Stream Environment and Water

Flora and Vegetation Survey of Warner Glen Road

MAY, 2022

PREPARED FOR THE SHIRE OF AUGUSTA -MARGARET RIVER

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Contents

List Figures

List of Tables

1 Introduction

1.1 Project Background

Stream Environment and Water Pty Ltd (Stream Environment and Water) were commissioned by the Shire of Augusta Margaret River (AMR Shire) to undertake a flora and vegetation survey, incorporating a reconnaissance and targeted flora and vegetation surveys of roadside vegetation along three sections of Warner Glen Road, Warner Glen.

The results of the survey will inform the preparation of a clearing permit (and potentially other environmental approvals) in association with proposed road widening and associated works.

1.2 Site location and details

The survey area is located within the Shire of Augusta Margaret River local government area along three sections of Warner Glen Road SLK 0 – 1.6; SLK 7.78 – 8.1 and SLK 9.42 – 19.34 (Figure 1). The survey area (area which is physically surveyed), is approximately 13.5 km in total length and approximately 30.3 ha in area.

A desktop study area (the 'study area') was defined for the desktop assessment. The study area includes the survey area with a 5 kilometre (km) buffer (Figure 1).

1.3 Scope and Objectives of the Study

The objective of the study was to undertake a reconnaissance spring flora and vegetation survey of the survey area in accordance with 'Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment' (EPA 2016a). The following actions were completed to fulfill the scope:

- A desktop assessment of the study area and survey area (prior to the field survey) to review the flora and vegetation values of the survey area. This included database searches and results of previous studies.
- Complete a reconnaissance spring flora and vegetation field survey to verify/groundtruth the desktop assessment findings (one season only)
- Conduct a targeted survey for Threatened and Priority flora identified in the desktop assessment
- Map vegetation types and condition within the survey area using a combination of recent aerial photographs and field surveys
- Assess the potential occurrence of Threatened Ecological Communities (TECs) and/or Priority Ecological Communities (PECs) within the survey area
- Map any Threatened or Priority flora and TECs/PECs found within the survey area
- Provide a concise report on the findings of the survey consistent with the reporting requirements detailed in EPA (2016a)
- Provide raw data and spatial files to the Shire.

1.4 Relevant legislation and policy

The approach and methodology of the flora and vegetation assessment was undertaken in accordance with all relevant legislation and Commonwealth and State policy, as follows:

- Biosecurity and Agriculture Management Act 2007 (BAM Act)
- Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016a)

- Draft Survey Guidelines for Australia's Threatened Orchids (Commonwealth of Australia 2013)
- Environmental Factor Guideline: Flora and Vegetation (EPA 2016b)
- Biodiversity Conservation Act 2016 (BC Act).

1.5 Legislative and policy context

1.5.1 Communities

Ecological communities are defined as a naturally occurring group of plants, animals and other organisms interacting in a unique habitat. The Department of Biodiversity, Conservation and Attractions (DBCA) identifies and lists ecological communities as a TEC if the community is presumed to be totally destroyed or at risk of becoming totally destroyed. Under the Western Australian BC Act, TECs can be classed as critically endangered (CR), endangered (EN), vulnerable (VU) or presumed totally destroyed (PD) (see Appendix A for details).

Where communities are considered rare but not (currently) threatened or there is insufficient information available for the community to be considered a TEC, communities can be listed as PECs (definitions of priority classes are provided in Appendix A).

The *Environment Protection and Biodiversity Conservation Act 1999* EPBC Act provides statutory listing and protection for TECs at a federal level. Under the EPBC Act TECs can be listed as critically endangered, endangered, or vulnerable (Appendix A). Communities listed under the EPBC Act as Threatened have statutory protection.

Other significant vegetation

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

- Is restricted in distribution
- Has a degree of historical impact from threatening processes
- Has a role as a refuge
- Provides an important function required to maintain ecological integrity of a significant ecosystem
- Supports local endemism in restricted habitats
- Supports novel combinations of taxa
- Has s role as a key habitat for Threatened species or large population representing a significant proportion of the local to regional total population of a species
- Is representative of a vegetation unit in 'pristine' condition in a highly cleared landscape, recently discovered range extensions, or isolated outliers of the main range.

1.5.2 Species

All native flora in Western Australia is protected under the EP Act by virtue of the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (WA). Specific flora species may be afforded special protection under the BC Act for flora taxa declared as 'Threatened Flora'. In addition, DBCA also classifies flora under four Priority codes (policy based) where they are under consideration for future listing as Threatened flora but there is insufficient information, or they are not currently threatened but could become so if circumstances change (Appendix B).

Flora species can also be listed under the EPBC Act as Threatened species and are classed as either extinct, extinct in the wild, critically endangered, endangered, vulnerable or conservation dependant

(Appendix B). Any actions likely to have significant impact on species (or communities) listed under the EPBC Act require referral for assessment and approval from the Federal Minister for the Environment.

Other significant flora

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

- A keystone role in a particular habitat for Threatened or Priority flora species, or large populations representing a considerable proportion of the local or regional total population of a species
- Relictual status, being representation of taxonomic or physiognomic groups that no longer occur widely in the broader landscape
- New species or anomalous features that indicate a potential new species
- Representative of the range of a species (particularly, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range)
- Unusual species, including restricted subspecies, varieties, or naturally occurring hybrids
- Locally endemic (a restricted distribution) or associated with a restricted habitat type (e.g. surface water or groundwater dependent ecosystems).

1.5.3 Introduced and Invasive species

Introduced species have been ranked by a number of attributes, including invasiveness, distribution and environmental impacts in the various regions in 'An Environmental Weed Strategy' (CALM, 1999). Those meeting certain criteria are classified as environmental weeds.

Under the National Weed Strategy, there are currently 32 weed species listed as Weeds of National Significance (WoNS) (DoEE 2019). The assessment of Weeds of National Significance (WoNS) is based on four major criteria:

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

Declared Pests, including pest plants are also listed under the BAM Act (DPIRD 2019).

1.5.4 Environmentally Sensitive Areas

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

- 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.

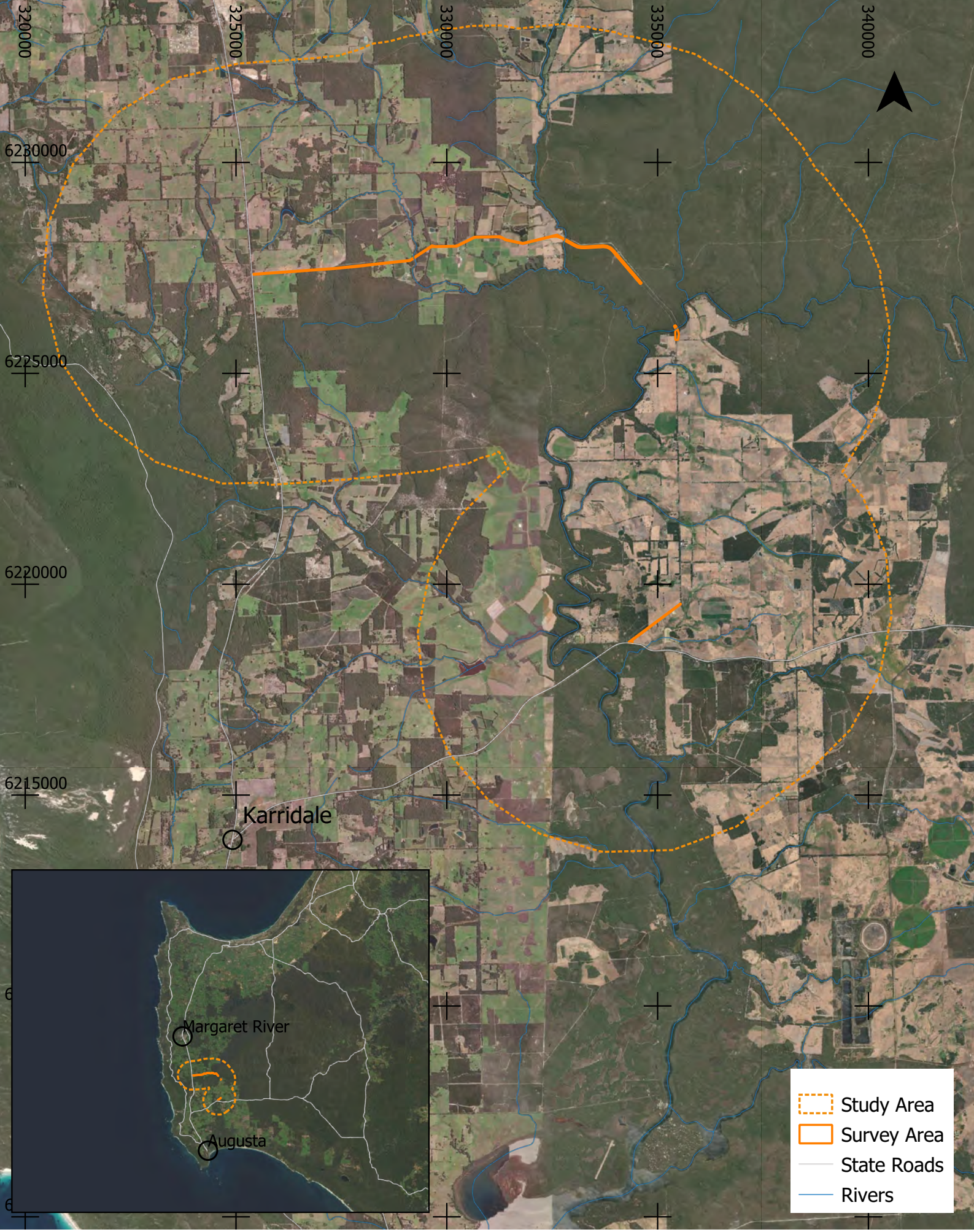

Figure 1: Study area and survey area location

Warner Glen Road Flora and Vegetation Survey

Ref: 212205
Date: 21/01/22 Author: MB

0 1 2 km

Projection: GDA zone 50

Source: Base map © ESRI and its data suppliers. Landgate (2022).

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2 Methodology

2.1 Desktop Assessment

A desktop assessment was completed prior to field surveys using relevant datasets and literature to describe the existing environment and identify potentially significant flora species and vegetation types occurring within the survey area. The desktop assessment was conducted over a desktop study area which included the Warner Glen survey area with a 5 km buffer (the study area).

Previous surveys

A search of the Index of Biodiversity Surveys for Assessment (IBSA) database was conducted to identify any previous flora and vegetation studies with survey areas that overlapped or were adjacent to the current survey area. The literature review also utilised publicly available regional surveys and datasets.

Spatial Data Review

Several regional-scale spatial data sets and accompanying reports were examined, including the following:

- Climate data from Bureau of Meteorology (BoM) Climate Data Online (2021)
- Interim Biogeographic Regionalisation for Australia (IBRA) Regions (Version 7, Subregions)(DAWE 2020)
- Soil mapping from Tille and Lantzke (1990) was used to identify soil types (digitially available in Soil Landscape Mapping – Systems, DPIRD-064)
- Identification of Environmentally Sensitive areas (Clearing Regulations - Environmentally Sensitive Areas (DWER-046) (DWER 2018a)
- Identification of any sensitive wetlands and waterways (Ramsar Sites (DBCA-010) (DBCA 2017), Hydrography Linear (DWER-031) (DWER 2018b), Directory of Important Wetlands in Australia - Western Australia (DBCA-045) (DBCA 2018)
- Mapping of vegetation associations (e.g. Beard 1981) and vegetation complexes (Mattiske and Havel 1998) using digital mapping from Pre-European Vegetation (DPIRD-006) (Beard *et al.* 2013) and Native Vegetation Extent (DPIRD-005) (DPIRD 2020)
- Statewide Vegetation Statistics (GoWA 2019).

Database Searches

The following databases were searched to identify flora and vegetation of significance potentially occurring within the survey area:

- DAWE's Protected Matters Search Tool (PMST) to identify any significant flora or communities listed under the EPBC Act (DAWE 2021).
- DBCA's NatureMap database (DBCA 2021a)
- DBCA's Threatened and Priority flora database and WA Herbarium database (DBCA 2021b)
- DBCA's TEC and PEC database (DBCA 2021c).

Assessment of Likelihood of Occurrence

For the purposes of this report, the term 'significant' has been applied to species and communities that have been formally assigned a conservation ranking under the BC Act, EPBC Act or the DBCA lists of Priority species and communities.

For each significant flora species, the criteria detailed in Table 1 were used to assess the likelihood that the species would occur in the survey area. Two assessments were completed:

- A pre-survey assessment was made during the desktop study; and
- A post-survey assessment based on the findings of the field surveys.

The criteria in Table 2 were used to assess the likelihood that potential PECs and/or TECs would occur in the survey area.

Table 1: Criteria used to assign the pre and post survey likelihood of occurrence of flora of significance

Flora likelihood of occurrence	Criteria
Recorded	Species was recorded in the current survey or has previously (in last 15 years) been recorded within the survey area.
Likely (High)	Species previously recorded within the study area and large areas of suitable habitat occur in the survey area.
Possible (Moderate)	Species previously recorded within the study area and areas of suitable habitat occur/may occur in the survey area.
Unlikely (low)	Species previously recorded within the study area, but suitable habitat does not occur in the survey area.
Highly unlikely (very low)	Species previously recorded within the study area, but suitable habitat does not occur in the survey area and/or the survey area is outside the natural distribution of the species or suitable search effort during the preferred season did not record the species. Or not recorded in study area. Previous record location details may be erroneous.

Table 2: Criteria used to assign the pre-survey likelihood of occurrence of significant communities

Flora likelihood of occurrence	Criteria
Recorded	Mapped or documented (previous survey) occurrence within survey area
Likely (High)	Community previously recorded within the study area and large areas of suitable soil and landforms mapped within survey area
Possible (Moderate)	Community previously recorded within the study area and some suitable soil and landforms mapped within survey area
Unlikely (low)	Community previously recorded within the study area however suitable soil and landforms do not occur within the survey area

2.2 Field Survey

2.2.1 Personnel, timing and weather conditions

A reconnaissance flora and vegetation survey, including targeted flora survey, was completed by Stream Environment and Water Principals Mike Braimbridge and Jane Wilshaw and Senior Botanist Ben Eckerman on 20 and 21 September 2021. The survey was timed to coincide with the flowering times of most flora species, in particular significant species identified during the desktop assessment.

Personnel

Roles and experience of field personnel are summarised in Table 3.

Table 3: Team member roles and experience.

Team member	Qualification	Roles	Experience	Flora taking (biological assessment) licence
Mike Braimbridge	BSc. Hons	Releve sampling, , vegetation mapping and condition assessment, targeted flora searches.	>20 years	FB62000161
Jane Wilshaw	BSc. Hons	Releve sampling, vegetation mapping and condition assessment, targeted flora searches.	>15 years	FB62000162
Ben Eckermann		Releve sampling and targeted flora searches	>15 years	FB62000262

2.2.2 Reconnaissance Survey

Relevé Sampling

Eleven relevés were surveyed during the field survey. At each relevé location (Figure 2), the following information was recorded using standardised field sheets including:

- Location and coordinates using handheld GPS
- Description of the dominant strata and vegetation community in accordance with the NVIS
- Soil and landforms
- Vegetation condition
- Period since last fire
- Description of Disturbances
- Comprehensive species list including weeds.

Where possible relevés were placed in vegetation units where the condition (as defined by Keighery 1994) was good or better. Relevé data was supplemented with opportunistic sampling through traverses and targeted searches (see below).

Vegetation Unit Mapping

Vegetation units were described and mapped through aerial photograph interpretation and confirmed in the field through sampling of relevés and field observations.

Vegetation units were described based on structure, dominant taxa and cover characteristics as defined by relevé data and field observations. Vegetation unit descriptions follow the NVIS and are consistent with NVIS Level V (Association). At Level V up to three taxa per stratum are used to describe the association (NVIS Technical Working Group 2017) (Refer to Appendix C).

Once the vegetation units were described, they were compared against the published descriptions of TECs and PECs to determine whether any of the vegetation in the survey area potentially corresponded to listed community types.

Vegetation Condition Mapping

Vegetation condition was assessed and mapped in accordance with the vegetation condition rating scale for the Southwest Botanical Provinces devised by Keighery (1994) and adapted by EPA (2016a). The scale recognises the intactness of vegetation and consists of six rating levels. The vegetation condition rating scale is outlined in Appendix C. Areas devoid of native vegetation were mapped as cleared (eg. roads) or other definitions as appropriate (eg. plantations of introduced species)

Targeted Survey for Significant Flora

Targeted searching for potential Threatened and Priority flora species was completed through meandering foot traverses of the survey area (Figure 2). Where located, the coordinates of potential Threatened and Priority flora species were recorded (to 2m accuracy) along with the number of plants, vegetation unit, landform, aspect, soil, vegetation condition, period since last fire and any disturbances.

Additional native species observed during the targeted searches were recorded and added to the species list for the survey.

Introduced Plants and Invasive Species

Locations of any declared pests or WoNS were recorded (GPS coordinates) during the targeted flora survey and relevé sampling.

Specimen Identification

Any flora species that were not able to be identified in the field were collected or photographed. Field collections were made where taxa were uncommon or unusual (for the survey area) or could not be identified without microscopic examination. Field collections were pressed and dried for later identification. Specimens were identified using relevant taxonomic literature, flora keys and comparison with voucher reference collections and collections held by Stream and the WA Herbarium. The majority of identifications were completed by Stream Director/Principal Environmental Scientists Mike Braimbridge and Jane Wilshaw. Where necessary, specialist taxonomists Frank Obbens and Sharnya Thomson assisted in identification and/or confirmation of specimens.

Nomenclature of flora identified during the survey follows that of the Western Australian Herbarium and as listed on FloraBase (WA Herbarium 1998) at the time of report preparation.

