spinulosa</i>	<i>Synaphea spinulosa</i>
<i>Tetralia octandra</i>	omitted; singleton
<i>Thelymitra graminea</i>	omitted; singleton
<i>Thelymitra macrophylla</i>	omitted; singleton
<i>Thelymitra</i> sp.	omitted; singleton; genera
<i>Thelymitra vulgaris/frenchii</i>	omitted; singleton
<i>Thysanotus manglesianus</i>	<i>Thysanotus</i> sp. <i>manglesianus/patersonii</i> scps
<i>Thysanotus patersonii</i>	<i>Thysanotus</i> sp. <i>manglesianus/patersonii</i> scps
<i>Thysanotus</i> sp. ( <i>manglesianus/patersonii</i> )	<i>Thysanotus</i> sp. <i>manglesianus/patersonii</i> scps
<i>Trifolium angustifolium</i> var. <i>angustifolium</i>	omitted; opportunistic collection
<i>Trifolium arvense</i> var. <i>arvense</i>	<i>Trifolium arvense</i>
<i>Trifolium campestre</i> var. <i>campestre</i>	<i>Trifolium campestre</i>
<i>Trifolium</i> sp.	omitted; genera
<i>Ursinia anthemoides</i> subsp. <i>anthemoides</i>	<i>Ursinia anthemoides</i>
<i>Verticordia densiflora</i>	omitted; opportunistic collection
<i>Vicia sativa</i>	omitted; singleton
<i>Vulpia myuros</i> forma <i>megalura</i>	<i>Vulpia myuros</i>
<i>Vulpia myuros</i> forma <i>myuros</i>	<i>Vulpia myuros</i>
<i>Vulpia</i> sp.	omitted; genera
<i>Wahlenbergia gracilentia</i>	<i>Wahlenbergia capensis</i>

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<i>Wahlenbergia preissii</i>	omitted; singleton
<i>Watsonia meriana</i>	omitted; opportunistic collection
<i>Xanthorrhoea brunonis</i> subsp. <i>brunonis</i>	<i>Xanthorrhoea brunonis</i>
<i>Xerochrysum</i> sp.	omitted; genera
<i>Xylomelum occidentale</i>	omitted; singleton



**Table 2: Twenty most similar SCP sites to each of the quadrats subject to a NNB analysis for the current study.**

Site	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<b>SOLO1</b>	talb4	PEARCE-2	waro 01	MUD-4	WATER-3	talb2	brick6	DUCK-2	talb13	brick3	talb12	ELLEN-6	brick5	card12	brick8	AUSTB-5	card10	BRIX-5	TWIN-3	brick1
	0.0618	0.0707	0.0707	0.0749	0.0752	0.0768	0.0771	0.0772	0.0782	0.0792	0.0818	0.0831	0.0832	0.0832	0.0839	0.0849	0.0851	0.0857	0.0862	0.0864
	FCT 3c	FCT 3c	FCT 3b	FCT 3a	FCT 3c	FCT 20c	FCT 3a	FCT 3c	FCT 3c	FCT 3a	FCT 3c	FCT 3c	FCT 3a	FCT 3b	FCT 3a	FCT 5	FCT 6	FCT 3a	FCT 6	FCT 3a
<b>SOLO2</b>	card12	BRIX-2	card13	talb2	waro 02	brick5	waro 01	card4	brick8	card8	BURNRD02	FL-1	MANEA-2	DUNS-1	CAPEL-5	KOOLJ-5	AMBR-4	brick6	YULE-3	WATER-3
	0.0569	0.0600	0.0606	0.0623	0.0658	0.0674	0.0676	0.0703	0.0705	0.0709	0.0729	0.0732	0.0744	0.0753	0.0761	0.0765	0.0768	0.0769	0.077	0.0779
	FCT 3b	FCT 3a	FCT 3b	FCT 20c	FCT 3b	FCT 3a	FCT 3b	FCT 6	FCT 3a	FCT 20b	FCT 3b	FCT 4	FCT 21a	FCT 3b	FCT 1b	FCT 3b	FCT 1b	FCT 3a	FCT 21c	FCT 3c
<b>SOLO3</b>	waro 01	brick8	brick6	MUD-4	lamb2	talb2	brick3	brick7	talb4	BRIX-5	MUD-5	brick1	card13	talb1	talb12	card12	WATER-3	talb13	CAPEL-5	BRIX-2
	0.0553	0.0590	0.0594	0.0599	0.0626	0.0631	0.0632	0.0644	0.0652	0.0655	0.0657	0.0668	0.0669	0.0691	0.0704	0.0709	0.071	0.0713	0.0714	0.0724
	FCT 3b	FCT 3a	FCT 3a	FCT 3a	FCT 3a	FCT 20c	FCT 3a	FCT 3a	FCT 3c	FCT 3a	FCT 3a	FCT 3a	FCT 3b	FCT 3c	FCT 3c	FCT 3b	FCT 3c	FCT 3c	FCT 1b	FCT 3a
<b>SOLO4</b>	card12	card13	brick8	AMBR-1	CAPEL-5	AMBR-4	BRIX-2	yar103	wonn01	AMBR-9	AMBRA1-1	BURNRD02	brick6	waro 01	KOOLJ-3	brick5	yar104	will02	card1	card8
	0.0623	0.0624	0.063	0.0684	0.0684	0.0698	0.0698	0.0704	0.0715	0.0716	0.0716	0.0716	0.0717	0.0754	0.0756	0.0761	0.0765	0.0784	0.0787	0.0791
	FCT 3b	FCT 3b	FCT 3a	FCT 1b	FCT 1b	FCT 1b	FCT 3a	FCT 3b	FCT 1a	FCT 1b	FCT 1b	FCT 3b	FCT 3a	FCT 3b	FCT 21a	FCT 3a	FCT 20b	FCT 1a	FCT 20b	FCT 20b