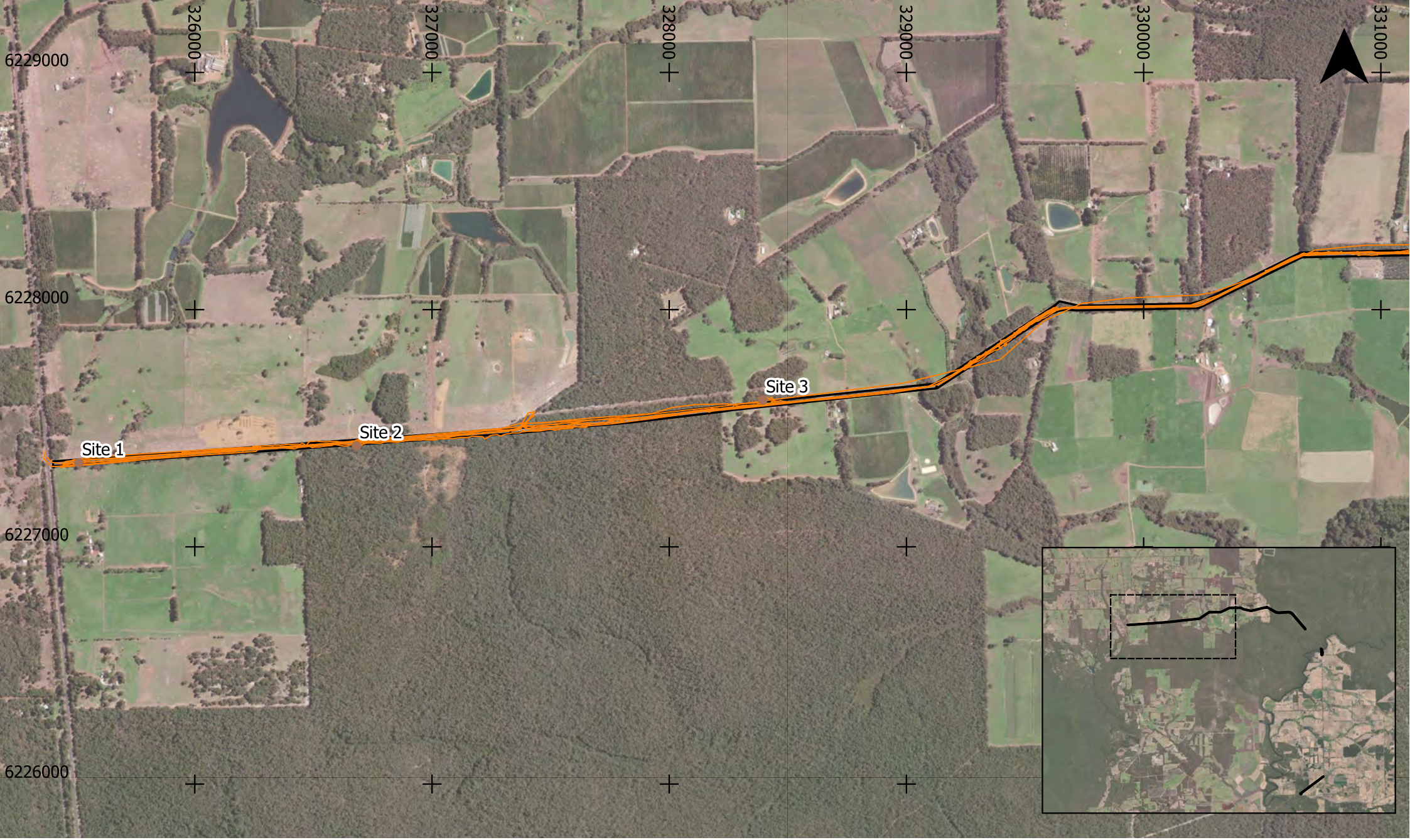

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Figure 2: Targeted search effort and survey site locations (Sheet 1 of 3)

Warner Glen Road Flora and Vegetation Survey

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Date: 21/01/22 Author: MB

Search effort GPS tracks
Survey sites
Survey area

Projection: GDA zone 50

Source: Base map © ESRI and its data suppliers (2022). Landgate (2022).

0 0.5 1 km

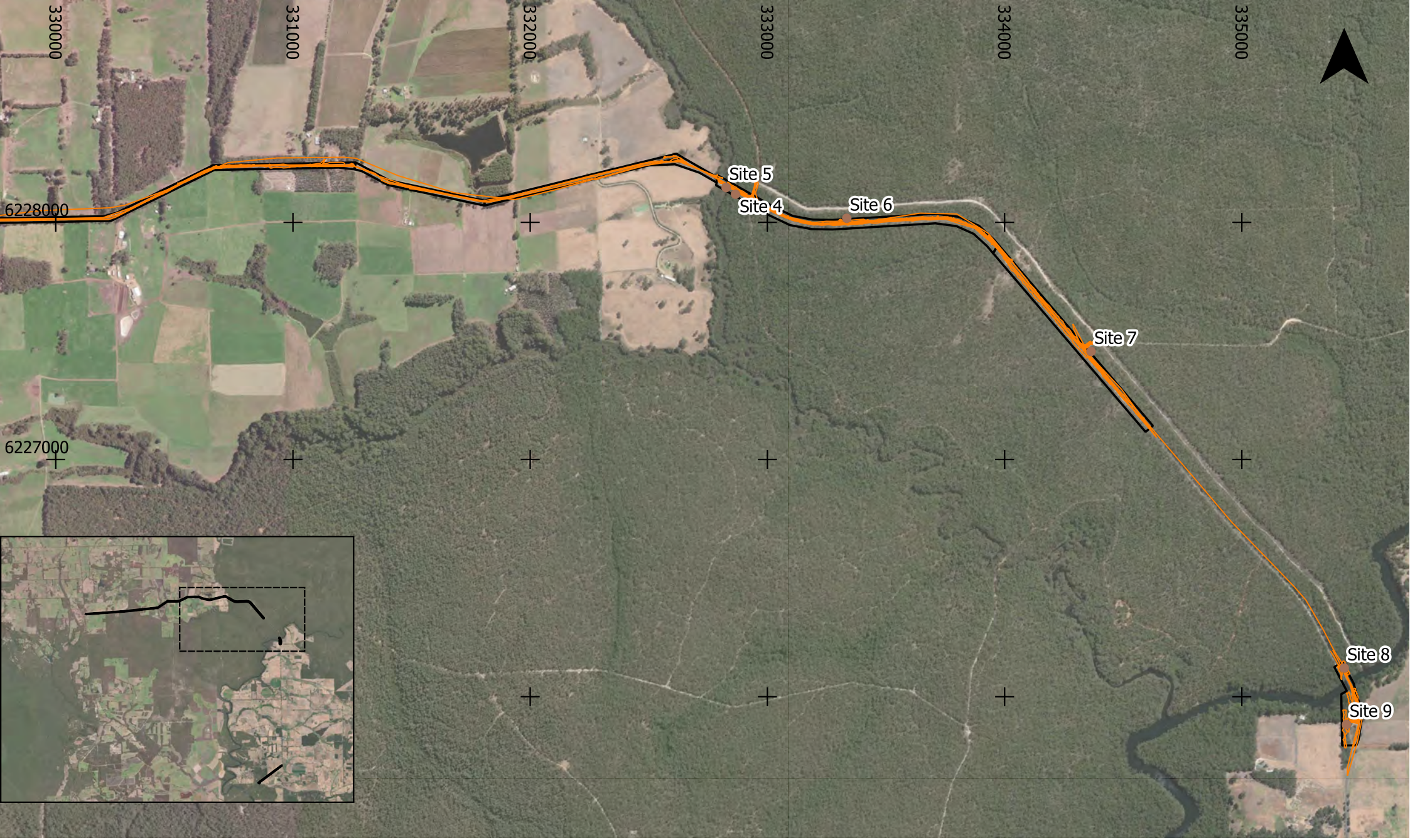

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Figure 2: Targeted search effort and survey site locations (Sheet 2 of 3)

Warner Glen Road Flora and Vegetation Survey

Job: 212205
Date: 21/01/22 Author: MB

Search effort GPS tracks
Survey sites
Survey area

Projection: GDA zone 50

0 0.5 1 km

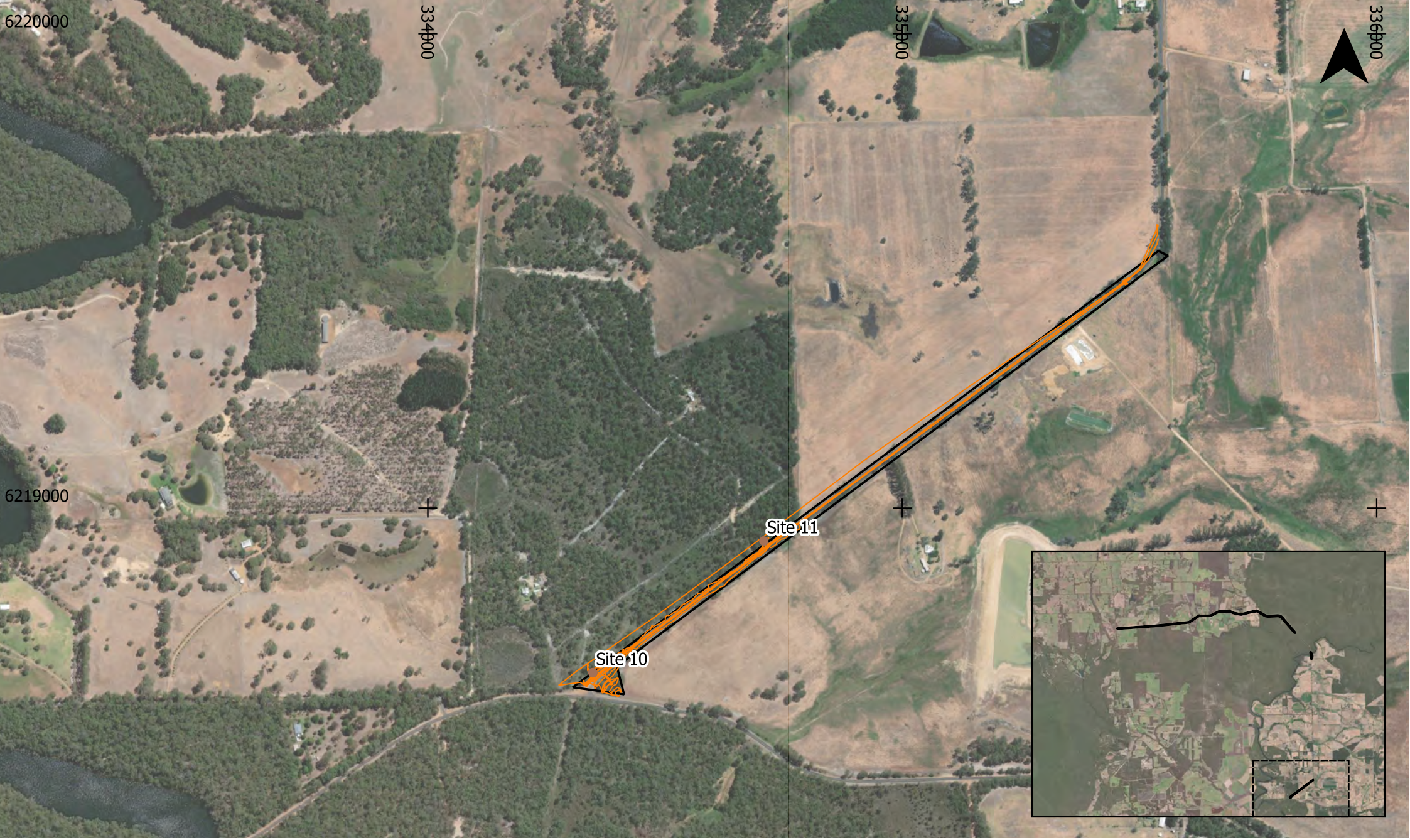

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Figure 2: Targeted search effort and survey site locations (Sheet 3 of 3)

Warner Glen Road Flora and Vegetation Survey

Job: 212205
Date: 21/01/22 Author: MB

Search effort GPS tracks
Survey sites
Survey area

Projection: GDA zone 50

0 0.25 0.5 km

2.2.3 Survey Limitations

The survey limitations were considered consistent with EPA Technical Guidance (EPA 2016a) and are summarised in Table 4.

Table 4: Assessment of survey limitations

Aspect	Constraint	Comment
Available regional and local information	Negligible	The region is well surveyed with regional vegetation association and complex mapping available.
Competency of personnel	Negligible	The survey was completed by Mike Braimbridge, Jane Wilshaw and Ben Eckermann who have >20 years', > 15 years' and 15 years' experience (respectively) in conducting flora and vegetation surveys in the Western Australia, including the south west.
Proportion of flora identified	Low	The field survey was completed during spring flowering period. Where required, specimens were collected or photographed and identified using relevant taxonomic literature.
Survey effort and extent	Negligible	Targeted searching covered the entire road reserve within the survey area
Accessibility	Negligible	The survey area is on public land and was accessible.
Survey timing and season	Negligible	The survey was completed in late September following a greater than average rainfall falling in the months preceding the survey (refer to Section 3.1).
Disturbance	Negligible	No recent disturbances. Multiple areas of historical disturbance that has impacted vegetation condition as discussed in relevant sections.

3 Desktop Assessment Results

3.1 Climate

The weather conditions leading up to and during flora and vegetation surveys can influence the number and type of species recorded from an area. High rainfall can increase the presence of annual flora species and contribute to the higher likelihood of plants bearing reproductive material. These factors result in a more complete list of species from the survey area and greater confidence in species identification.

The south west of Western Australia has a Mediterranean climate with mild wet winters and hot dry summers. Warner Glen (Climate Data Station 9613) has an average annual rainfall of 999mm (1942 to current), with most of the rain falling between May and September (BOM 2021). In the months leading up to the survey rainfall was higher than average (Figure 3). Climate statistics for nearby Witchcliffe (<1km northwest of the survey area) show a temperature range from an average maximum of 27.1°C in the hottest month of February to an average minimum of 8.2°C in August (Climate Data Station 9746) (BOM 2021).

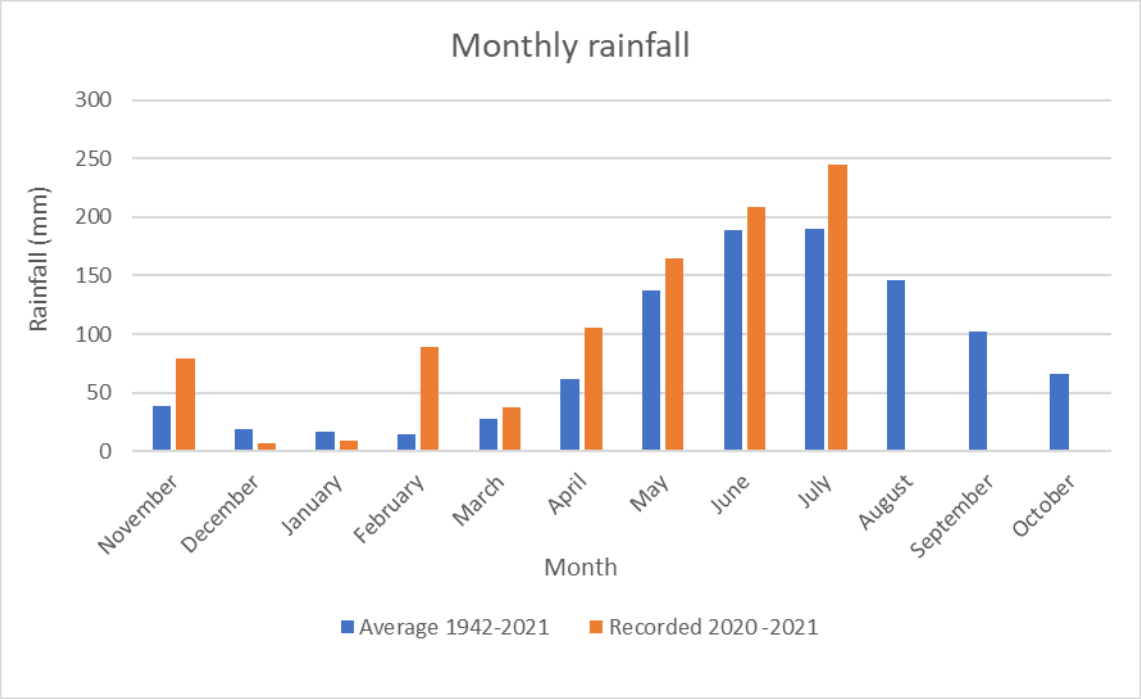

Figure 3: Mean monthly rainfall from 1942-2021 and in the months leading up to the survey (BOM Station 9613)

3.2 Biogeographic Region

The Interim Biogeographic Regionalisation of Australia (IBRA) divides Australia into 89 bioregions based on major biological, geographical and geological attributes. These bioregions are subdivided into 419 subregions as part of a refinement of the IBRA framework (DoEE 2016).

Most of the survey area occurs within the Southern Jarrah Forest (JAR02) sub-region of the Jarrah biogeographic region. The very north western portion of the survey area (near the intersection with Bussell Highway) occurs within the Warren (WAR01) bioregion (not further divided into subregions).

The Southern Jarrah Forest subregion incorporates the area south of Collie, where the Darling Plateau broadens and slopes gently to the south coast. Drainage is dissected in the west but broadening and levelling of the surface in the east produces poor drainage, creating numerous wetlands. Vegetation

comprises Jarrah - Marri forest in the west grading to Marri and Wandoo woodlands in the east. There are extensive areas of swamp vegetation in the south–east, dominated by Paperbarks and Swamp Yate. The highest diversity in vegetation communities occurs on the lower slopes or near granite soils where there are rapid changes in site conditions (Hearn *et al*. 2002b).

The Warren bioregion includes dissected undulating country of the Leeuwin Complex, Southern Perth Basin (Blackwood Plateau), South-West intrusions of the Yilgarn Craton and western parts of the Albany Orogen. The bioregion contains loamy soils supporting Karri forest, laterites supporting Jarrah-Marri forest, leached sandy soils in depressions and plains supporting low Jarrah woodlands and paperbark / sedge swamps. It also includes Holocene marine dunes with *Agonis flexuosa* and Banksia woodlands and heaths (Hearn *et al*. 2002).

3.3 Soils and landforms

Soil mapping by the Department of Agriculture and Food (Tille and Lantzke 1990) identifies 46 soil units across the study area, eleven of which occur within the survey area (Figure 4, **Error! Reference source not found.**).

Table 5: Soils of the Survey Area

Soil Phase	Description
Cowaramup, undifferentiated upland Phase	*Flats and gentles slopes (0-5% gradient) with gravelly duplex (Forest Grove) and pale grey mottled (Mungite) soils.*
Cowaramup ironstone rises Phase	*Flats and gentle slopes (0-5% gradient) with some laterite outcrop and shallow gravelly sands over laterite*
Wilyabrup, undifferentiated hillslope Phase	*Slopes with gradients generally 5-15% but ranging from 2-30%, and gravelly soils (i.e. Forest Grove and Keenan Soils)*
Treeton fertile flats Phase	*Well drained valley flats and floodplains with deep alluvial soils, often red brown loams (i.e. Marybrook soils)*
Treeton hillslopes Phase	*Slopes with gradients generally ranging from 2-15% and gravelly duplex (Forest Grove) and pale grey mottled (Mungite) soils*
Treeton valley Phase	*Narrow V-shaped drainage depressions*
Treeton ironstone slopes Phase	*Low slopes (gradients ranging from 2-10%) with shallow gravelly sands over laterite*
Nillup flats Phase	*Flats mainly with pale grey mottled (Mungite) soils*
Blackwood River deep sands Phase	*Flats and low dunes with deep bleached sands*
Blackwood River Wet Flats Phase	*Flats and slight depressions which are winter wet. Mixed alluvial and sandy soils*
Blackwood River Flats Phase	*Flats with a variety of deep (mainly sandy) soils*

3.4 Land Use

The vegetation within the road reserve includes sections of remnant roadside native vegetation, native vegetation adjacent to National Park and completely cleared areas vegetated by introduced weeds and grasses. Adjoining land uses include National Park, cleared agricultural (grazing and cropping), viticulture and plantations (blue gum).

3.5 Surface Hydrology

The survey area crosses the Blackwood River, Chapman Brook and the Upper Chapman Brook (Figure 4).

The Blackwood River (including where the survey area crosses the river) is listed under the Directory of Important Wetlands in Australia. The listing is for the Black River (Lower Reaches) and Tributaries system. In addition, the survey area intersects the Spearwood Creek draft proposed Ramsar addition which runs east to west across the survey area and approximately aligns with a section of the Blackwood River and a continuous corridor of intact native vegetation within the Blackwood River and Forest Grove National Parks and other areas of Timber Reserve.

The survey area overlaps two datasets of geomorphic wetlands, the Geomorphic Wetland Augusta to Walpole dataset and the Geomorphic Wetlands of the South West (currently a preliminary unreviewed dataset recently released by DBCA. The survey area intersects five mapped wetlands across the two datasets. The Upper Chapman Brook is mapped as a wetland in each dataset (as a floodplain in one and palusvale in the other) (Table 6). Management categories are not assigned to wetlands in the Augusta Walpole dataset and are preliminary in the South West dataset.

Table 6: Geomorphic wetlands mapped within the survey area.

Wetland site	Name	Wetland type	Management Category
Augusta Walpole			
2735	Blackwood River	Estuary (water body)	Not assigned
3606	Upper Chapman Brook	Floodplain	Not assigned
3800	NA	Palusplain	Not assigned
South West			
170	Chapman Brook	Palusvale	Resource Enhancement
172	Upper Chapman Brook	Palusvale	Resource Enhancement
188	NA	Palusvale	Conservation

3.6 Conservation Estates and Reserves

The survey area is located in a road reserve which is passes through the Blackwood River National Park and runs adjacent to the Forest Grove National Park. Both are Class 'A' Conservation reserve vested with the Conservation Commission of WA under the CALM Act 1984.

3.6.1 Environmentally Sensitive Areas

The wetlands mapped as part of the Geomorphic Wetlands Augusta Walpole dataset are Environmentally Sensitive Areas under the definition in the EP Act Regulations. Given the draft/preliminary status of the Geomorphic Wetlands South West data set, the status of wetlands in this dataset (as environmentally sensitive areas) requires clarification.

3.7 Vegetation

3.7.1 Vegetation Associations

The study area intersects the Boranup, Chapman and Scott River vegetation systems (as described and mapped by Beard 1981). Seven associations are mapped within the study area, of which three system associations occur within the survey (Table 7). Each of the three system associations has greater than 30% of pre-European extent remaining (Government of Western Australia, 2019).

Table 7: Vegetation Associations mapped within the Warner Glen Road survey area.

Vegetation System	Association	Description	Pre-European extent	Current Extent	% Remaining

Boranup	3	Medium forest; jarrah-marri	38,751.42	14,905.63	38.46
Boranup	1	Tall forest; karri (Eucalyptus diverscolor)	12,132.73	6,252.72	51.54
Chapman	3	Medium forest; jarrah-marri	320,688.28	253,852.36	79.16

3.7.2 Vegetation Complexes

Vegetation complexes in the area were mapped by Mattiske and Havel (1998). Twenty five vegetation complexes are mapped within the study area, 10 of which occur within the survey area (Figure 5). Descriptions and the remaining extent of the 10 complexes occurring within the survey area are detailed in Table 8.

The State and Federal governments' policies to manage environmental impacts and clearing, apply a target to retain >30% of pre-clearing extent for ecological communities (DER 2014). All of the vegetation complexes occurring within the survey area retain >30% of their pre-European extent.

Table 8: Vegetation Complexes mapped within the Warner Glen Road survey area

Vegetation complex	Description	% pre-European extent remaining	% pre-European extent remaining in AMR Shire LGA
Blackwood, B	Woodland to open forest of Eucalyptus marginata subsp. marginata-Corymbia calophylla-Xylomelum occidentale-Agonis flexuosa on raised river terrace in the perhumid zone.	70.77	70.77
Blackwood, Bd	Low open woodland of Banksia attenuata-Nuytsia floribunda-Eucalyptus marginata subsp. marginata on low dunes in the perhumid zone.	85.77	85.77
Blackwood, BK	Open forest of Corymbia calophylla-Eucalyptus marginata subsp. marginata on the variable slopes in perhumid and humid zones.	92.70	90.56
Blackwood, Bw	Woodland to low forest of Melaleuca rhaphiophylla, tall shrubland of Melaleuca incana and closed heath of Agonis spp. on depressions in the perhumid zone.	50.58	50.58
Cowaramup, C1	Open to tall open forest of Eucalyptus marginata subsp. marginata-Corymbia calophylla-Banksia grandis on lateritic uplands in the hyperhumid zone.	34.46	34.46
Nillup, N	Open forest of Eucalyptus marginata subsp. marginata-Corymbia calophylla –Banksia grandis-Xylomelum occidentale-Agonis flexuosa on low undulating plains in the perhumid zone.	72.42	58.56
Treeton, T	Woodland of Eucalyptus marginata subsp. marginata-Corymbia calophylla with some Allocasuarina fraseriana on mild slopes in the perhumid zone.	46.67	47.72
Treeton, Tw	Open forest of Eucalyptus patens-Corymbia calophylla-Eucalyptus marginata subsp. marginata on lower slopes and on floors of minor valleys in the perhumid zone.	33.73	34.83

Wilyabrup, W1	Tall open forest of Eucalyptus diversicolor-Corymbia calophylla-Allocasuarina decussata-Agonis flexuosa on deeply incised valleys in the hyperhumid zone.	53.67	53.67
Wilyabrup, Ww1	Tall open forest of Eucalyptus diversicolor-Agonis flexuosa-Callistachys lanceolata with some Corymbia calophylla on flats and valleys in the hyperhumid zone.	53.71	53.71

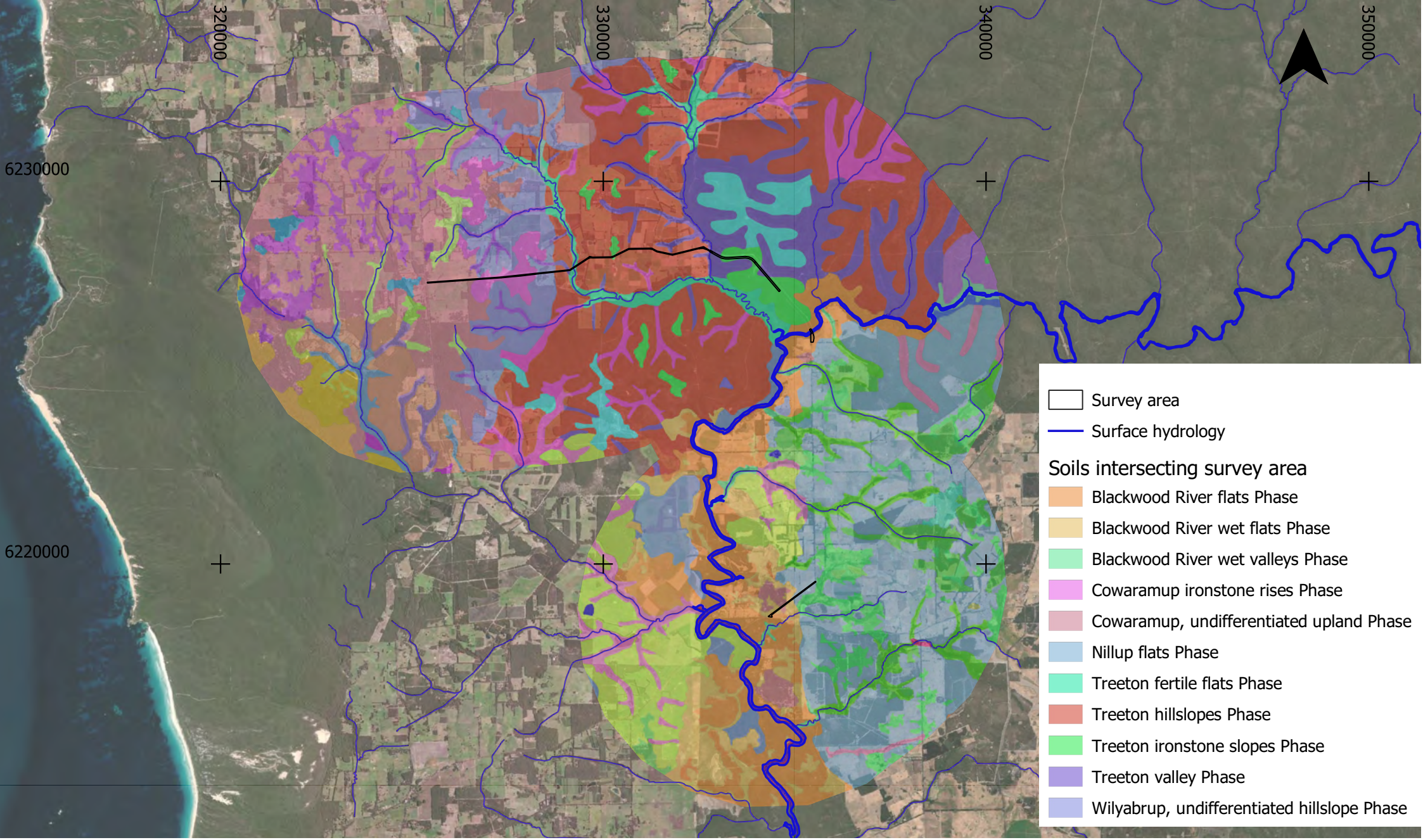

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Figure 4: Soils and hydrography of the survey area

Warner Glen Road Flora and Vegetation Survey

Job: 212205
Date: 21/01/22 Author: MB

Projection: GDA zone 50

Source: Base map © ESRI and its data suppliers (2022). Landgate (2022).

0 2.5 5 km

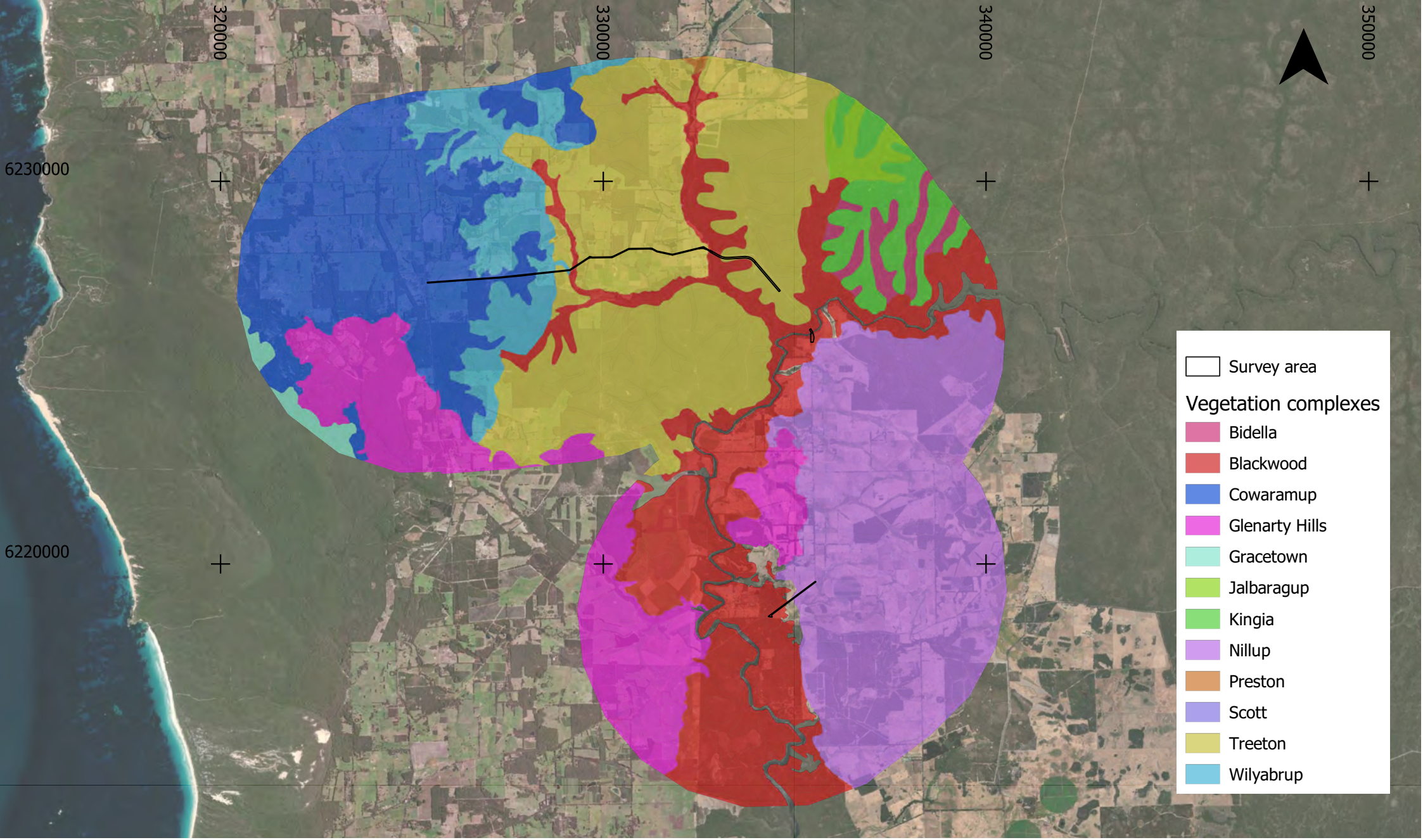

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Figure 5: Vegetation complexes of the study area

Warner Glen Road Flora and Vegetation Survey

Job: 212205
Date: 21/01/22 Author: MB

Projection: GDA zone 50

Source: Base map © ESRI and its data suppliers (2022). Landgate (2022).

0 2.5 5 km

3.7.3 Significant Communities

The desktop survey identified one state listed PEC within the 5km desktop study area (Table 9). The Reedia Swamps – Blackwood Plateau community occurs in floodplains and waterlogged peat slopes on the southern Blackwood Plateau. The community is characterised as being composed of diverse sedges and rushes including *Reedia spathacea* (Threatened), *Empodisma gracillimum* and *Sporadanthus rivularis*.

Table 9: Threatened and Priority Ecological Communities within 5km of the survey area and their likelihood of occurrence

Community	Description	EPBC	State	Likelihood of occurrence within the survey area
Reedia Swamps Blackwood Plateau	Diverse closed sedges and rushes to 1.5 m in height of *Reedia spathacea/Empodisma gracillimum/Sporadanthus rivularis* with open low shrubs to open scrub of *Taxandria linearifolia*	NA	Priority 1	Moderate

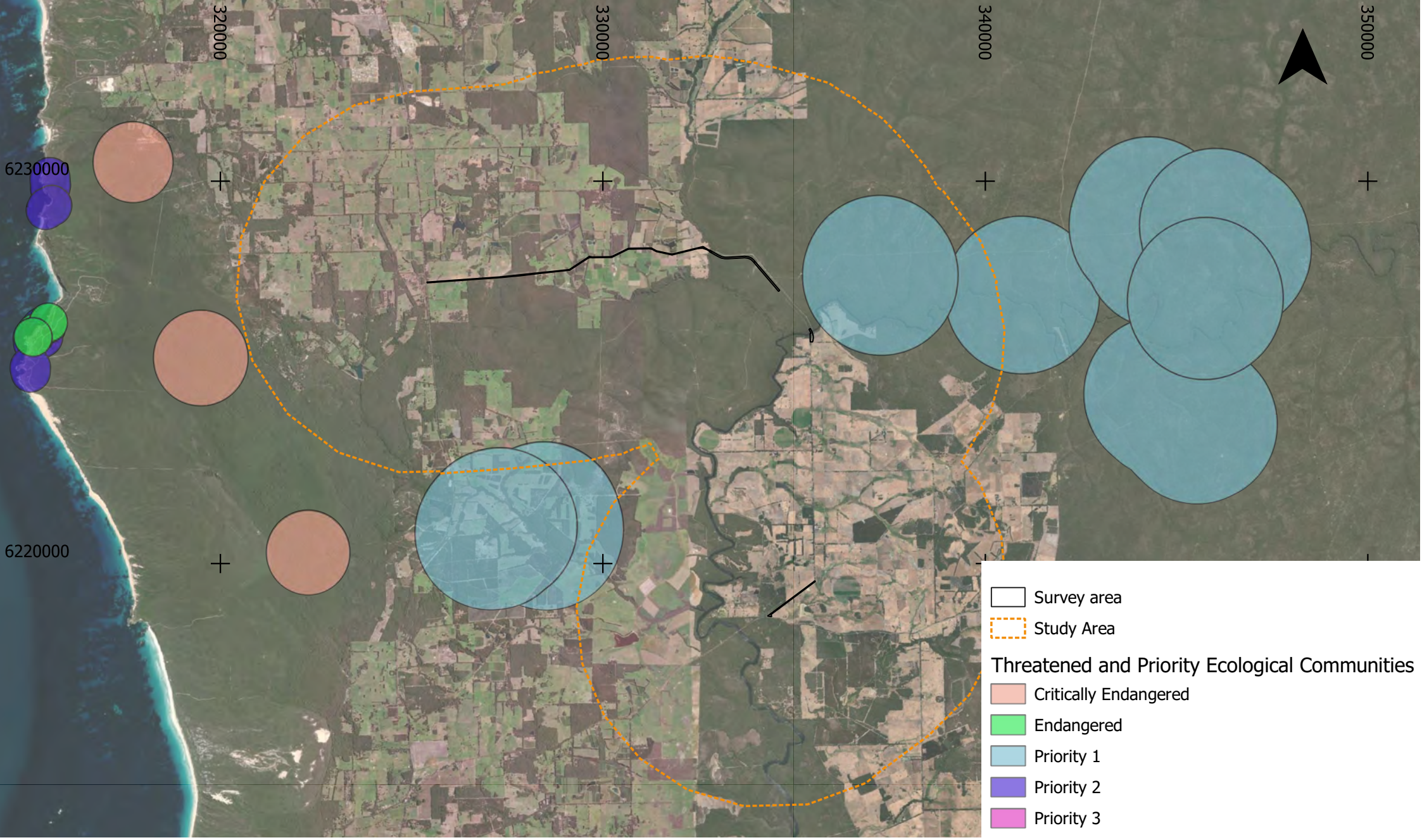

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Figure 6: Threatened and Priority Ecological Communities in the study area

Warner Glen Road Flora and Vegetation Survey

Job: 212205
Date: 21/01/22 Author: MB

Projection: GDA zone 50

Source: Base map © ESRI and its data suppliers (2022). Landgate (2022).

0 2.5 5 km

3.8 Flora

3.8.1 Flora Diversity

The NatureMap database identified 652 flora taxa, representing 92 families previously recorded within 5km of the study area (DBCA 2021a). This total comprised 579 native flora taxa and 73 naturalised (introduced) flora taxa. Dominant families recorded included Fabaceae (87 taxa), Orchidaceae (60 taxa), and Cyperaceae (37 taxa).

The NatureMap database search is provided in Appendix D.

3.8.2 Significant Species

The results of the database searches identified two Threatened flora species and 18 Priority flora species previously recorded or potentially occurring (based on DBCA pers. comm.) within the study area (Figure 7). Based on a review of the soils, landforms and previous vegetation mapping, three species were identified with a high likelihood and 16 with a moderate likelihood (Table 10) of occurring in habitats found within the survey area. Refer to Appendix E for results of the PMST search and Appendix F for the full species list (based on combined database searches) and likelihood assessment.