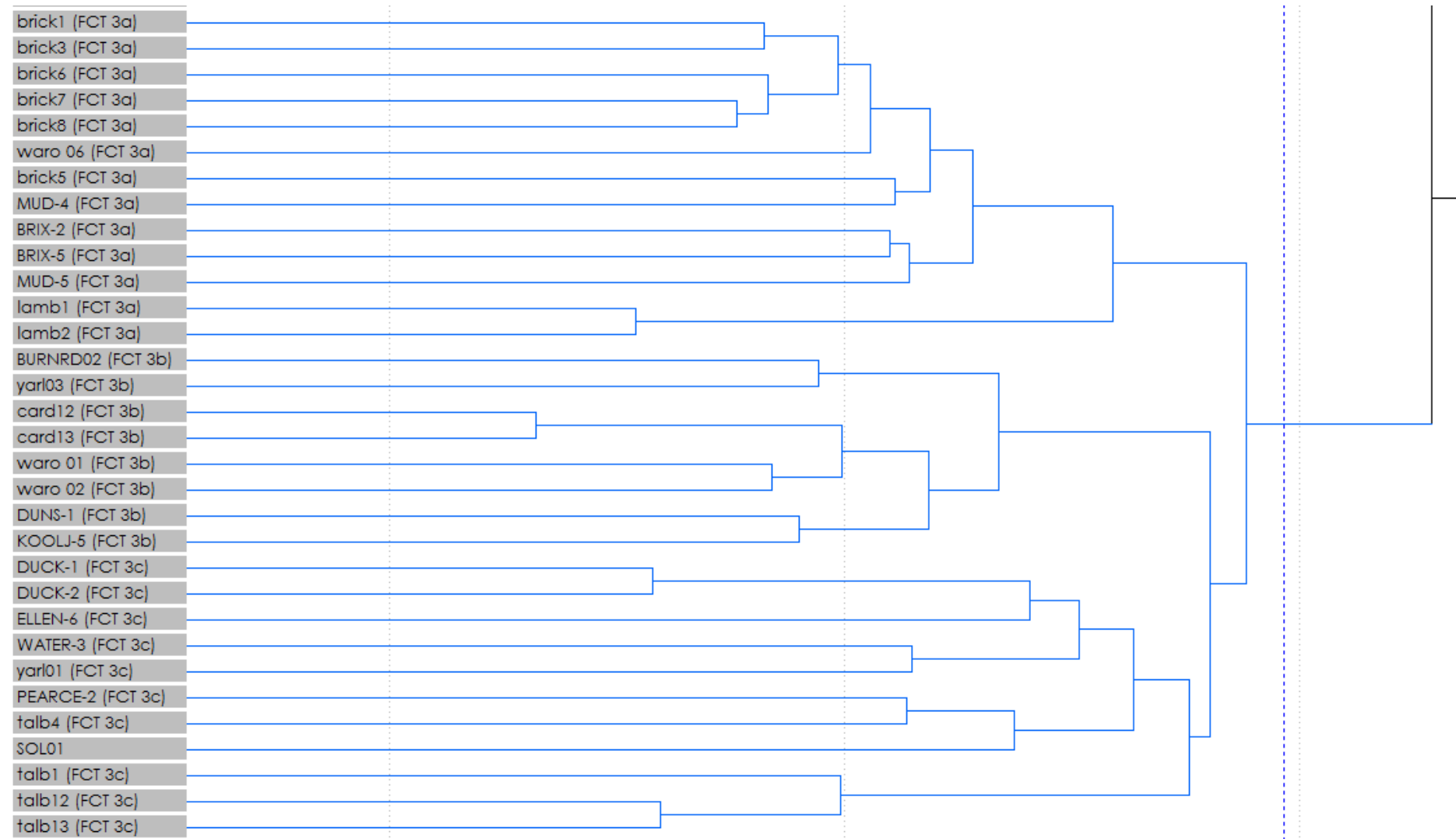


Figure 1: Dendrogram section from floristic clustering analysis against the Gibson SCP data set – quadrat SOL01.