Table 10: Significant flora within 5km of the survey area with a moderate – high likelihood of occurrence

Species Name	Status (WA)	Status (EPBC)	Description and Habitat	Pre-survey likelihood of occurrence
Acacia inops	3		Weak, scrambling, pungent shrub, 0.4-1.1 m high. Fl. white-cream, Sep to Nov. Black peaty sand, clay. Swamps, creeks.	Moderate
Acacia lateriticola var. Glabrous variant (B.R.Maslin 6765)	3		Erect or spreading, branching or slender, ferny-leaved shrub, 0.4-1.5 m high. Fl. yellow/cream, May to Oct. Lateritic soils. Glabrous variant - hairless.	High
Acacia semitrullata	4		Slender, erect, pungent shrub, (0.1-)0.2-0.7(-1.5) m high. Fl. cream-white, May to Oct. White/grey sand, sometimes over laterite, clay. Sandplains, swampy areas.	Moderate
Acacia tayloriana	4		Prostrate shrub. Fl. cream-white, Jan. Grey or yellow/orange sandy soils, lateritic gravel, clay loam. Winter-wet areas.	Moderate
Actinotus repens	3		Prostrate herb to 5 cm. Scattered ovate leaves with 5-13 teeth. Stalked flower heads. Flowers white. Summer flowering. sandy clay and mud in valleys along creek-lines	Moderate
Boronia exilis	T		Erect perennial herb to 1m. Terminal cluster of bluish pink flowers (September). Staminal filaments strongly ciliate/fringed. Seasonally wet heath. Scott River.	Moderate

Species Name	Status (WA)	Status (EPBC)	Description and Habitat	Pre-survey likelihood of occurrence
Calothamnus lateralis var. *crassus*	3		Shrub to 2.5m. Needle like leaves 50-170mm by 1mm. Flower spike usually cylindrical, deeply embedded in stem. Flower late winter to summer. Winter wet heath.	Moderate
Grevillea papillosa	3		Spreading, sprawling shrub to 1.2m. Linear/narrow hairless leaves entire to 3 lobes spiny tips. Flowers (variable Spring and Autumn) white/yellow and red short spike-like inflorescence. Winter-wet swamps or sedgelands, brown peaty sandy clay, loam. Scott River.	Moderate
Hemigenia sp. Nillup (R.D. Royce 98)	2		Scott River. Limited information	Moderate
Hypolaena robusta	4		Perennial herb to 0.5m. Dioecious. Flowers September to October. White sands, sandplain.	Moderate
Juncus meianthus	3		Tufted perennial, herb, 0.05-0.2 m high, to 0.4 m wide. Fl. brown, Nov to Dec or Jan. Black sand, sandy clay. Creeks, seepage areas.	Moderate
Leptinella drummondii	3		Small creeping herb to 0.15m. Disc like flower (late spring - summer) heads yellow-cream. Clay loam, mud. Along rivers.	Moderate
Lepyrodia heleocharoides	3		Rhizomatous, slender, tufted perennial, herb (sedge-like), 0.15-0.25 m high. Fl. Dec. Moist peaty sand. Dry or seasonally inundated heath or woodland, swamps.	High
Leucopogon wheelerae	3		Sprawling shrub to 0.8m. Leaves 3-8mm by 2.6-7mm. Base cordate/stem clasping. Between the Hardy Inlet, near Augusta, and the Donnelly River. Heath or woodland edge on seasonally wet flats. Flowers August to October.	Moderate
Netrostylis sp. Blackwood River (A.R. Annels 3043)	3		Limited information	Moderate
Pimelea ciliata subsp. *longituba*	3		Erect shrub, 0.3-1 m high. Fl. pink, Oct to Dec. Grey sand over clay, loam	Moderate
Reedia spathacea	T		Robust, tufted perennial, grass-like or herb (sedge), 2-4 m high, clumps 1.5-2 m wide. Fl. brown, Nov to Dec or Jan. Peaty sand. Swamps, river edges.	Moderate
Synaphea macrophylla	1		Decumbent shrub. Gravelly loam Jarrah-Marri forest. Spring flowering.	High

Species Name	Status (WA)	Status (EPBC)	Description and Habitat	Pre-survey likelihood of occurrence
Verticordia lehmannii	4		Slender shrub, 0.2-1 m high. Fl. pink, Jan or Apr to Jun or Aug or Dec. Sandy clay. Winter-wet flats.	Moderate

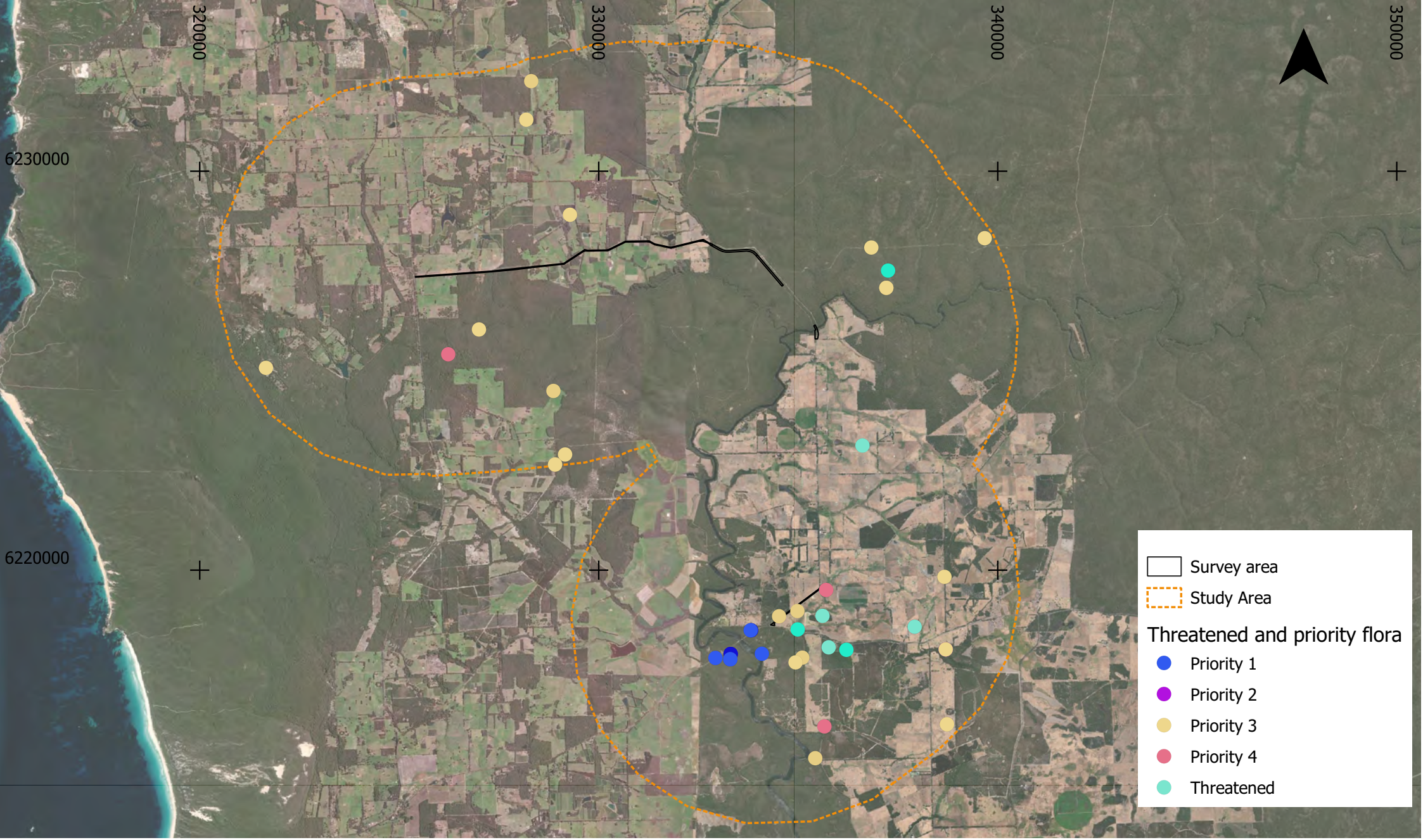

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Figure 7: Previously recorded Threatened and Priority flora in the study area

Warner Glen Road Flora and Vegetation Survey

Job: 212205
Date: 21/01/22 Author: MB

Projection: GDA zone 50

Source: Base map © ESRI and its data suppliers (2022). Landgate (2022).

0 2.5 5 km

3.9 Field Survey Results

3.10 Flora

3.10.1 Flora Diversity

The field survey recorded 169 taxa of vascular plants from 44 families (Appendix G). Twenty one of the 168 taxa are introduced. The most common families by number of taxa were Fabaceae (29 taxa), Cyperaceae (14 taxa) and Myrtaceae (13 taxa). The representation of these families is consistent with the flora of the area and the location in the landscape of the survey area. A Nature Map search of flora records in the study area indicated Fabaceae, Orchidaceae, Cyperaceae and Myrtaceae as the most common species.

3.10.2 Threatened and Priority Flora

One Priority flora species, *Acacia semitrullata* (P4) was recorded during the field survey. No Threatened flora were recorded. Of the remaining 19 species identified as potentially occurring within the survey area, following the field survey, 14 species were considered to have a very low likelihood of occurring and 5 as having a low likelihood of occurring (Appendix F). Further details of the species recorded during the field survey are provided below.

Priority species

Acacia semitrullata was recorded from the Open forest of *Corymbia calophylla* and *Eucalyptus marginata* over sparse shrubland of *Bossiaea linophylla* over shrubland of *Hibbertia hypericoides, Morelotia octandra* and *Macrozamia riedlei* (unit EmCcBl – see Section 3.1.1). Two individuals of the Priority 4 species were recorded at the same location on the edge of the cleared road verge.

Acacia semitrullata is known from 31 populations in the central forest region (where the survey area is located) (Williams *et al.* 2001). The species is commonly found in Jarrah Marri Woodland often adjacent to swamps or low lying areas on sand/ sand over laterite (Williams *et al.* 2001). Florabase has records of the species extending from Forest Grove, east to Nannup and north to approximately Waroona, with an outlier population near Walpole (Western Australian Herbarium 1998).

Other significant species

Flora species may also be considered of significance but not formally listed under legislation or policy if they are:

- Locally endemic or occur associated with a restricted habitat type
- A potentially new species
- Representative of the range of a species (e.g. range extensions, outliers or at the limit of a species range)
- Unusual species including restricted subspecies, varieties or hybrids
- Relictual i.e. representative of a taxonomic group that no longer occur widely in the landscape (EPA 2016a).

No other significant species were recorded during the survey.

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Figure 8: Priority flora recorded in the survey area

Warner Glen Road Flora and Vegetation Survey

Job: 212205
Date: 21/01/22 Author: MB

Survey area
Priority flora location

Projection: GDA zone 50

0 0.75 1.5 km

3.10.3 Weeds

Three of the 21 introduced flora species are listed as Declared pest plants under the *Biosecurity and Agriculture Management Act* 2007, *Asparagus asparagoides* (bridal creeper), *Rubus anglocandicans* (blackberry) and *Zantedeschia aethiopica* (Arum lily). Declared and invasive weeds are mapped in Figure 9.

Numerous weedy grasses and herbs common in an agricultural setting were also recorded. These are considered environmental weeds, in particular, *Watsonia meriana* var. *bulbillifera* which was recorded at numerous locations within the survey area. This species is a potentially invasive weed species. Weedy grasses and herbs occurred predominantly at the edges of intact native vegetation and in previously cleared areas.

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Figure 9: Vegetation condition and weeds within the survey area (Sheet 1 of 6)

Warner Glen Road Flora and Vegetation Survey

Job: 212205
Date: 21/01/22 Author: MB

Projection: GDA zone 50

Source: Base map © ESRI and its data suppliers (2022). Landgate (2022).

0 0.25 0.5 km

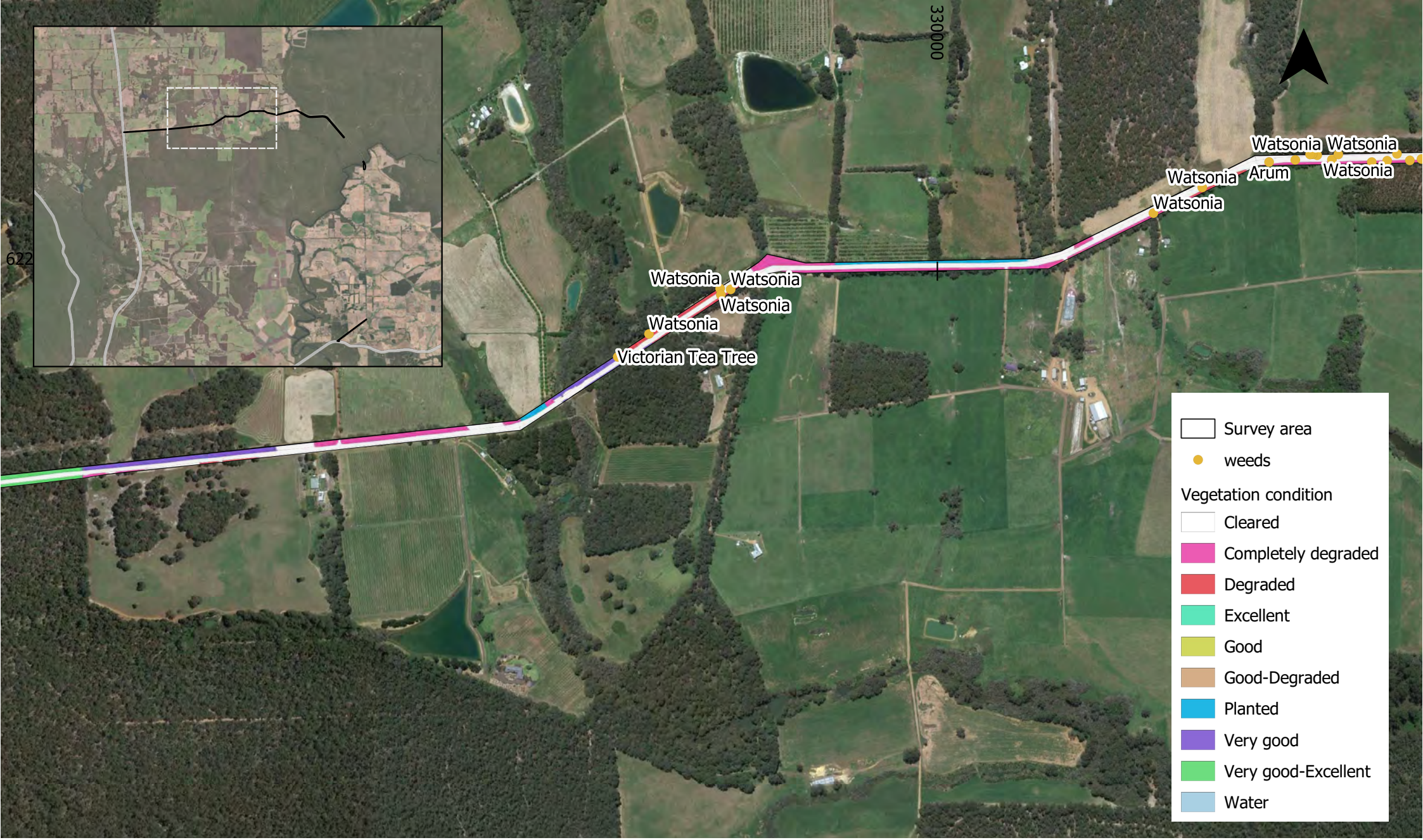

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Figure 9: Vegetation condition and weeds within the survey area (Sheet 2 of 6)

Warner Glen Road Flora and Vegetation Survey

Job: 212205
Date: 21/01/22 Author: MB

Projection: GDA zone 50

0 0.25 0.5 km

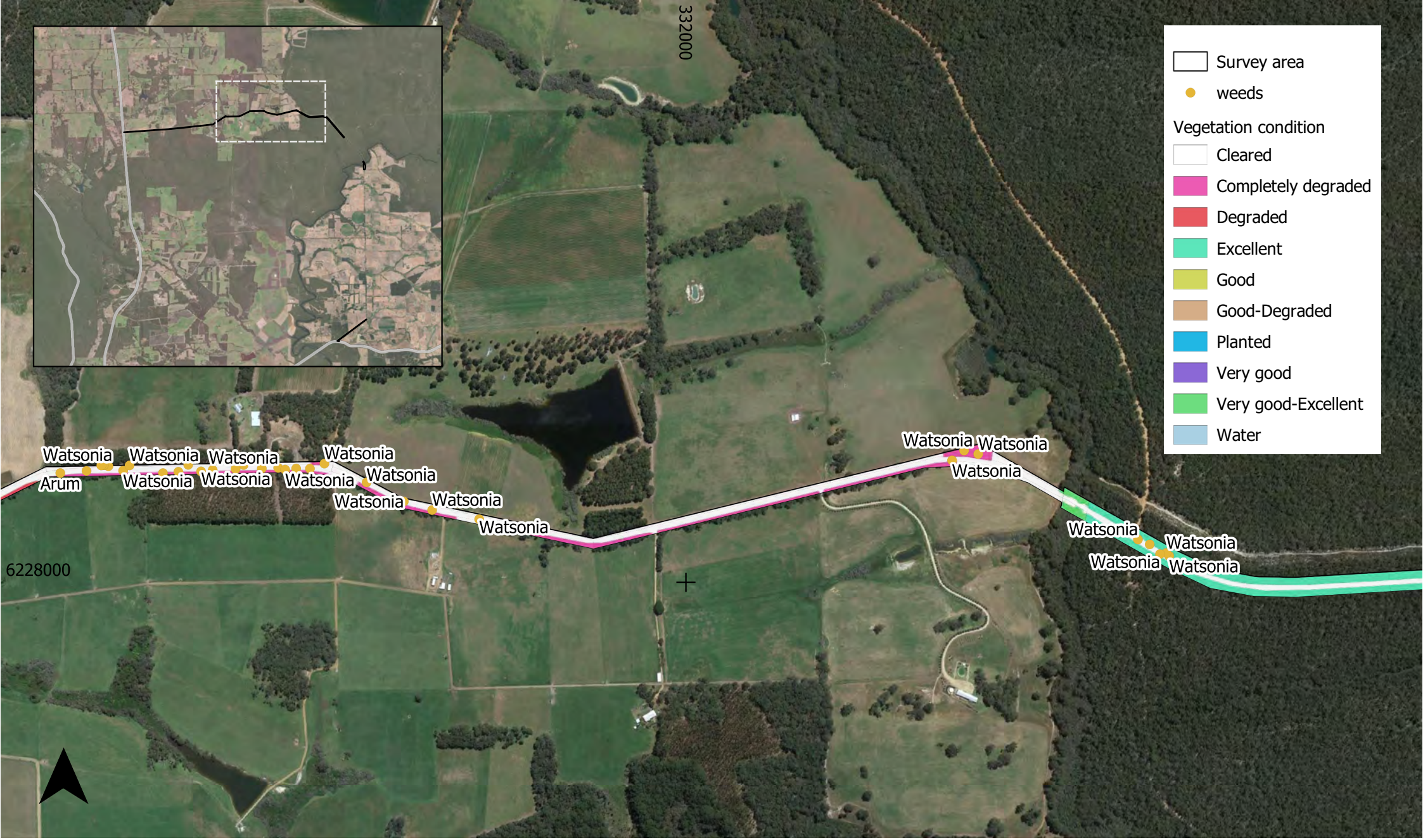

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Figure 9: Vegetation condition and weeds within the survey area (Sheet 3 of 6)

Warner Glen Road Flora and Vegetation Survey

Job: 212205
Date: 21/01/22 Author: MB

Projection: GDA zone 50

Source: Base map © ESRI and its data suppliers (2022). Landgate (2022).