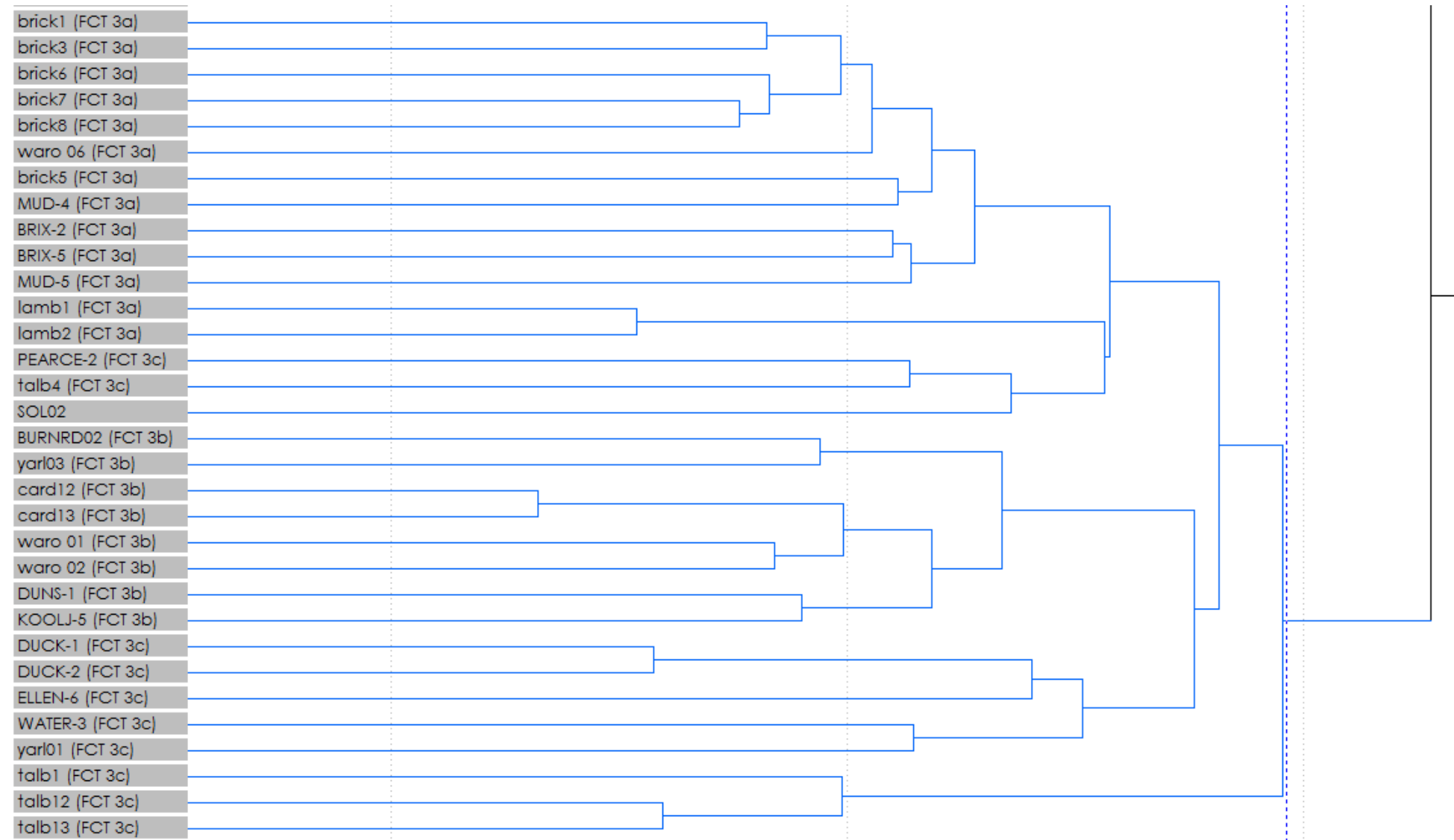


Figure 2: Dendrogram section from floristic clustering analysis against the Gibson SCP data set – quadrat SOL02