0 0.25 0.5 km

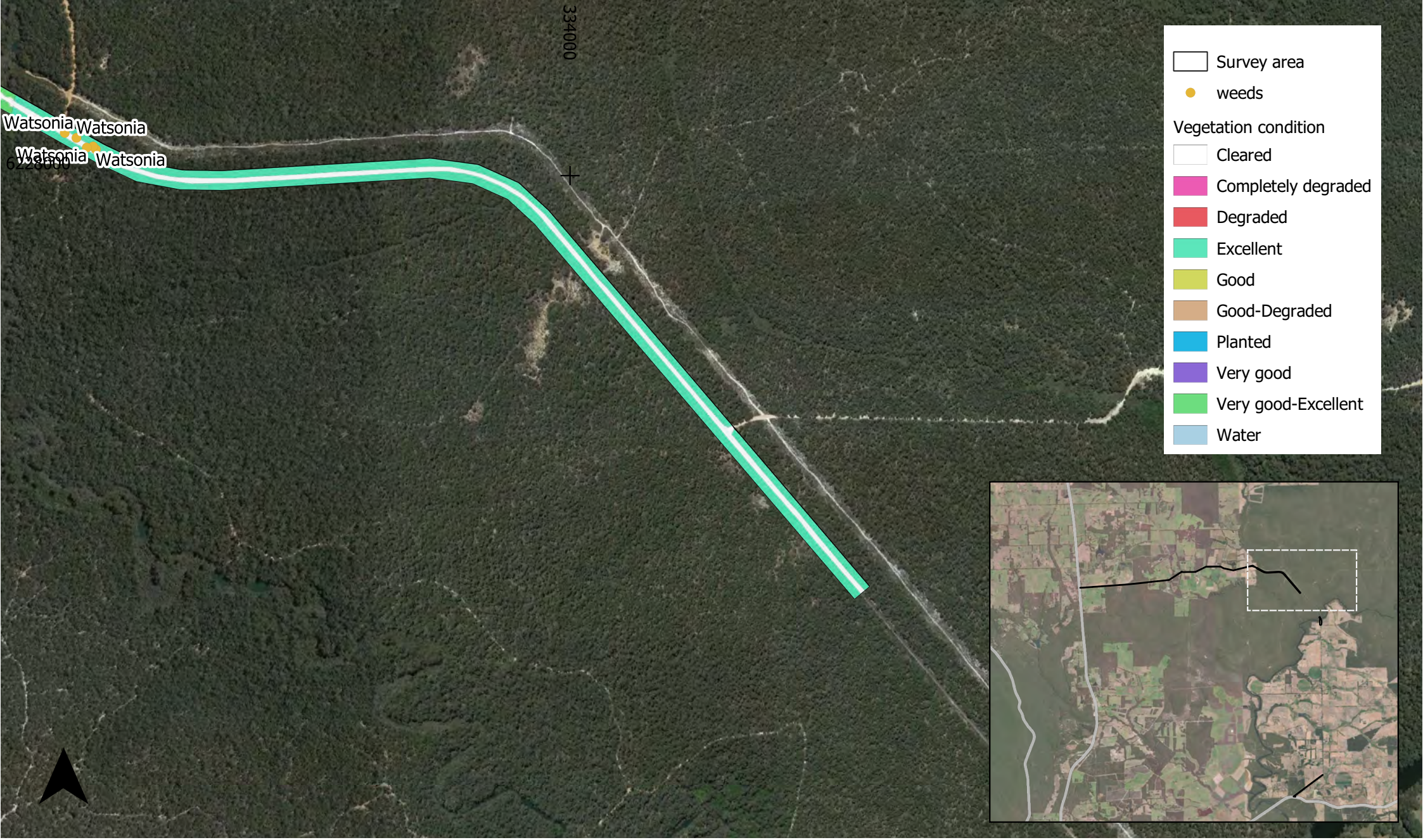

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Figure 9: Vegetation condition and weeds within the survey area (Sheet 4 of 6)

Warner Glen Road Flora and Vegetation Survey

Job: 212205
Date: 21/01/22 Author: MB

Projection: GDA zone 50

Source: Base map © ESRI and its data suppliers (2022). Landgate (2022).

0 0.25 0.5 km

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Figure 9: Vegetation condition and weeds within the survey area (Sheet 5 of 6)

Warner Glen Road Flora and Vegetation Survey

Job: 212205
Date: 21/01/22 Author: MB

Projection: GDA zone 50

Source: Base map © ESRI and its data suppliers (2022). Landgate (2022).

0 0.2 0.4 km

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Figure 9: Vegetation condition and weeds within the survey area (Sheet 6 of 6)

Warner Glen Road Flora and Vegetation Survey

Job: 212205
Date: 21/01/22 Author: MB

Projection: GDA zone 50

Source: Base map © ESRI and its data suppliers (2022). Landgate (2022).

0 0.2 0.4 km

3.11 Vegetation

3.11.1 Vegetation Units

Eleven vegetation units predominantly comprised of native vegetation, were identified within the survey area (Figure 10). In addition, one unit which was predominately cleared with occasional isolated remnant native species and including road and other infrastructure was also mapped, as were areas of planted introduced flora species and areas of open water.

In total, the survey area contains a total of approximately 15.3 ha of native vegetation. Community descriptions (Table 7) are based on the results of relevés surveyed in each, supplemented by opportunistic recording of additional species during targeted searches. Relevé details and representative photos from each unit are provided in Appendix H.

The vegetation units were predominantly Jarrah/Marri forests or woodlands, with some Karri/Marri forest. Two vegetation units were mapped in association with riparian or wetland vegetation including:

- vegetation unit TlMi associated with the Upper Chapman Brook
- and vegetation unit CcAfLe, associated with the Blackwood River.

The vegetation units mapped and described were consistent with broader vegetation associations and vegetation complexes occurring within the survey area.

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Figure 10: Vegetation units within the survey area (Sheet 1 of 6)

Warner Glen Road Flora and Vegetation Survey

Job: 212205
Date: 21/01/22 Author: MB

Projection: GDA zone 50

Source: Base map © ESRI and its data suppliers (2022). Landgate (2022).

0 0.2 0.4 km

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Figure 10: Vegetation units within the survey area (Sheet 2 of 6)

Warner Glen Road Flora and Vegetation Survey

Job: 212205
Date: 21/01/22 Author: MB

Projection: GDA zone 50

0 0.2 0.4 km

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Figure 10: Vegetation units within the survey area (Sheet 3 of 6)

Warner Glen Road Flora and Vegetation Survey

Job: 212205
Date: 21/01/22 Author: MB

Projection: GDA zone 50

0 0.2 0.4 km

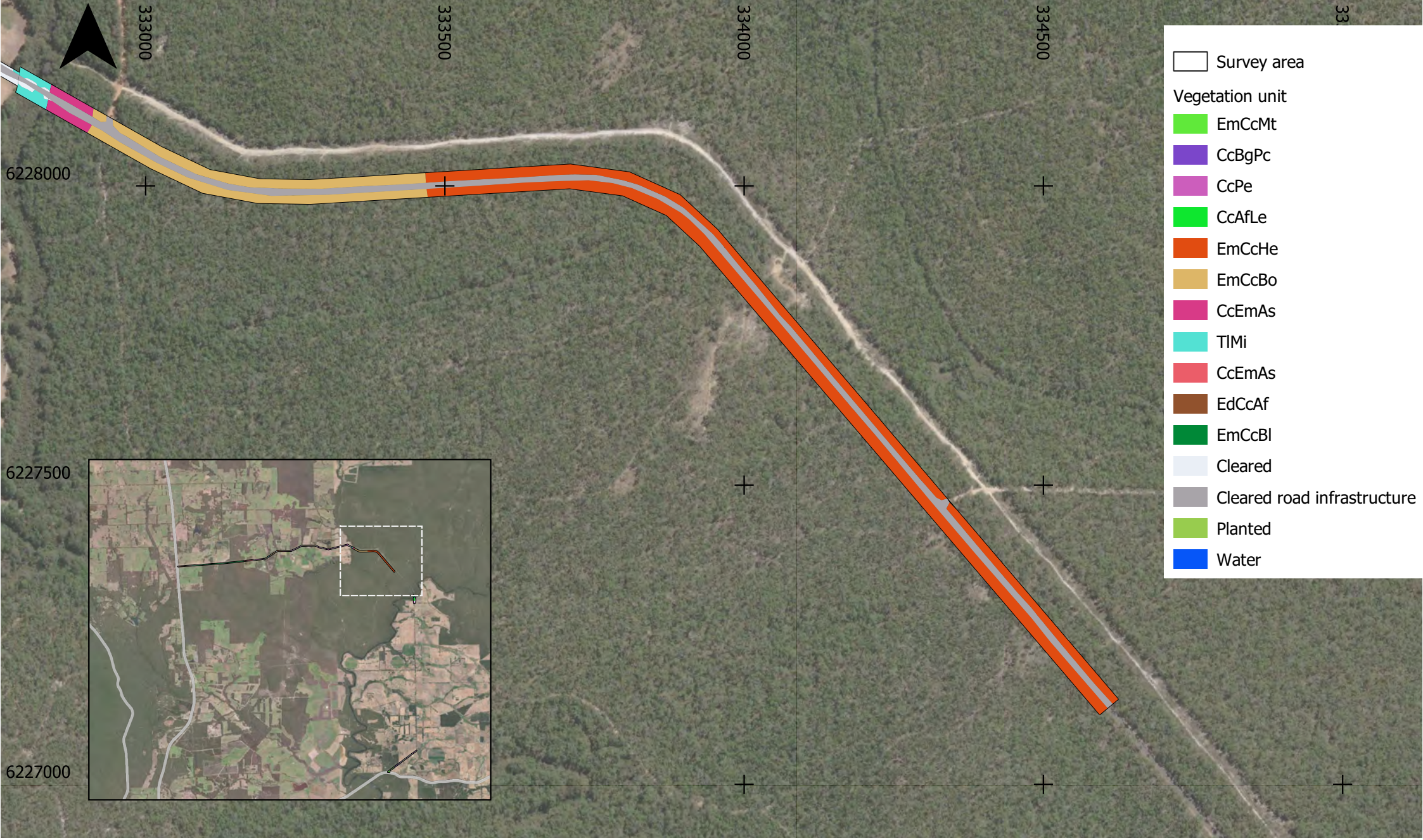

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Figure 10: Vegetation units within the survey area (Sheet 4 of 6)

Warner Glen Road Flora and Vegetation Survey

Job: 212205
Date: 21/01/22 Author: MB

Projection: GDA zone 50

0 0.2 0.4 km

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Figure 10: Vegetation units within the survey area (Sheet 5 of 6)

Warner Glen Road Flora and Vegetation Survey

Job: 212205
Date: 21/01/22 Author: MB

Projection: GDA zone 50

0 0.1 0.2 km

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Figure 10: Vegetation units within the survey area (Sheet 6 of 6)

Warner Glen Road Flora and Vegetation Survey

Job: 212205
Date: 21/01/22 Author: MB

Projection: GDA zone 50

Source: Base map © ESRI and its data suppliers (2022). Landgate (2022).

0 0.1 0.2 km

Table 11: Vegetation units described for the survey area.

Unit Code	Description	Condition	Site Reference	Area (ha)
EdCcAf	Open forest of *Corymbia calophylla, Eucalyptus marginata* and *Eucalyptus diversicolor* over open woodland of *Agonis flexuosa* over sparse shrubland of *Bossiaea linophylla, Podocarpus drouynianus* and *Leucopogon verticillatus* over shrubland of *Patersonia umbrosa* var. *xanthina, Lomandra integra* and *Opercularia hispidula*.	Completely Degraded to Good	Site 01	0.81
EmCcBl	Open forest of *Corymbia calophylla* and *Eucalyptus marginata* over sparse shrubland of *Bossiaea linophylla* over shrubland of *Hibbertia hypericoides, Morelotia octandra* and *Macrozamia riedlei*.	Completely Degraded to Very Good-Excellent	Site 02	2.64
CcEmAs	Open forest of *Corymbia calophylla* and *Eucalyptus marginata* over open shrubland of *Anarthria scabra, Bossiaea linophylla* and *Podocarpus drouynianus* over shrubland of *Hibbertia hypericoides* and *Morelotia octandra*.	Completely Degraded to Very Good-Excellent	Site 03	0.43
CcEmKa	Forest of *Corymbia calophylla* and *Eucalyptus marginat*a over sparse shrubland of *Kingia australis, Hovea elliptica* and *Podocarpus drouynianus* over shrubland of *Lepidosperma ? pubisquameum* and *Pteridium esculentum*.	Very Good to Excellent	Site 04	0.24
TlMi	Shrubland of *Taxandria linearifolia* and *Melaleuca incana* subsp. *incana* over sedgeland *Hypolaena exsulca* and *Leptocarpus coangustatus*.	Completely Degraded to Excellent	Site 05	0.29
EmCcBo	Forest of *Eucalyptus marginata* and *Corymbia calophylla* over sparse shrubland of *Hovea elliptica* over shrubland of *Bossiaea ornata, Hibbertia hypericoides* and *Netrostylis capillaris.*	Completely Degraded to Excellent	Site 06	2.31
EmCcHe	Forest of *Eucalyptus marginata* and *Corymbia calophylla* over sparse shrubland of *Hovea elliptica, Taxandria parviceps* and *Bossiaea linophylla* over shrubland of *Hibbertia hypericoides, Bossiaea ornata* and *Patersonia umbrosa.*	Excellent	Site 07	4.59
CcAfLe	Forest of *Corymbia calophylla* and *Eucalyptus marginata* over open woodland of *Agonis flexuosa* over	Good to Very Good	Site 08	0.93

	shrubland of *Podocarpus drouynianus* and *Lepidosperma effusum*.			
CcPe	Open forest of *Corymbia calophylla* over shrubland of *Pteridium esculentum* (in partially disturbed areas).	Completely Degraded to Very Good	Site 09	2.31
EmCcMt	Woodland of *Eucalyptus marginata* and *Corymbia calophylla* over *Mirbelia dilatata, Xanthorrhoea preissii* and *Logania vaginalis* over shrubland of *Mesomelaena tetragona* and Hibbertia hypericoides.	Completely Degraded to Very Good	Site 10	0.49
CcBgPd	Open forest of *Corymbia calophylla* and *Eucalyptus marginata* over open woodland of *Banksia grandis* over open shrubland of *Podocarpus drouynianus, Bossiaea linophylla* and *Taxandria parviceps* over sedgeland/shrubland of *Phlebocarya ciliata, Hibbertia hypericoides* and *Anarthria prolifera*.	Completely Degraded to Very Good-Excellent	Site 11	0.27
Planted	Planted introduced species	NA	NA	0.29
Cleared	Cleared or predominantly cleared, including road and other infrastructure	NA	NA	14.93
Water	Open water	NA	NA	0.14

3.11.2 Vegetation Condition

The condition of vegetation was mapped during the field survey and included areas classed as Completely Degraded to Excellent (Figure 9, Table 8). Vegetation condition was variable within vegetation communities and reflective of land use in adjoining areas. That is, the native vegetation condition was generally poor in sections of the survey area that adjoin cleared agricultural land

By area, approximately 15.4 ha of the survey area was mapped as cleared, planted or water and native vegetation condition was not assigned. The remaining 15.3 ha was mapped as native vegetation and included approximately 6.5 ha of excellent condition. Approximately 3.3 ha was mapped as degraded or completely degraded.

Table 12: Vegetation condition within the survey area

Condition	**Area (ha)**
Excellent	6.50
Very Good - Excellent	1.76
Very Good	1.68
Good	1.52

Good - Degraded	0.53
Degraded	0.37
Completely Degraded	2.93
Other (cleared, planted and open water areas)	15.36
Total	30.65

3.11.3 Significance of Vegetation Units

The conservation significance of the vegetation units was assessed against the potentially occurring PEC (identified in the desktop analysis) using the detailed description of the PEC. None of the vegetation units described are consistent with the description of the Reedia Swamps PEC. Vegetation unit TlMi occurs in a similar position in the landscape but does not contain key dominant species (eg. *Reedia spathacea*).

4 Discussion and Conclusions

The flora and vegetation survey of Warner Glen Road survey area found that native vegetation covered approximately half of the survey area. The native vegetation within the survey area ranged in condition from Excellent to Completely Degraded, with the best condition vegetation generally occurring where the survey area passed through State Forest or other areas of intact native vegetation.

Eleven native vegetation units were mapped and described within the survey area. Areas of native vegetation were predominantly Jarrah/Marri forests and woodlands (nine of the eleven vegetation units) with differing understorey composition. One vegetation unit with Karri (*Eucalyptus diversicolor*) present as a dominant overstorey was also recorded and one *Taxandria linearifolia* dominated shrubland was mapped and described associated with a tributary of the Chapman Brook. The vegetation units mapped and described are consistent with the vegetation complexes mapped for the area and consistent with vegetation expected for the soils, geomorphology and location. No threatened or priority ecological communities were recorded.

The *Taxandria linearifolia* shrubland (vegetation unit TlMi) is a wetland/riparian vegetation unit and there is a narrow riparian strip associated with the Blackwood River, mapped as part of vegetation unit CcAfLe. Both of these units have a somewhat restricted distribution in the landscape. Impacts to these units, in particular, should be minimised during proposed works.

The flora species recorded, and families represented were generally consistent with those expected for the area. One priority flora species, *Acacia semitrullata* (P4) was recorded within the survey area. Two individuals of the priority 4 species were recorded from one location within the survey area. The record is close to the south western limit of the species distribution with other records from Forest Grove and east to Nannup. There is also a record from the south coast, near Walpole (Western Australian Herbarium 1998). No other species of significance (formally listed or of other significance) were recorded during the survey.

Three Declared pest plants under the *Biosecurity and Agriculture Management Act* 2007, *Asparagus asparagoides* (bridal creeper), *Rubus anglocandicans* (blackberry) and *Zantedeschia aethiopica* (Arum lily) were recorded during the field survey. All three species are relatively common in the local area and their record is not unusual, particularly in native vegetation adjacent to previously cleared areas. The remaining introduced species are considered environmental weeds and reflective of adjoining land use for agriculture

To minimise the spread of weeds during proposed road works the following controls (or similar) are recommended:

- Demarcate the location of weeds, in particular Declared Plants, prior to commencement of construction
- Ensure machinery is cleaned down when moving from weed infested areas to weed free areas to minimise the chance of movement of propagules
- Implement appropriate monitoring of weed populations (in particular declared plant species) following completion of the works and implement appropriate controls (eg. spraying) if spread of weeds into previously un-infested areas is observed through monitoring.

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Appendix A: Categories and definitions for Threatened and Priority ecological communities

State Threatened and Priority Ecological Community Categories

Category	Description
Threatened	
Presumed totally Destroyed (PD)	An ecological community that has been adequately searched for but for which no representative occurrences have been located.
Critically Endangered (CR)	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.
Endangered (EN)	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 riskof total destruction in the near future.
Vulnerable (VU)	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 (within approximately 50 years) to long-term future.
Priority	
Priority 1 (P1) – Poorly known	Ecological communities that are known from very few occurrences with a very restricted distribution (generally ≤5 occurrences or a total area of ≤100ha). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist.
Priority 2 (P2) – Poorly known	Communities that are known from few occurrences with a restricted distribution (generally ≤10 occurrences or a total area of ≤200ha). At least some occurrences are not believed to be under immediate threat (within approximately 10 years) of destruction or degradation.
Priority 3 (P3) – Poorly known	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: known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat(within approximately 10 years), or; made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range
Priority 4 (P4) – Adequately known	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.
Priority 5 (P5) – Conservation dependent	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.

EPBC Act conservation categories for threatened ecological communities

Category	Description
Critically Endangered (CR)	An ecological community that is facing an extremely high risk of extinction in the wild in the immediate future (indicative timeframe being the next 10 years)
Endangered (EN)	An ecological community that is not critically endangered but is facing a very high risk of extinction in the wild in the near future (indicative timeframe being the next 20 years).
Vulnerable (VU)	an ecological community is not critically endangered or endangered, but is facing a high risk of extinction in the wild in the medium–term future (indicative timeframe being the next 50 years).