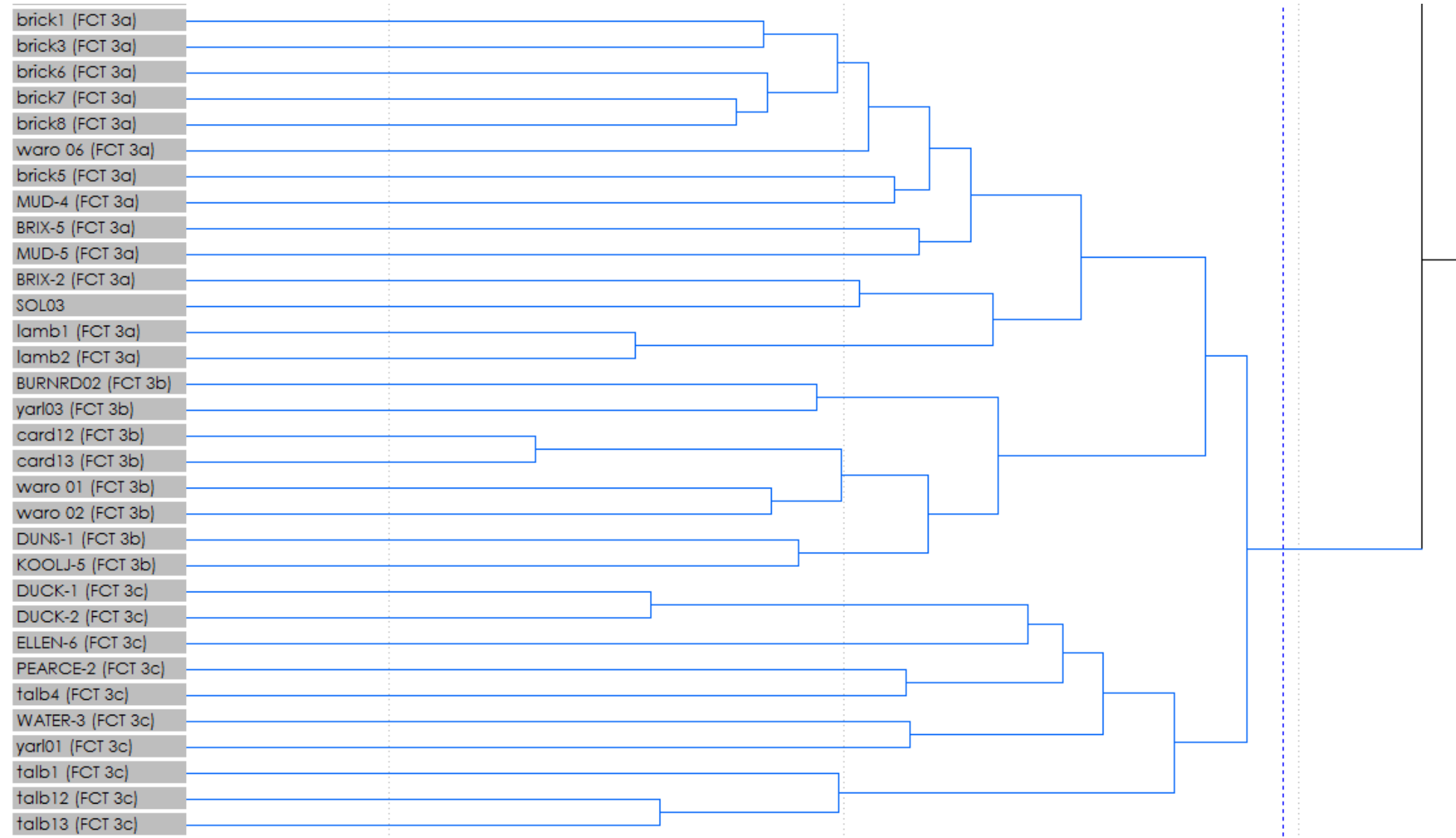


Figure 3: Dendrogram section from floristic clustering analysis against the Gibson SCP data set – quadrat SOL03.

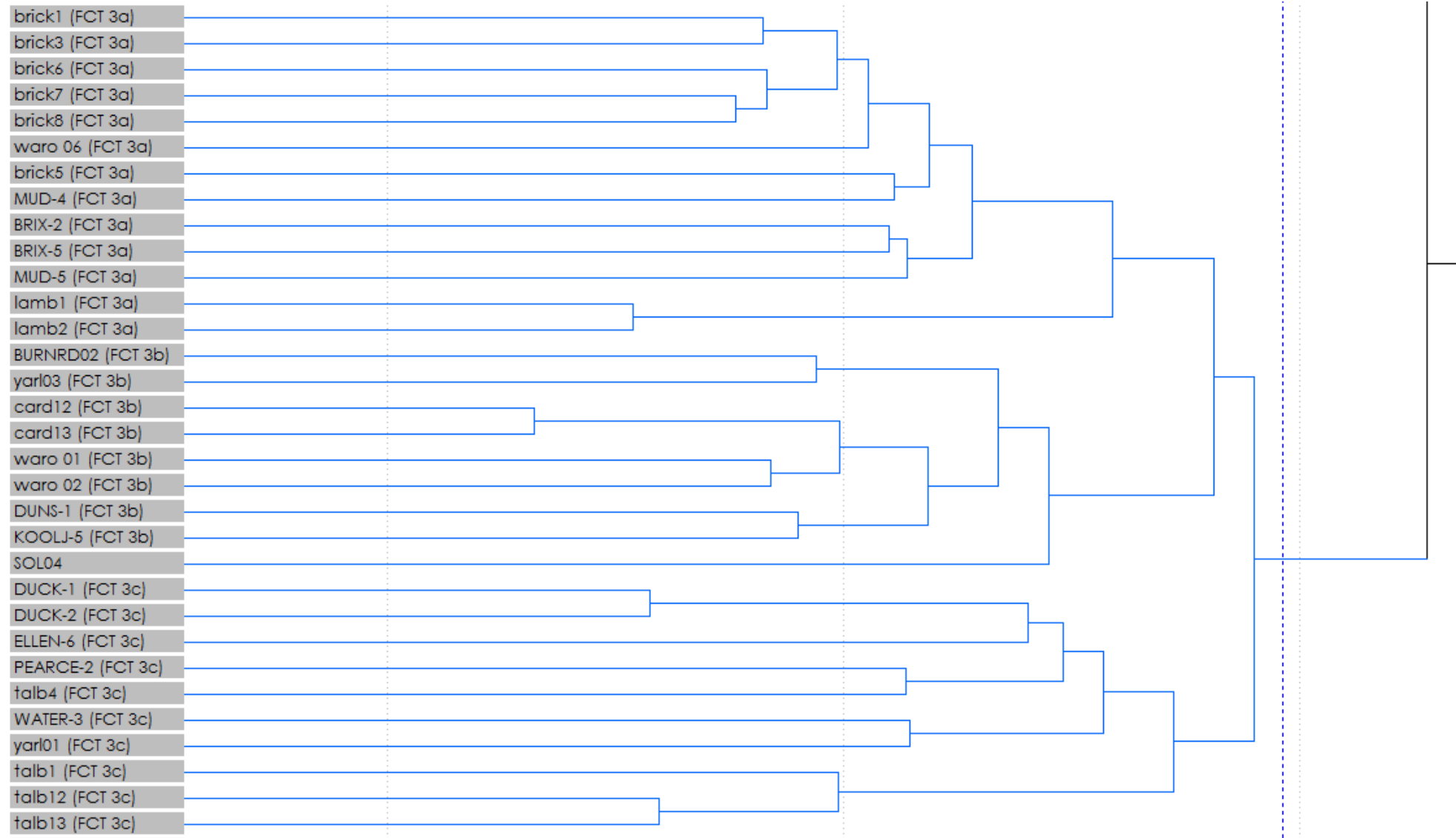


Figure 4: Dendrogram section from floristic clustering analysis against the Gibson SCP data set – quadrat SOL04.



## Appendix 7

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### Vascular Flora Species Recorded During the Current Survey







Family	Species	Status
<b>Amaranthaceae</b>	<i>Ptilotus manglesii</i>	
	<i>Ptilotus polystachyus</i>	
<b>Apiaceae</b>	<i>Xanthosia huegelii</i>	
<b>Araceae</b>	* <i>Zantedeschia aethiopica</i>	Declared Pest
<b>Asparagaceae</b>	* <i>Asparagus asparagoides</i>	WONS, Declared Pest
	<i>Chamaescilla corymbosa</i>	
	<i>Laxmannia squarrosa</i>	
	<i>Lomandra caespitosa</i>	
	<i>Lomandra hermaphrodita</i>	
	<i>Lomandra odora</i>	
	<i>Lomandra preissii</i>	
	<i>Lomandra purpurea</i>	
	<i>Lomandra sonderi</i>	
	<i>Lomandra suaveolens</i>	
	<i>Sowerbaea laxiflora</i>	
	<i>Thysanotus arbuscula</i>	
	<i>Thysanotus patersonii/manglesianus</i>	
	<i>Thysanotus tenellus</i>	
	<i>Thysanotus thyrsoides</i>	
	<i>Thysanotus triandrus</i>	
	<b>Asteraceae</b>	* <i>Hypochaeris glabra</i>
* <i>Hypochaeris</i> sp.		
<i>Quinetia urvillei</i>		
<i>Siloxerus multiflorus</i>		
* <i>Ursinia anthemoides</i> subsp. <i>anthemoides</i>		
<b>Boraginaceae</b>	* <i>Echium plantagineum</i>	Declared Pest
<b>Boryaceae</b>	<i>Borya scirpoidea</i>	
<b>Caryophyllaceae</b>	<i>Caryophyllaceae</i> sp.	
<b>Centrolepidaceae</b>	<i>Aphelia cyperoides</i>	
	<i>Centrolepis drummondiana</i>	
<b>Colchicaceae</b>	<i>Burchardia multiflora</i>	
<b>Cyperaceae</b>	<i>Cyathochaeta avenacea</i>	
	<i>Cyathochaeta equitans</i>	
	<i>Isolepis cernua</i>	
	<i>Isolepis marginata</i>	
	<i>Lepidosperma apicola</i>	
	<i>Lepidosperma costale</i>	
	<i>Mesomelaena tetragona</i>	
	<i>Tetaria capillaris</i>	
<b>Dasypogonaceae</b>	<i>Calectasia grandiflora</i>	Priority 2
	<i>Calectasia narragara</i>	
	<i>Dasypogon bromeliifolius</i>	
	<i>Kingia australis</i>	
<b>Dilleniaceae</b>	<i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i>	
<b>Droseraceae</b>	<i>Drosera erythrorhiza</i>	
	<i>Drosera gigantea</i> subsp. <i>gigantea</i>	
	<i>Drosera glanduligera</i>	
	<i>Drosera menziesii</i>	
	<i>Drosera micrantha</i>	
	<i>Drosera platystigma</i>	
	<i>Drosera porrecta</i>	
<b>Ericaceae</b>	<i>Styphelia pallida</i>	