Appendix B: Categories and definitions for Threatened and Priority flora species

CONSERVATION CODES FOR WESTERN AUSTRALIAN FLORA

T: Threatened Flora - Specially protected under the BC Act, listed under Schedules 1, 2 and 3 of the Wildlife Conservation (Rare Flora) Notice 2018 (which may also be referred to as Declared Rare Flora). Taxa which have been adequately searched for and are deemed to be, in the wild, either rare, at risk of extinction, or otherwise in need of special protection, and have been gazetted as such. The assessment of the conservation status of these species is based on their national extent. Ranking: CR · Schedule 1 - taxa that are extant and considered likely to become extinct or rare, as critically endangered flora, and therefore in need of special protection. EN · Schedule 2 - taxa that are extant and considered likely to become extinct or rare, as endangered flora, and therefore in need of special protection. VU · Schedule 3 - taxa that are extant and considered likely to become extinct or rare, as vulnerable flora, and therefore in need of special protection.
EX: Presumed extinct Flora - Specially protected under the BC Act, listed under Schedule 4 of the Wildlife Conservation (Rare Flora) Notice (which may also be referred to as Declared Rare Flora). Taxa which have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such. Threatened flora are ranked according to their level of threat using IUCN Red List categories and criteria. EX · Schedule 4 - taxa that are presumed to be extinct in the wild and therefore in need of special protection.
Priority Flora
Taxa that may be threatened or near threatened, but are data deficient or have not yet been adequately surveyed to be listed under the Wildlife Conservation (Rare Flora) Notice, are added to the Priority Flora List under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status, so that consideration can be given to their declaration as threatened flora. Taxa 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 for other than taxonomic reasons, are placed in Priority 4. These taxa require regular monitoring.
1: Priority One: 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 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 Two: 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, 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 Three: Poorly-known species
Species that are known from several locations, and the species do 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 Four: 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 do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.
(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

EPBC Act conservation categories (follow IUCN Red List categories)

Category	**Description**
Extinct (EX)	A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual.
Extinct in the wild (EW)	A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual.
Critically Endangered (CR)	A taxon is Critically Endangered when the best available evidence indicates that it is considered to be (according to specified criteria) facing an extremely high risk of extinction in the wild.
Endangered (EN)	A taxon is Endangered when it is considered (according to specified criteria) to be facing a very high risk of extinction in the wild.
Vulnerable (VU)	A taxon is Vulnerable when the best available evidence indicates that it is considered (according to specified criteria) to be facing a high risk of extinction in the wild.
Conservation dependent (CD)	A taxon is conservation dependent if, at a particular time, it is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered.

Appendix C: Vegetation Structural Classification (NVIS 1990) and Vegetation Condition Ranking (EPA 2016a)

Table 2: Vegetation Condition Scale (adapted from Keighery 1994 and Trudgen 1988)

Vegetation Condition	South West and Interzone Botanical Provinces	Eremaean and Northern Botanical Provinces
Pristine	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.	
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
Very Good	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
Good	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.
Poor		Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
Degraded	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.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees and shrubs.	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.

Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment

Table 1: The NVIS Information Hierarchy.

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

* Walker & Hopkins (2016a)
** 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	**CLASS**	-	1 dominant growth form for the dominant stratum	-	-
	Example	*Tree*			
II	**STRUCTURAL FORMATION**	-	1 dominant growth form for the dominant stratum	1 cover class for the dominant stratum	1 height class for the dominant stratum
	Example	*Open woodland*			
III	**BROAD FLORISTIC FORMATION**	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	*Eucalyptus open woodland*			
IV	**SUB-FORMATION**	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	*+Eucalyptus open woodland\^Acacia tall sparse shrubland\^Aristida open tussock grassland*			
V	**ASSOCIATION**	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	*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*			
VI	**SUB-ASSOCIATION**	Up to 5 dominant species for each sub-stratum (i.e. for U1, U2, U3, M1, M2, M3, G1, G2 where present) • Indicate characteristic genus in each sub-stratum with an up arrow or hat "^". Must match characteristic growth form.	Up to 5 dominant growth forms for each sub-stratum. • Indicate characteristic growth form with an up arrow or hat "^". Must match characteristic genus	1 cover class code for each sub-stratum	1 height class code for each sub-stratum
	Example	*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*			

Appendix D: DBCA Naturemap database search results

NatureMap
Mapping Western Australia's biodiversity

NatureMap Species Report

Created By Mike Braimbridge on 23/11/2021

Kingdom Plantae
Current Names Only Yes
Core Datasets Only Yes
Method 'By Rectangle'
Extent 115° 04' 27" E, 115° 17' 18" E, 34° 10' 14" S, 33° 58' 42" S
Group By Family

Family	Species	Records
Alliaceae	1	1
Amaranthaceae	1	1
Amaryllidaceae	1	1
Anarthriaceae	2	10
Apiaceae	13	38
Apocynaceae	1	1
Araceae	1	1
Araliaceae	4	6
Asparagaceae	17	45
Asteraceae	20	29
Brassicaceae	1	1
Bryaceae	3	4
Campanulaceae	5	9
Casuarinaceae	1	1
Celastraceae	2	4
Centrolepidaceae	3	8
Cephaloziellaceae	2	2
Chenopodiaceae	1	1
Codiaceae	2	2
Colchicaceae	2	4
Corallinaceae	1	1
Cyperaceae	37	108
Dasypogonaceae	4	8
Dennstaedtiaceae	2	3
Dicranaceae	2	6
Dilleniaceae	14	36
Droseraceae	11	26
Elaeocarpaceae	4	10
Ericaceae	28	80
Euphorbiaceae	5	16
Fabaceae	87	230
Fissidentaceae	1	1
Funariaceae	1	1
Galaxauraceae	1	2
Gentianaceae	1	1
Geraniaceae	1	1
Goodeniaceae	15	39
Haemodoraceae	11	31
Halimedaceae	1	1
Haloragaceae	8	9
Hemerocallidaceae	5	12
Hypericaceae	1	2
Iridaceae	12	16
Juncaceae	7	19
Juncaginaceae	1	1
Lamiaceae	4	8
Lauraceae	5	12
Lentibulariaceae	4	7
Linaceae	1	1
Lindsaeaceae	1	1
Loganiaceae	5	17
Lophocoleaceae	1	1
Lycopodiaceae	1	1
Lythraceae	1	1
Malvaceae	5	16
Menyanthaceae	4	13
Myrtaceae	35	65
Olacaceae	1	1
Onagraceae	3	3
Orchidaceae	60	117
Orthotrichaceae	1	2
Oxalidaceae	4	4
Papaveraceae	2	3
Passifloraceae	1	1
Phyllanthaceae	1	3
Pittosporaceae	5	12
Plantaginaceae	4	5
Poaceae	21	32
Podocarpaceae	1	3
Polygalaceae	5	11
Polygonaceae	1	2
Pottiaceae	1	4
Proteaceae	34	83
Racopilaceae	1	4
Ranunculaceae	2	3
Restionaceae	23	99
Rhamnaceae	4	8

Rosaceae	1	6
Rubiaceae	4	8
Rutaceae	11	30
Santalaceae	3	10
Sapindaceae	1	1
Scrophulariaceae	2	2
Sematophyllaceae	1	3
Solanaceae	1	1
Stylidiaceae	21	48
Thuidiaceae	1	1
Thymelaeaceae	8	24
Violaceae	2	3
Xanthorrhoeaceae	4	5
Xyridaceae	5	19
Zamiaceae	1	2
TOTAL	**652**	**1535**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Alliaceae					
1.	1379	*Allium vineale (Crow Garlic)*	Y		
Amaranthaceae					
2.	2648	*Alternanthera denticulata (Lesser Joyweed)*			
Amaryllidaceae					
3.	1489	*Amaryllis belladonna (Belladonna Lily)*	Y		
Anarthriaceae					
4.	1062	*Anarthria prolifera*			
5.	1063	*Anarthria scabra*			
Apiaceae					
6.	6203	*Actinotus glomeratus*			
7.	12958	*Actinotus laxus*			
8.	6206	*Actinotus omnifertilis*			
9.	44007	*Actinotus repens*		P3	
10.	6218	*Daucus glochidiatus (Australian Carrot)*			
11.	6245	*Pentapeltis peltigera*			
12.	6253	*Platysace filiformis*			
13.	6259	*Platysace tenuissima*			
14.	6263	*Schoenolaena juncea*			
15.	6283	*Xanthosia atkinsoniana*			
16.	6284	*Xanthosia candida*			
17.	6289	*Xanthosia huegelii*			
18.	19330	*Xanthosia tasmanica*			
Apocynaceae					
19.	6575	*Vinca major (Blue Periwinkle)*	Y		
Araceae					
20.	1049	*Zantedeschia aethiopica (Arum Lily)*	Y		
Araliaceae					
21.	6226	*Hydrocotyle callicarpa (Small Pennywort)*			
22.	6229	*Hydrocotyle diantha*			
23.	19041	*Trachymene coerulea subsp. coerulea*			
24.	6280	*Trachymene pilosa (Native Parsnip)*			
Asparagaceae					
25.	1223	*Lomandra caespitosa (Tufted Mat Rush)*			
26.	1225	*Lomandra drummondii*			
27.	1229	*Lomandra integra*			
28.	1234	*Lomandra nigricans*			
29.	1238	*Lomandra pauciflora*			
30.	1240	*Lomandra purpurea (Purple Mat Rush)*			
31.	1243	*Lomandra sericea (Silky Mat Rush)*			
32.	1244	*Lomandra sonderi*			
33.		*Lomandra sp.*			
34.	1246	*Lomandra suaveolens*			
35.	1328	*Thysanotus dichotomus (Branching Fringe Lily)*			
36.	1335	*Thysanotus gracilis*			
37.	1338	*Thysanotus manglesianus (Fringed Lily)*			
38.	1339	*Thysanotus multiflorus (Many-flowered Fringe Lily)*			
39.	1343	*Thysanotus patersonii*			
40.	1351	*Thysanotus sparteus*			
41.	1358	*Thysanotus triandrus*			
Asteraceae					
42.	7838	*Arctotheca calendula (Cape Weed, African Marigold)*	Y		
43.	7941	*Conyza parva*	Y		
44.	20074	*Conyza sumatrensis*	Y		
45.	7945	*Cotula coronopifolia (Waterbuttons)*	Y		
46.	7947	*Cotula turbinata (Funnel Weed)*	Y		
47.	46134	*Glebionis segetum*	Y		
48.	18585	*Lagenophora huegelii*			
49.	8099	*Leontodon saxatilis (Hairy Hawkbit)*	Y		
50.	8100	*Leptinella drummondii*		P3	
51.	8133	*Olearia elaeophila*			
52.	8143	*Olearia paucidentata (Autumn Scrub Daisy)*			
53.	8149	*Olearia rudis (Rough Daisybush)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
54.	42281	*Pithocarpa cordata*			
55.	42260	*Pithocarpa ramosa*			
56.	13300	*Rhodanthe citrina*			
57.	8204	*Senecio elegans (Purple Groundsel)*	Y		
58.	20663	*Senecio multicaulis subsp. multicaulis*			
59.	8218	*Senecio ramosissimus (Auricled Groundsel)*			
60.	8224	*Siloxerus filifolius*			
61.	8251	*Trichocline spathulata (Native Gerbera)*			
Brassicaceae					
62.	19989	*Lepidium didymum*	Y		
Bryaceae					
63.	32424	*Rosulabryum albolimbatum*			
64.	44608	*Rosulabryum billarderii*			
65.	32426	*Rosulabryum campylothecium*			
Campanulaceae					
66.	7396	*Isotoma hypocrateriformis (Woodbridge Poison)*			
67.	9289	*Lobelia anceps (Angled Lobelia)*			
68.	7402	*Lobelia gibbosa (Tall Lobelia)*			
69.	7406	*Lobelia rhombifolia (Tufted Lobelia)*			
70.	7389	*Wahlenbergia preissii*			
Casuarinaceae					
71.	1728	*Allocasuarina fraseriana (Sheoak, Kondil)*			
Celastraceae					
72.	4733	*Stackhousia monogyna*			
73.	4737	*Tripterococcus brunonis (Winged Stackhousia)*			
Centrolepidaceae					
74.	1117	*Aphelia cyperoides*			
75.	1121	*Centrolepis aristata (Pointed Centrolepis)*			
76.	1128	*Centrolepis fascicularis*			
Cephaloziellaceae					
77.		*Cephaloziella hirta*			
78.		*Cephaloziella varians*			
Chenopodiaceae					
79.	33480	*Dysphania pumilio (Clammy Goosefoot)*			
Codiaceae					
80.	26672	*Codium galeatum*			
81.	26683	*Codium spongiosum*			
Colchicaceae					
82.	12770	*Burchardia congesta*			
83.	12072	*Wurmbea dioica subsp. alba*			
Corallinaceae					
84.	27070	*Metamastophora flabellata*			
Cyperaceae					
85.	739	*Baumea acuta (Pale Twig-rush)*			
86.	19943	*Baumea sp. Blackwood (R. Davis 7681)*			
87.	748	*Baumea vaginalis (Sheath Twigrush)*			
88.	43241	*Carex thecata*			
89.	762	*Chorizandra cymbaria (Heron Bristle Rush)*			
90.	763	*Chorizandra enodis (Black Bristlerush)*			
91.	768	*Cyathochaeta avenacea*			
92.	17618	*Cyathochaeta equitans*			
93.	16245	*Cyathochaeta teretifolia*		P3	
94.	783	*Cyperus congestus (Dense Flat-sedge)*	Y		
95.	815	*Cyperus tenellus (Tiny Flatsedge)*	Y		
96.	834	*Evandra aristata*			
97.	902	*Gahnia decomposita*			
98.	908	*Gymnoschoenus anceps*			
99.	912	*Isolepis cyperoides*			
100.	10831	*Isolepis prolifera (Budding Club-rush)*	Y		
101.	42742	*Lepidosperma calcicola*			
102.	932	*Lepidosperma effusum (Spreading Sword-sedge)*			
103.	936	*Lepidosperma leptostachyum*			
104.	937	*Lepidosperma longitudinale (Pithy Sword-sedge)*			
105.	940	*Lepidosperma pubisquameum*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
106.	20398	*Lepidosperma sp. Blackwood (R. Davis 7696)*			
107.	945	*Lepidosperma squamatum*			
108.	946	*Lepidosperma striatum*			
109.	948	*Lepidosperma tetraquetrum*			
110.	953	*Mesomelaena graciliceps*			
111.	957	*Mesomelaena tetragona (Semaphore Sedge)*			
112.	958	*Reedia spathacea*		T	
113.	48356	*Schoenoplectus tabernaemontani*			
114.	985	*Schoenus discifer*			
115.	986	*Schoenus efoliatus*			
116.	992	*Schoenus grandiflorus (Large Flowered Bogrush)*			
117.	1020	*Schoenus sublateralis*			
118.	1036	*Tetraria octandra*			
119.	35578	*Tetraria sp. Blackwood River (A.R. Annels 3043)*		P3	
120.	35579	*Tetraria sp. Jarrah Forest (R. Davis 7391)*			
121.	33282	*Tetraria sp. Nannup (P.A. Jurjevich 1133)*		P1	
Dasypogonaceae					
122.	1212	*Baxteria australis*			
123.	1218	*Dasypogon bromeliifolius (Pineapple Bush)*			
124.	1219	*Dasypogon hookeri (Pineapple Bush)*			
125.	1221	*Kingia australis (Kingia, Pulonok)*			
Dennstaedtiaceae					
126.	13758	*Histiopteris incisa*			
127.	41651	*Pteridium esculentum subsp. esculentum*			
Dicranaceae					
128.	32337	*Campylopus flindersii*			
129.	32338	*Campylopus introflexus*	Y		
Dilleniaceae					
130.	5109	*Hibbertia amplexicaulis*			
131.	5114	*Hibbertia commutata*			
132.	5117	*Hibbertia cuneiformis (Cutleaf Hibbertia)*			
133.	5118	*Hibbertia cunninghamii*			
134.	20051	*Hibbertia diamesogenos*			
135.	5125	*Hibbertia ferruginea*			
136.	5132	*Hibbertia grossulariifolia*			
137.	45534	*Hibbertia hypericoides subsp. hypericoides*			
138.	5137	*Hibbertia inconspicua*			
139.	19687	*Hibbertia notibractea*			
140.	5154	*Hibbertia perfoliata*			
141.	5155	*Hibbertia pilosa (Hairy Guinea Flower)*			
142.	5162	*Hibbertia racemosa (Stalked Guinea Flower)*			
143.	5169	*Hibbertia serrata (Serrate Leaved Guinea Flower)*			
Droseraceae					
144.	48751	*Drosera drummondii*			
145.	13200	*Drosera enodes*			
146.	3095	*Drosera erythrorhiza (Red Ink Sundew)*			
147.	3100	*Drosera hamiltonii (Rosy Sundew)*			
148.	3111	*Drosera modesta (Modest Rainbow)*			
149.	3112	*Drosera myriantha (Star Rainbow)*			
150.	3118	*Drosera pallida (Pale Rainbow)*			
151.	3124	*Drosera pulchella (Pretty Sundew)*			
152.		*Drosera sp.*			
153.	3131	*Drosera stolonifera (Leafy Sundew)*			
154.	8914	*Drosera sulphurea (Sulphur-flowered Sundew)*			
Elaeocarpaceae					
155.	4533	*Tetratheca filiformis*			
156.	4544	*Tetratheca setigera*			
157.	4547	*Tremandra diffusa*			
158.	4548	*Tremandra stelligera*			
Ericaceae					
159.	6306	*Andersonia caerulea (Foxtails)*			
160.	25844	*Andersonia caerulea subsp. caerulea*			
161.	6317	*Andersonia micrantha*			
162.	6321	*Andersonia sprengelioides*			
163.	6323	*Astroloma ciliatum (Candle Cranberry)*			
164.	6325	*Astroloma drummondii*			
165.	6331	*Astroloma microcalyx (Native Cranberry)*			