<b>Fabaceae</b>	<i>Acacia applanata</i>	
	<i>Acacia drewiana</i> subsp. <i>drewiana</i>	
	<i>Acacia drummondii</i> subsp. ? <i>drummondii</i>	
	* <i>Acacia podalyriifolia</i>	
	<i>Chorizema dicksonii</i>	
	<i>Daviesia decurrens</i>	
	<i>Daviesia preissii</i>	
	<i>Gompholobium marginatum</i>	
	<i>Gompholobium polymorphum</i>	
	<i>Gompholobium tomentosum</i>	
	<i>Hovea trisperma</i>	
	<i>Isotropis cuneifolia</i>	
	<i>Jacksonia alata</i>	
	<i>Jacksonia sternbergiana</i>	
	<i>Kennedia coccinea</i> subsp. <i>coccinea</i>	
	<i>Kennedia prostrata</i>	
	<i>Sphaerolobium medium</i>	
<b>Goodeniaceae</b>	<i>Dampiera linearis</i>	
	<i>Goodenia micrantha</i>	
	<i>Lechenaultia floribunda</i>	
<b>Haemodoraceae</b>	<i>Anigozanthos manglesii</i>	
	<i>Anigozanthos viridis</i>	
	<i>Conostylis juncea</i>	
	<i>Conostylis setigera</i> subsp. <i>setigera</i>	
	<i>Conostylis setosa</i>	
	<i>Haemodorum discolor</i>	
	<i>Haemodorum</i> sp.	
	<i>Tribonanthes australis</i>	
<b>Hemerocallidaceae</b>	<i>Agrostocrinum hirsutum</i>	
	<i>Caesia micrantha</i>	
	<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2
	<i>Tricoryne tenella</i>	
<b>Iridaceae</b>	* <i>Ixia maculata</i>	
	* <i>Moraea flaccida</i>	Declared Pest
	<i>Patersonia juncea</i>	
	<i>Patersonia occidentalis</i>	
	<i>Patersonia occidentalis</i> var. <i>occidentalis</i>	
	* <i>Romulea rosea</i>	
<b>Lauraceae</b>	<i>Cassytha racemosa</i>	
<b>Lentibulariaceae</b>	<i>Utricularia tenella</i>	
<b>Loranthaceae</b>	<i>Nuytsia floribunda</i>	
<b>Myrtaceae</b>	<i>Babingtonia camphorosmae</i>	
	<i>Corymbia calophylla</i>	
	<i>Darwinia citriodora</i>	
	<i>Darwinia thymoides</i> subsp. <i>thymoides</i>	
	<i>Eucalyptus lane-poolei</i>	
	<i>Eucalyptus marginata</i> subsp. <i>marginata</i>	
	<i>Kunzea micrantha</i>	
	* <i>Leptospermum laevigatum</i>	
	<i>Verticordia acerosa</i> var. <i>preissii</i>	
	<i>Verticordia huegelii</i> var. <i>stylosa</i>	
<b>Orchidaceae</b>	<i>Caladenia</i> ? <i>flava</i>	
	<i>Caladenia ferruginea</i>	
	<i>Caladenia longicauda</i> subsp. <i>longicauda</i>	
	<i>Caladenia</i> sp.	

	<i>*Disa bracteata</i>	
	<i>Diuris</i> sp.	
	<i>Elythranthera emarginata</i>	
	<i>Microtis media</i> subsp. <i>media</i>	
	<i>Prasophyllum</i> sp.	
	<i>Thelymitra crinita</i>	
	<i>Thelymitra graminea</i>	
	<i>Thelymitra macrophylla</i>	
<b>Oxalidaceae</b>	<i>*Oxalis glabra</i>	
<b>Philydraceae</b>	<i>Philydrella pygmaea</i>	
<b>Phyllanthaceae</b>	<i>Poranthera microphylla</i>	
<b>Poaceae</b>	<i>*Aira caryophyllea</i>	
	<i>Austrostipa compressa</i>	
	<i>*Briza maxima</i>	
	<i>*Ehrharta calycina</i>	
	<i>Neurachne alopecuroidea</i>	
	<i>Rytidosperma caespitosum</i>	
	<i>*Tribolium uniolae</i>	
<b>Polygalaceae</b>	<i>Comesperma calymega</i>	
<b>Proteaceae</b>	<i>Adenanthos meisneri</i>	
	<i>Banksia nivea</i> subsp. <i>nivea</i>	
	<i>Banksia sessilis</i>	
	<i>Banksia sessilis</i> var. <i>sessilis</i>	
	<i>Conospermum huegelii</i>	
	<i>Grevillea bipinnatifida</i> subsp. ? <i>pagna</i>	Priority 1
	<i>Grevillea wilsonii</i>	
	<i>Hakea trifurcata</i>	
	<i>Lambertia multiflora</i> var. <i>darlingensis</i>	
	<i>Stirlingia latifolia</i>	
	<i>Synaphea acutiloba</i>	
	<i>Synaphea gracillima</i>	
	<i>Synaphea petiolaris</i> subsp. <i>petiolaris</i>	
	<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened
<b>Restionaceae</b>	<i>Desmocladus fasciculatus</i>	
	<i>Hypolaena exsulca</i>	
	<i>Leptocarpus canus</i>	
	<i>Leptocarpus coangustatus</i>	
<b>Rhamnaceae</b>	<i>Spyridium globulosum</i>	
<b>Rubiaceae</b>	<i>Opercularia vaginata</i>	
<b>Rutaceae</b>	<i>Philothea spicata</i>	
<b>Stylidiaceae</b>	<i>Levenhookia pusilla</i>	
	<i>Stylidium brunonianum</i>	
	<i>Stylidium cilium</i>	
	<i>Stylidium hispidum</i>	
	<i>Stylidium petiolare</i>	
	<i>Stylidium repens</i>	
<b>Thymelaeaceae</b>	<i>Pimelea imbricata</i> var. <i>imbricata</i>	
<b>Xanthorrhoeaceae</b>	<i>Xanthorrhoea gracilis</i>	
	<i>Xanthorrhoea preissii</i>	



## Appendix 8

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### Locations of Significant Flora





Species	Status	Site	Easting	Northing	Date	Number of Individuals	Specimen No.
<b>Threatened</b>							
<i>Synaphea</i> ? sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405625	6431053	6/10/2021	4	SW20
<i>Synaphea</i> ? sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405779	6431635	7/10/2021	1	SW20=
<i>Synaphea</i> ? sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405806	6431732	7/10/2021	1	SW20=
<i>Synaphea</i> ? sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405812	6431747	7/10/2021	2	Sw20=
<i>Synaphea</i> ? sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405822	6431801	7/10/2021	3	Sw20=
<i>Synaphea</i> ? sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	406166	6433230	7/10/2021	1	Sw20=
<i>Synaphea</i> ? sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	406158	6433191	7/10/2021	2	Sw20=
<i>Synaphea</i> ? sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	406116	6432981	7/10/2021	2	Sw20=
<i>Synaphea</i> ? sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405802	6431767	7/10/2021	1	Sw20=
<i>Synaphea</i> ? sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405784	6431694	7/10/2021	3	Sw20=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405237	6429506	6/10/2021	3	SWMK-02
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405208	6429421	6/10/2021	4	SWMK-02=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405207	6429418	6/10/2021	3	SWMK-02=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405209	6429416	6/10/2021	2	SWMK-02=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405213	6429427	6/10/2021	2	SWMK-02=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405218	6429428	6/10/2021	4	SWMK-02=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405212	6429435	6/10/2021	1	SWMK-02=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405211	6429436	6/10/2021	1	SWMK-02=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405211	6429439	6/10/2021	1	SWMK-02=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405213	6429441	6/10/2021	1	SWMK-02=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405215	6429444	6/10/2021	1	SWMK-02=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405226	6429492	6/10/2021	1	SWMK-02=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405231	6429492	6/10/2021	1	SWMK-02=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405228	6429496	6/10/2021	1	SWMK-02=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405231	6429501	6/10/2021	1	SWMK-02
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405237	6429506	6/10/2021	4	SWMK-02=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405242	6429508	6/10/2021	4	SWMK-02=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405355	6429982	6/10/2021	1	SWMK-05