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166.	6334	*Astroloma pallidum (Kick Bush)*			
167.	6348	*Conostephium pendulum (Pearl Flower)*			
168.	6352	*Cosmelia rubra (Spindle Heath)*			
169.	6360	*Leucopogon australis (Spiked Beard-heath)*			
170.	6367	*Leucopogon capitellatus*			
171.	6402	*Leucopogon hirsutus*			
172.	33380	*Leucopogon interstans*			
173.	40941	*Leucopogon obovatus subsp. revolutus*			
174.	6428	*Leucopogon pendulus*			
175.	6436	*Leucopogon propinquus*			
176.	6440	*Leucopogon racemulosus*			
177.	6441	*Leucopogon reflexus (Heart-leaf Beard-heath)*			
178.	19662	*Leucopogon sp. Margaret River (J. Scott 207)*			
179.	34718	*Leucopogon sp. Southern Forests (B.G. Hammersley 1000)*			
180.	6454	*Leucopogon verticillatus (Tassel Flower)*			
181.	33397	*Leucopogon wheelerae*		P3	
182.	6457	*Lysinema conspicuum*			
183.	34736	*Lysinema pentapetalum*			
184.	31931	*Sphenotoma capitata*			
185.	31952	*Sphenotoma gracilis (Swamp Paper-heath)*			
186.	49143	*Styphelia sp. Nannup (R.D. Royce 3978)*			
Euphorbiaceae					
187.	4585	*Amperea ericoides*			
188.	4587	*Amperea protensa*			
189.	13101	*Amperea simulans*			
190.	9051	*Homalanthus novo-guineensis*			
191.	4695	*Ricinocarpos glaucus*			
Fabaceae					
192.	15429	*Acacia alata var. alata*			
193.	11731	*Acacia browniana var. browniana*			
194.	11377	*Acacia browniana var. obscura*			
195.	3307	*Acacia divergens*			
196.	3331	*Acacia extensa (Wiry Wattle)*			
197.	3347	*Acacia gilbertii*			
198.	3386	*Acacia inops*		P3	
199.	3410	*Acacia lateriticola*			
200.	3448	*Acacia mooreana*			
201.	3453	*Acacia myrtifolia*			
202.	3464	*Acacia obovata*			
203.	3502	*Acacia pulchella (Prickly Moses)*			
204.	15483	*Acacia pulchella var. pulchella*			
205.	3530	*Acacia scalpelliformis*			
206.	3537	*Acacia semitrullata*		P4	
207.	3567	*Acacia subracemosa*			
208.	3571	*Acacia tayloriana*		P4	
209.	3576	*Acacia tetragonocarpa*			
210.	3588	*Acacia uliginosa*			
211.	3591	*Acacia urophylla*			
212.	15487	*Acacia varia var. varia*			
213.	3685	*Aotus carinata*		P4	
214.	3686	*Aotus cordifolia*			
215.	3689	*Aotus intermedia*			
216.	14397	*Bossiaea aquifolium subsp. laidlawiana*			
217.	3708	*Bossiaea disticha*			
218.	3713	*Bossiaea linophylla*			
219.	3714	*Bossiaea ornata (Broad Leaved Brown Pea)*			
220.	14291	*Bossiaea praetermissa*			
221.	3718	*Bossiaea rufa*			
222.	10861	*Callistachys lanceolata (Wonnich)*			
223.	8971	*Chorizema cordatum*			
224.	3757	*Chorizema glycinifolium*			
225.	12765	*Chorizema nanum*			
226.	3760	*Chorizema reticulatum (Showy Flame Pea)*			
227.	13107	*Chorizema retrorsum*			
228.	3761	*Chorizema rhombeum*			
229.	3799	*Daviesia cordata (Bookleaf)*			
230.	19747	*Daviesia decurrens subsp. decurrens*			
231.	3817	*Daviesia inflata*			
232.	3835	*Daviesia preissii*			

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233.	3867	*Dipogon lignosus (Dolichos Pea)*	Y		
234.	3876	*Eutaxia epacridoides*			
235.	32756	*Eutaxia exilis*			
236.	3891	*Gastrolobium bilobum (Heart Leaf Poison)*			
237.	19190	*Gastrolobium cuneatum*			
238.	20473	*Gastrolobium ebracteolatum*			
239.	3936	*Genista linifolia (Flaxleaf Broom)*	Y		
240.	18143	*Genista monspessulana*	Y		
241.	3948	*Gompholobium capitatum*			
242.	10909	*Gompholobium confertum*			
243.	3950	*Gompholobium knightianum*			
244.	3953	*Gompholobium ovatum*			
245.	3954	*Gompholobium polymorphum*			
246.	11115	*Gompholobium villosum*			
247.	3961	*Hardenbergia comptoniana (Native Wisteria)*			
248.	3964	*Hovea chorizemifolia (Holly-leaved Hovea)*			
249.	3965	*Hovea elliptica (Tree Hovea)*			
250.	3968	*Hovea trisperma (Common Hovea)*			
251.	3992	*Isotropis cuneifolia (Granny Bonnets)*			
252.	4017	*Jacksonia horrida*			
253.	4036	*Kennedia carinata*			
254.	4037	*Kennedia coccinea (Coral Vine)*			
255.	4059	*Lotus angustissimus (Narrowleaf Trefoil)*	Y		
256.	8564	*Lotus subbiflorus*	Y		
257.	4063	*Lotus uliginosus (Greater Lotus)*	Y		
258.	4090	*Mirbelia dilatata (Holly-leaved Mirbelia)*			
259.	4114	*Ornithopus pinnatus (Slender Serradella)*	Y		
260.	17016	*Podalyria sericea*	Y		
261.	40080	*Psoralea arborea*	Y		
262.	20195	*Pultenaea brachytropis*			
263.	4172	*Pultenaea ericifolia*			
264.	4179	*Pultenaea pinifolia*		P3	
265.	4181	*Pultenaea reticulata*			
266.	17551	*Sphaerolobium drummondii*			
267.	4202	*Sphaerolobium fornicatum*			
268.	20302	*Sphaerolobium hygrophilum*			
269.	4207	*Sphaerolobium medium*			
270.	4209	*Sphaerolobium racemulosum*			
271.	17763	*Trifolium campestre var. campestre (Hop Clover)*	Y		
272.	4293	*Trifolium cernuum (Drooping Flower Clover)*	Y		
273.	4295	*Trifolium dubium (Suckling Clover)*	Y		
274.	17541	*Trifolium incarnatum var. incarnatum*	Y		
275.	14738	*Trifolium resupinatum var. resupinatum*	Y		
276.	4313	*Trifolium subterraneum (Subterranean Clover)*	Y		
277.	11474	*Vicia sativa subsp. nigra*	Y		
278.	4325	*Viminaria juncea (Swishbush, Koweda)*			
Fissidentaceae					
279.	32369	*Fissidens tenellus*			
Funariaceae					
280.	32370	*Funaria hygrometrica*			
Galaxauraceae					
281.	34959	*Dichotomaria spathulata*			
Gentianaceae					
282.	6542	*Centaurium tenuiflorum*	Y		
Geraniaceae					
283.	4346	*Pelargonium littorale*			
Goodeniaceae					
284.	7420	*Dampiera alata (Winged-stem Dampiera)*			
285.	7444	*Dampiera hederacea (Karri Dampiera)*			
286.	7452	*Dampiera leptoclada (Slender-shooted Dampiera)*			
287.	7454	*Dampiera linearis (Common Dampiera)*			
288.	7484	*Dampiera trigona (Angled-stem Dampiera)*			
289.	7487	*Diaspasis filifolia (Thread-leaved Diaspasis)*			
290.	7505	*Goodenia eatoniana*			
291.	18633	*Goodenia lancifolia (Scruffy Goodenia)*			
292.	13165	*Goodenia pusilla*			
293.	7572	*Lechenaultia expansa*			

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294.	7602	*Scaevola calliptera*			
295.	7613	*Scaevola glandulifera (Viscid Hand-flower)*			
296.	7624	*Scaevola microphylla (Small-leaved Scaevola)*			
297.	7646	*Scaevola striata (Royal Robe)*			
298.	7665	*Velleia trinervis*			
Haemodoraceae					
299.	1407	*Anigozanthos flavidus (Tall Kangaroo Paw)*			
300.	1418	*Conostylis aculeata (Prickly Conostylis)*			
301.	11826	*Conostylis aculeata subsp. aculeata*			
302.	1438	*Conostylis laxiflora*			
303.	1453	*Conostylis serrulata*			
304.	11597	*Conostylis setigera subsp. setigera*			
305.	1468	*Haemodorum laxum*			
306.	1474	*Haemodorum sparsiflorum*			
307.	1475	*Haemodorum spicatum (Mardja)*			
308.	1478	*Phlebocarya ciliata*			
309.	1481	*Tribonanthes australis (Southern Tiurndin)*			
Halimedaceae					
310.	47213	*Halimeda versatilis*			
Haloragaceae					
311.	6146	*Gonocarpus benthamii*			
312.	16746	*Gonocarpus benthamii subsp. benthamii*			
313.	6150	*Gonocarpus diffusus*			
314.	6160	*Gonocarpus paniculatus*			
315.	6189	*Myriophyllum crispatum*			
316.	6201	*Myriophyllum verrucosum (Red Water Milfoil)*			
317.	34963	*Trihaloragis hexandra*			
318.	34965	*Trihaloragis hexandra subsp. serrata*			
Hemerocallidaceae					
319.	23474	*Agrostocrinum hirsutum*			
320.	1276	*Caesia micrantha (Pale Grass Lily)*			
321.	1294	*Hodgsoniola junciformis*			
322.	1297	*Johnsonia lupulina (Hooded Lily)*			
323.	1362	*Tricoryne humilis*			
Hypericaceae					
324.	5182	*Hypericum perforatum (St John's Wort)*	Y		
Iridaceae					
325.	11445	*Ferraria crispa subsp. crispa*	Y		
326.	1518	*Gladiolus angustus (Long Tubed Painted Lady)*	Y		
327.	1519	*Gladiolus cardinalis*	Y		
328.	1532	*Ixia maculata (Yellow Ixia)*	Y		
329.	1537	*Orthrosanthus laxus (Morning Iris)*			
330.	1550	*Patersonia occidentalis (Purple Flag, Koma)*			
331.	30472	*Patersonia occidentalis var. occidentalis*			
332.	1553	*Patersonia umbrosa (Yellow Flags)*			
333.	11550	*Patersonia umbrosa var. xanthina (Yellow Flags)*			
334.	1558	*Sparaxis bulbifera*	Y		
335.	18108	*Watsonia meriana var. bulbillifera*	Y		
336.	18118	*Watsonia meriana var. meriana*	Y		
Juncaceae					
337.	8328	*Juncus amabilis*			
338.	1178	*Juncus bufonius (Toad Rush)*	Y		
339.	14631	*Juncus meianthus*		P3	
340.	1186	*Juncus microcephalus*	Y		
341.	1188	*Juncus pallidus (Pale Rush)*			
342.	1189	*Juncus pauciflorus (Loose Flower Rush)*			
343.	1190	*Juncus planifolius (Broadleaf Rush)*			
Juncaginaceae					
344.	40661	*Cycnogeton lineare*			
Lamiaceae					
345.	6855	*Hemigenia humilis*			
346.	6866	*Hemigenia pritzelii*			
347.	6883	*Mentha pulegium (Pennyroyal)*	Y		
348.	6927	*Prunella vulgaris (Self Heal)*	Y		
Lauraceae					

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349.	2952	*Cassytha glabella (Tangled Dodder Laurel)*			
350.	11501	*Cassytha glabella forma casuarinae*			
351.	2957	*Cassytha racemosa (Dodder Laurel)*			
352.	11242	*Cassytha racemosa forma pilosa*			
353.	11799	*Cassytha racemosa forma racemosa*			
Lentibulariaceae					
354.	7148	*Utricularia multifida*			
355.	17672	*Utricularia paulineae*			
356.	7153	*Utricularia tenella*			
357.	7157	*Utricularia violacea (Violet Bladderwort)*			
Linaceae					
358.	4363	*Linum trigynum (French Flax)*	Y		
Lindsaeaceae					
359.	59	*Lindsaea linearis (Screw Fern)*			
Loganiaceae					
360.	6515	*Logania vaginalis (White Spray)*			
361.	46255	*Orianthera campanulata*			
362.	46316	*Orianthera serpyllifolia subsp. angustifolia*			
363.	46315	*Orianthera serpyllifolia subsp. serpyllifolia*			
364.	16177	*Phyllangium paradoxum*			
Lophocoleaceae					
365.		*Chiloscyphus semiteres var. semiteres*			
Lycopodiaceae					
366.	4	*Phylloglossum drummondii (Pigmy Clubmoss)*			
Lythraceae					
367.	5281	*Lythrum hyssopifolia (Lesser Loosestrife)*	Y		
Malvaceae					
368.	48345	*Lasiopetalum occidentale*			
369.	4963	*Modiola caroliniana*	Y		
370.	5092	*Thomasia pauciflora (Few Flowered Thomasia)*			
371.	17391	*Thomasia sp. Big Brook (M. Koch 2373)*			
372.	33488	*Thomasia sp. Vasse (C. Wilkins & K. Shepherd CW 581)*			
Menyanthaceae					
373.	36178	*Liparophyllum lasiospermum*			
374.	36180	*Liparophyllum latifolium*			
375.	36177	*Ornduffia albiflora*			
376.	36181	*Ornduffia parnassifolia*			
Myrtaceae					
377.	5316	*Agonis flexuosa (Peppermint, Wonil)*			
378.	17202	*Agonis flexuosa var. flexuosa*			
379.	20249	*Astartea leptophylla (River-bank Astartea)*			
380.	45213	*Astartea pulchella*			
381.	5392	*Beaufortia sparsa (Swamp Bottlebrush)*			
382.	35799	*Calothamnus lateralis var. crassus*		P3	
383.	17104	*Corymbia calophylla (Marri)*			
384.	5508	*Darwinia citriodora (Lemon-scented Darwinia)*			
385.	5577	*Eucalyptus calcicola (Hamelin Bay Mallee)*			
386.	33520	*Eucalyptus conferruminata subsp. recherche*			
387.	5605	*Eucalyptus cornuta (Yate, Yeid)*			
388.	5625	*Eucalyptus diversicolor (Karri)*			
389.	5708	*Eucalyptus marginata (Jarrah, Djara)*			
390.	5709	*Eucalyptus megacarpa (Bullich, Pulidj)*			
391.	5816	*Homalospermum firmum*			
392.	5818	*Hypocalymma cordifolium*			
393.	5819	*Hypocalymma ericifolium*			
394.	43120	*Hypocalymma minus*			
395.	5825	*Hypocalymma robustum (Swan River Myrtle)*			
396.	5827	*Hypocalymma strictum*			
397.	5841	*Kunzea recurva*			
398.	14776	*Kunzea rostrata*			
399.	5847	*Leptospermum erubescens (Roadside Teatree)*			
400.	5850	*Leptospermum laevigatum (Coast Teatree)*	Y		
401.	5921	*Melaleuca incana (Grey Honeymyrtle)*			
402.	13273	*Melaleuca incana subsp. incana*			
403.	5926	*Melaleuca lateritia (Robin Redbreast Bush)*			

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404.	5952	*Melaleuca preissiana (Moonah)*			
405.	5980	*Melaleuca thymoides*			
406.	11109	*Pericalymma crassipes*			
407.	15501	*Pericalymma spongiocaule*			
408.	20114	*Taxandria fragrans*			
409.	20113	*Taxandria inundata*			
410.	20135	*Taxandria linearifolia*			
411.	20133	*Taxandria parviceps*			
Olacaceae					
412.	2365	*Olax benthamiana*			
Onagraceae					
413.	11992	*Epilobium billardiereanum subsp. intermedium*			
414.	6133	*Epilobium hirtigerum (Hairy Willow Herb)*			
415.	6139	*Oenothera glazioviana (Evening Primrose)*	Y		
Orchidaceae					
416.	15328	*Caladenia applanata subsp. applanata*			
417.	13853	*Caladenia arrecta*			
418.	15332	*Caladenia attingens subsp. attingens*			
419.	15335	*Caladenia brownii*			
420.	1580	*Caladenia cairnsiana (Zebra Orchid)*			
421.	15579	*Caladenia chapmanii*			
422.	15341	*Caladenia citrina*			
423.	1590	*Caladenia ferruginea (Rusty Spider Orchid)*			
424.	1592	*Caladenia flava (Cowslip Orchid)*			
425.	15348	*Caladenia flava subsp. flava*			
426.	15353	*Caladenia heberleana*			
427.	1599	*Caladenia latifolia (Pink Fairy Orchid)*			
428.	15366	*Caladenia longicauda subsp. merrittii*			
429.	1603	*Caladenia longiclavata (Clubbed Spider Orchid)*			
430.	1604	*Caladenia macrostylis (Leaping Spider Orchid)*			
431.	10883	*Caladenia magniclavata (Big Clubbed Spider Orchid)*			
432.	15503	*Caladenia paludosa*			
433.	18033	*Caladenia pholcoidea subsp. pholcoidea*			
434.	15377	*Caladenia reptans subsp. reptans*			
435.	10830	*Caladenia rhomboidiformis*			
436.	15379	*Caladenia serotina*			
437.	15404	*Cyanicula sericea*			
438.	10916	*Cyrtostylis huegelii*			
439.	19649	*Disa bracteata*	Y		
440.	1633	*Diuris laevis (Nannygoat Orchid)*			
441.	15436	*Diuris porrifolia*			
442.	1638	*Diuris setacea (Bristly Donkey Orchid)*			
443.	1640	*Drakaea glyptodon (King-in-his-carriage)*			
444.	13635	*Drakaea micrantha*		T	
445.	1643	*Elythranthera brunonis (Purple Enamel Orchid)*			
446.	1644	*Elythranthera emarginata (Pink Enamel Orchid)*			
447.	15410	*Eriochilus dilatatus subsp. dilatatus*			
448.	15411	*Eriochilus dilatatus subsp. magnus*			
449.	15412	*Eriochilus dilatatus subsp. multiflorus*			
450.	15415	*Eriochilus scaber subsp. scaber*			
451.	12932	*Gastrodia lacista*			
452.	1656	*Lyperanthus serratus (Rattle Beak Orchid)*			
453.	1658	*Microtis atrata (Swamp Mignonette Orchid)*			
454.	33741	*Microtis eremicola*			
455.	20460	*Pheladenia deformis*			
456.	15424	*Praecoxanthus aphyllus*			
457.	1671	*Prasophyllum elatum (Tall Leek Orchid)*			
458.	44084	*Prasophyllum sp. early (G. Brockman GBB 1626)*			
459.	1683	*Prasophyllum triangulare (Dark Leek Orchid)*			
460.	1686	*Pterostylis barbata (Bird Orchid)*			
461.	45342	*Pterostylis parva*			
462.	1693	*Pterostylis recurva (Jug Orchid)*			
463.		*Pterostylis sp.*			
464.	18655	*Pterostylis sp. crinkled leaf (G.J. Keighery 13426)*			
465.	1698	*Pterostylis vittata (Banded Greenhood)*			
466.	16367	*Pyrorchis nigricans (Red beaks, Elephants ears)*			
467.	1701	*Thelymitra antennifera (Vanilla Orchid)*			
468.	10856	*Thelymitra benthamiana (Leopard Orchid)*			
469.	1704	*Thelymitra cornicina (Lilac Sun Orchid)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
470.	1705	*Thelymitra crinita (Blue Lady Orchid)*			
471.	1706	*Thelymitra cucullata (Swamp Sun Orchid)*			
472.	11143	*Thelymitra graminea*			
473.	11053	*Thelymitra macrophylla*			
474.	20730	*Thelymitra paludosa*			
475.	20731	*Thelymitra vulgaris*			
Orthotrichaceae					
476.	36218	*Zygodon menziesii*			
Oxalidaceae					
477.	30375	*Oxalis exilis*			
478.	4352	*Oxalis glabra*	Y		
479.	4356	*Oxalis pes-caprae (Soursob)*	Y		
480.	4358	*Oxalis purpurea (Largeflower Wood Sorrel)*	Y		
Papaveraceae					
481.	2969	*Fumaria capreolata (Whiteflower Fumitory)*	Y		
482.	31532	*Fumaria muralis subsp. muralis*	Y		
Passifloraceae					
483.	5225	*Passiflora filamentosa*	Y		
Phyllanthaceae					
484.	4690	*Poranthera huegelii*			
Pittosporaceae					
485.	3157	*Billardiera floribunda (White-flowered Billardiera)*			
486.	3159	*Billardiera laxiflora*			
487.	3165	*Billardiera variifolia*			
488.	28290	*Cheiranthera parviflora*			
489.	17630	*Marianthus tenuis*			
Plantaginaceae					
490.	14282	*Gratiola pubescens*			
491.	7303	*Plantago lanceolata (Ribwort Plantain)*	Y		
492.	7108	*Veronica arvensis (Wall Speedwell)*	Y		
493.	7112	*Veronica plebeia (Creeping Speedwell)*			
Poaceae					
494.	185	*Aira cupaniana (Silvery Hairgrass)*	Y		
495.	194	*Amphipogon amphipogonoides*			
496.	197	*Amphipogon debilis*			
497.	198	*Amphipogon laguroides*			
498.	20184	*Amphipogon laguroides subsp. laguroides*			
499.	20196	*Amphipogon setaceus*			
500.	202	*Anthoxanthum odoratum (Sweet Vernal Grass)*	Y		
501.	17233	*Austrostipa campylachne*			
502.		*Austrostipa sp.*			
503.	244	*Briza maxima (Blowfly Grass)*	Y		
504.	245	*Briza minor (Shivery Grass)*	Y		
505.	13685	*Catapodium rigidum (Rigid Fescue)*	Y		
506.	41564	*Cenchrus clandestinus (Kikuyu Grass)*	Y		
507.	299	*Deyeuxia quadriseta (Reed Bentgrass)*			
508.	17043	*Glyceria declinata*	Y		
509.	444	*Holcus lanatus (Yorkshire Fog)*	Y		
510.	452	*Hyparrhenia hirta (Tambookie Grass)*	Y		
511.	575	*Poa homomalla*			
512.	40431	*Rytidosperma acerosum*			
513.	8710	*Sporobolus africanus (Parramatta Grass)*	Y		
514.	667	*Tetrarrhena laevis (Forest Ricegrass)*			
Podocarpaceae					
515.	86	*Podocarpus drouynianus (Wild Plum, Kula)*			
Polygalaceae					
516.	4551	*Comesperma ciliatum*			
517.	4552	*Comesperma confertum*			
518.	4554	*Comesperma flavum*			
519.	4557	*Comesperma nudiusculum*			
520.	4564	*Comesperma virgatum (Milkwort)*			
Polygonaceae					
521.	13911	*Persicaria decipiens*			
Pottiaceae					