Species	Status	Site	Easting	Northing	Date	Number of Individuals	Specimen No.
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405350	6429949	6/10/2021	4	SWMK-05=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405355	6429992	6/10/2021	1	SWMK-05=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405359	6429994	6/10/2021	6	SWMK-05=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405362	6430002	6/10/2021	4	SWMK-05=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405363	6430006	6/10/2021	3	SWMK-05=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405364	6430010	6/10/2021	8	SWMK-05=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405365	6430015	6/10/2021	4	SWMK-05=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405367	6430030	6/10/2021	3	SWMK-05=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405371	6430035	6/10/2021	3	SWMK-05=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405369	6430037	6/10/2021	1	SWMK-05=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405390	6430119	6/10/2021	1	SWMK-05=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405389	6430122	6/10/2021	1	SWMK-05=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405763	6431561	6/10/2021	3	SWMK-05=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405724	6431419	6/10/2021	5	SWMK-05=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405718	6431369	6/10/2021	6	SWMK-05=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405704	6431347	6/10/2021	2	SWMK-05=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405685	6431259	6/10/2021	5	SWMK-05=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405458	6430424	6/10/2021	1	SWMK-05=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405464	6430426	6/10/2021	6	SWMK-05=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405534	6430722	6/10/2021	6	SWMK-05=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405553	6430787	6/10/2021	1	SWMK-05=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405583	6430899	6/10/2021	5	SWMK-05=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405595	6430957	6/10/2021	4	SWMK-05=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405670	6431247	6/10/2021	4	SWMK-05=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405419	6430256	6/10/2021	1	SWMK-10
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405603	6430987	6/10/2021	2	SWMK-10=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405601	6430990	6/10/2021	3	SWMK-10=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	Opportunistic	405687	6431323	6/10/2021	3	SWMK-10=
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	Threatened	SOL02	405387	6430115	08/10/2021	1	SOL02-01



Species	Status	Site	Easting	Northing	Date	Number of Individuals	Specimen No.
<i>Calectasia grandiflora</i>	Priority 2	Opportunistic	406211	6433425	7/10/2021	1	SWMK-22
<i>Calectasia grandiflora</i>	Priority 2	Opportunistic	406217	6433472	7/10/2021	1	SWMK-22=
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	Opportunistic	405388	6430110	06/10/2021	2	SWMK-06=
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	Opportunistic	405407	6430238	06/10/2021	2	SW16
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	Opportunistic	405395	6430138	06/10/2021	1	SW16=
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	Opportunistic	405439	6430311	06/10/2021	30	SW16=
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	Opportunistic	405448	6430346	06/10/2021	12	SW16=
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	Opportunistic	406197	6433306	07/10/2021	4	SW16=
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	Opportunistic	406226	6433410	07/10/2021	1	SW16=
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	Opportunistic	406203	6433347	07/10/2021	1	SW16=
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	Opportunistic	406197	6433332	07/10/2021	1	SW16=
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	Opportunistic	406189	6433296	07/10/2021	4	SW16=
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	Opportunistic	405384	6430092	06/10/2021	2	SWMK-06
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	Opportunistic	405385	6430102	06/10/2021	1	SWMK-06=
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	Opportunistic	405386	6430106	06/10/2021	1	SWMK-06=
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	Opportunistic	405387	6430107	06/10/2021	1	SWMK-06=
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	Opportunistic	405387	6430109	06/10/2021	1	SWMK-06=
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	Opportunistic	405392	6430124	06/10/2021	1	SWMK-06=
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	Opportunistic	405392	6430131	06/10/2021	1	SWMK-06=
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	Opportunistic	405398	6430178	06/10/2021	1	SWMK-06=
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	Opportunistic	405413	6430236	06/10/2021	1	SWMK-06=
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	Opportunistic	405413	6430238	06/10/2021	1	SWMK-06=
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	Opportunistic	405425	6430283	06/10/2021	3	SWMK-06=
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	Opportunistic	405428	6430292	06/10/2021	1	SWMK-06=
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	Opportunistic	405431	6430319	06/10/2021	1	SWMK-06=
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	Opportunistic	405431	6430321	06/10/2021	2	SWMK-06=
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	Opportunistic	405437	6430331	06/10/2021	5	SWMK-06=
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	SOL02	405387	6430115	08/10/2021	7	SWMK-06=
<i>Grevillea bipinnatifida</i> subsp. <i>?pagna</i>	Priority 1	SOL03	405721	6431428	08/10/2021	-	SOL03-10