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
522.	32315	*Barbula calycina*			
Proteaceae					
523.	10824	*Acidonia microcarpa*			
524.	1791	*Adenanthos obovatus (Basket Flower)*			
525.	28281	*Adenanthos sp. Whicher Range (G.J. Keighery 9736)*			
526.	1819	*Banksia grandis (Bull Banksia, Pulgarla)*			
527.	1830	*Banksia littoralis (Swamp Banksia, Pungura)*			
528.	17107	*Banksia meisneri subsp. ascendens (Scott River Banksia)*		P4	
529.	1863	*Conospermum capitatum*			
530.	1872	*Conospermum flexuosum (Tangled Smokebush)*			
531.	16847	*Conospermum paniculatum*			
532.	1967	*Grevillea brachystylis (Short-styled Grevillea)*			
533.	12219	*Grevillea bronwenae*		P3	
534.	14911	*Grevillea papillosa*		P3	
535.	15990	*Grevillea pulchella subsp. ascendens*			
536.	2080	*Grevillea quercifolia (Oak-leaf Grevillea)*			
537.	2112	*Grevillea trifida*			
538.	2128	*Hakea amplexicaulis (Prickly Hakea)*			
539.	2137	*Hakea ceratophylla (Horned Leaf Hakea)*			
540.	2170	*Hakea lasianthoides*			
541.	2174	*Hakea linearis*			
542.	2175	*Hakea lissocarpha (Honey Bush)*			
543.	2203	*Hakea ruscifolia (Candle Hakea)*			
544.	2212	*Hakea sulcata (Furrowed Hakea)*			
545.	2216	*Hakea varia (Variable-leaved Hakea)*			
546.	2262	*Persoonia elliptica (Spreading Snottygobble)*			
547.	2264	*Persoonia graminea*			
548.	2267	*Persoonia longifolia (Snottygobble)*			
549.	2273	*Persoonia saccata (Snottygobble)*			
550.	2282	*Petrophile acicularis*			
551.	2293	*Petrophile diversifolia*			
552.	2299	*Petrophile linearis (Pixie Mops)*			
553.	2323	*Synaphea gracillima*			
554.	17271	*Synaphea macrophylla*		P1	
555.	18591	*Synaphea sp. Redgate Road (J. Scott 16)*		P1	
556.	2331	*Xylomelum occidentale (Woody Pear, Djandin)*			
Racopilaceae					
557.	32480	*Racopilum cuspidigerum var. convolutaceum*			
Ranunculaceae					
558.	2929	*Clematis pubescens (Common Clematis)*			
559.	18634	*Ranunculus inundatus*			
Restionaceae					
560.	1065	*Chaetanthus leptocarpoides*			
561.	17688	*Chordifex amblycoleus*			
562.	17691	*Desmocladus fasciculatus*			
563.	1067	*Empodisma gracillimum*			
564.	1070	*Hypolaena exsulca*			
565.	17841	*Hypolaena pubescens*			
566.	17622	*Hypolaena robusta*		P4	
567.	16836	*Hypolaena viridis*			
568.	1078	*Leptocarpus coangustatus*			
569.	19833	*Leptocarpus laxus*			
570.	46382	*Leptocarpus roycei*			
571.	1080	*Leptocarpus scariosus*			
572.	1082	*Leptocarpus tenax (Slender Twine Rush)*			
573.	46379	*Leptocarpus thysananthus*			
574.	1086	*Lepyrodia heleocharoides*		P3	
575.	1088	*Lepyrodia macra (Large Scale Rush)*			
576.	1090	*Lepyrodia muirii*			
577.	17552	*Lepyrodia porterae*			
578.	1092	*Loxocarya cinerea*			
579.	17681	*Platychorda applanata*			
580.	14917	*Sporadanthus rivularis*			
581.	14915	*Sporadanthus strictus*			
582.	17680	*Tyrbastes glaucescens*			
Rhamnaceae					
583.	13484	*Cryptandra arbutiflora var. tubulosa*			
584.	4842	*Trymalium ledifolium*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
585.	13479	*Trymalium ledifolium var. rosmarinifolium*			
586.	33438	*Trymalium odoratissimum subsp. trifidum*			
Rosaceae					
587.	20506	*Rubus anglocandicans*	Y		
Rubiaceae					
588.	18254	*Opercularia apiciflora*			
589.	7346	*Opercularia echinocephala (Bristly Headed Stink Weed)*			
590.	7348	*Opercularia hispidula (Hispid Stinkweed)*			
591.	7354	*Opercularia volubilis (Twining Stinkweed)*			
Rutaceae					
592.	4401	*Asterolasia squamuligera*			
593.	4413	*Boronia crenulata (Aniseed Boronia)*			
594.	11503	*Boronia crenulata subsp. crenulata var. crenulata*			
595.	4417	*Boronia dichotoma*			
596.	16318	*Boronia exilis*		T	
597.	4422	*Boronia gracilipes (Karri Boronia)*			
598.	16632	*Boronia juncea subsp. minima*			
599.	4429	*Boronia molloyae (Tall Boronia)*			
600.	20392	*Boronia tenuior*			
601.	4448	*Chorilaena quercifolia (Chorilaena)*			
602.	18529	*Philotheca spicata (Pepper and Salt)*			
Santalaceae					
603.	2342	*Leptomeria cunninghamii*			
604.	17703	*Leptomeria ellytes*			
605.	2355	*Leptomeria squarrulosa*			
Sapindaceae					
606.	4757	*Dodonaea ceratocarpa*			
Scrophulariaceae					
607.	7292	*Myoporum oppositifolium (Twin-leaf Myoporum)*			
608.	7107	*Verbascum virgatum (Twiggy Mullein)*	Y		
Sematophyllaceae					
609.	32433	*Sematophyllum homomallum*			
Solanaceae					
610.	7037	*Solanum symonii*			
Stylidiaceae					
611.	7673	*Levenhookia pauciflora (Deceptive Stylewort)*			
612.	7676	*Levenhookia pusilla (Midget Stylewort)*			
613.	39881	*Stylidium acuminatum subsp. meridionale*			
614.	7684	*Stylidium amoenum (Lovely Triggerplant)*			
615.	17666	*Stylidium amoenum var. amoenum*			
616.	30278	*Stylidium androsaceum*			
617.	39960	*Stylidium angustifolium subsp. angustifolium*			
618.	39880	*Stylidium angustifolium subsp. glaucifolium*			
619.	7695	*Stylidium caespitosum (Fly-away Triggerplant)*			
620.	7702	*Stylidium ciliatum (Golden Triggerplant)*			
621.	7708	*Stylidium crassifolium (Thick-leaved Triggerplant)*			
622.	7718	*Stylidium diversifolium (Touch-me-not)*			
623.	20691	*Stylidium gloeophyllum*		P4	
624.	25801	*Stylidium hesperium*			
625.	25851	*Stylidium nymphaeum*			
626.	7772	*Stylidium perpusillum (Tiny Triggerplant)*			
627.	7785	*Stylidium repens (Matted Triggerplant)*			
628.	7787	*Stylidium rhynchocarpum (Black-beaked Triggerplant)*			
629.	7796	*Stylidium scandens (Climbing Triggerplant)*			
630.	7798	*Stylidium schoenoides (Cow Kicks)*			
631.	7802	*Stylidium squamosotuberosum (Fleshy-rhizomed Trigger Plant)*			
Thuidiaceae					
632.	32486	*Thuidium sparsum var. hastatum*			
Thymelaeaceae					
633.	12077	*Pimelea ciliata subsp. longituba*		P3	
634.	5249	*Pimelea hispida (Bristly Pimelea)*			
635.	11533	*Pimelea imbricata var. imbricata*			
636.	5252	*Pimelea lanata*			
637.	5255	*Pimelea longiflora*			
638.	18117	*Pimelea rosea subsp. rosea*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
639.	5264	*Pimelea spectabilis (Bunjong)*			
640.	12041	*Pimelea suaveolens subsp. suaveolens*			
Violaceae					
641.	5218	*Hybanthus debilissimus*			
642.	5223	*Viola odorata (Common Violet)*	Y		
Xanthorrhoeaceae					
643.	1280	*Chamaescilla corymbosa (Blue Squill)*			
644.	11299	*Chamaescilla corymbosa var. corymbosa*			
645.	1253	*Xanthorrhoea gracilis (Graceful Grass Tree, Mimidi)*			
646.	1256	*Xanthorrhoea preissii (Grass tree, Palga)*			
Xyridaceae					
647.	1145	*Xyris gracillima*			
648.	1149	*Xyris lacera*			
649.	1150	*Xyris lanata*			
650.	1151	*Xyris laxiflora*			
651.	1153	*Xyris roycei*			
Zamiaceae					
652.	85	*Macrozamia riedlei (Zamia, Djiridji)*			

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

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

Appendix E: EPBC Protected Matters database search results

Australian Government

Department of Agriculture, Water and the Environment

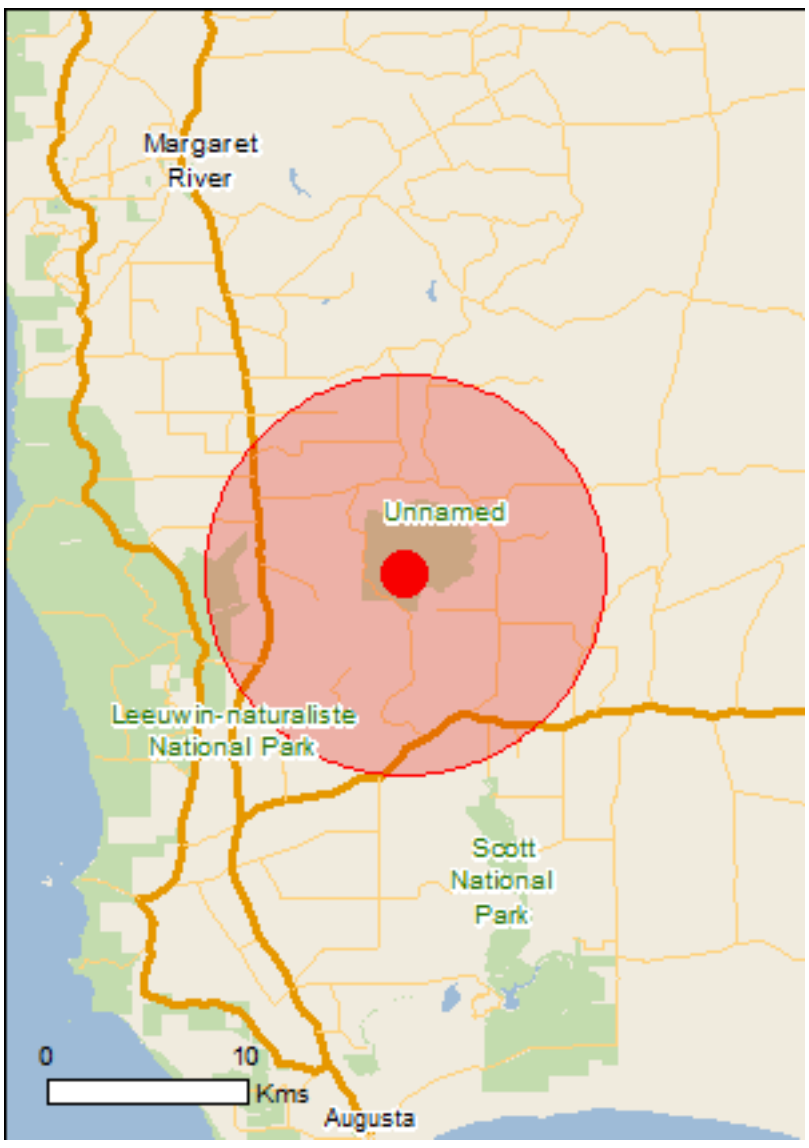
EPBC Act Protected Matters Report

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.

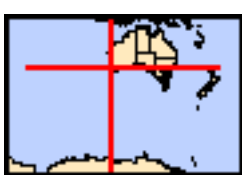
Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 24/08/21 18:09:55



Coordinates

Buffer: 10.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	46
Listed Migratory Species:	28

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	31
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	5
Regional Forest Agreements:	1
Invasive Species:	21
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area
Calyptorhynchus baudinii Baudin's Cockatoo, Long-billed Black-Cockatoo [769]	Endangered	Breeding known to occur within area
Calyptorhynchus latirostris Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within

Name	Status	Type of Presence
		area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat likely to occur within area
Crustaceans		
Engaewa reducta Dunsborough Burrowing Crayfish [82675]	Critically Endangered	Species or species habitat known to occur within area
Fish		
Galaxiella nigrostriata Blackstriped Dwarf Galaxias, Black-stripe Minnow [88677]	Endangered	Species or species habitat may occur within area
Nannatherina balstoni Balston's Pygmy Perch [66698]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Geocrinia alba White-bellied Frog, Creek Frog [26181]	Critically Endangered	Species or species habitat known to occur within area
Mammals		
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
Pseudocheirus occidentalis Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat known to occur within area
Setonix brachyurus Quokka [229]	Vulnerable	Species or species habitat likely to occur within area
Other		
Westralunio carteri Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat known to occur within area
Plants		

Name	Status	Type of Presence
Banksia nivea subsp. uliginosa Swamp Honeypot [82766]	Endangered	Species or species habitat likely to occur within area
Banksia squarrosa subsp. argillacea Whicher Range Dryandra [82769]	Vulnerable	Species or species habitat likely to occur within area
Boronia exilis Scott River Boronia [64844]	Endangered	Species or species habitat known to occur within area
Caladenia hoffmanii Hoffman's Spider-orchid [56719]	Endangered	Species or species habitat likely to occur within area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat likely to occur within area
Gastrolobium papilio Butterfly-leaved Gastrolobium [78415]	Endangered	Species or species habitat may occur within area
Grevillea brachystylis subsp. australis [55525]	Vulnerable	Species or species habitat may occur within area
Lambertia echinata subsp. occidentalis Western Prickly Honeysuckle [64528]	Endangered	Species or species habitat may occur within area
Lambertia orbifolia Roundleaf Honeysuckle [15725]	Endangered	Species or species habitat likely to occur within area
Leptomeria dielsiana Diels' Currant Bush [5146]	Vulnerable	Species or species habitat known to occur within area
Reedia spathacea Reedia [2995]	Critically Endangered	Species or species habitat known to occur within area
Verticordia plumosa var. ananeotes Tufted Plumed Featherflower [23871]	Endangered	Species or species habitat may occur within area
Verticordia plumosa var. vassensis Vasse Featherflower [55804]	Endangered	Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat may occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known 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

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat likely to occur within area
Migratory Marine Species		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat may occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat may occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray		Species or species habitat may occur within

Name	Threatened	Type of Presence
[84995]		area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Migratory Terrestrial Species		
Motacilla cinerea		
Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris canutus		
Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus		
Osprey [952]		Species or species habitat likely to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

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

Name
Commonwealth Land -

Listed Marine Species [Resource Information]

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

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat known to occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Species or species habitat likely to occur within area
Thinornis rubricollis		
Hooded Plover [59510]		Species or species habitat may occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
Mammals		
Neophoca cinerea		
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area
Reptiles		
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Species or species habitat may occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat may occur within area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Blackwood River	WA
Forest Grove	WA
Leeuwin-Naturaliste	WA
Scott	WA
Unnamed WA46400	WA

Regional Forest Agreements	[Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
South West WA RFA	Western Australia

Invasive Species

[Resource Information]

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

Name	Status	Type of Presence
Birds		
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Mammals		
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
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Genista linifolia Flax-leaved Broom, Mediterranean Broom, Flax Broom [2800]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area

Nationally Important Wetlands [Resource Information]

Name	State
Blackwood River (Lower Reaches) and Tributaries System	WA

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-34.10862 115.17449

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 F: Significant Flora Likelihood of Occurrence Assessment

Flora likelihood of occurrence assessment guidelines

Flora likelihood of occurrence	Guideline
Recorded	Species was recorded in the current survey or has previously (in last 15 years) been recorded within the survey area.
Likely (High)	Species previously recorded within the study area and large areas of suitable habitat occur in the survey area.
Possible (Moderate)	Species previously recorded within the study area and areas of suitable habitat occur/may occur in the survey area.
Unlikely (low)	Species previously recorded within the study area, but suitable habitat does not occur in the survey area.
Highly unlikely (very low)	Species previously recorded within the study area, but suitable habitat does not occur in the survey area and/or the survey area is outside the natural distribution of the species or suitable search effort during the preferred season did not record the species. Or not recorded in study area. Previous record location details may be erroneous.

Source information - desktop searches

[1] PMST – DEE Protected Matters Search Tool (PMST) to identify flora listed under the EPBC Act potentially occurring within the study area

[2] TPFL and WAHERB – records of threatened flora from TPFL and WAHERB database searches within the study area

[3] NM – DBCA *NatureMap* (accessed May 2021)

Taxon	Status (WA)	Status (EPBC)	Description and Habitat†	Pre-survey likelihood of occurrence	Post-survey likelihood of occurrence
Acacia inops	3		Weak, scrambling, pungent shrub, 0.4-1.1 m high. Fl. white-cream, Sep to Nov. Black peaty sand, clay. Swamps, creeks.	Moderate	Very low
Acacia lateriticola var. Glabrous variant (B.R.Maslin 6765)	3		Erect or spreading, branching or slender, ferny-leaved shrub, 0.4-1.5 m high. Fl. yellow/cream, May to Oct. Lateritic soils. Glagrous variant - hairless.	High	Low
Acacia semitrullata	4		Slender, erect, pungent shrub, (0.1-)0.2-0.7(-1.5) m high. Fl. cream-white, May to Oct. White/grey sand, sometimes over laterite, clay. Sandplains, swampy areas.	Moderate	Recorded
Acacia tayloriana	4		Prostrate shrub. Fl. cream-white, Jan. Grey or yellow/orange sandy soils, lateritic gravel, clay loam. Winter-wet areas.	Moderate	Very low

Taxon	Status (WA)	Status (EPBC)	Description and Habitat†	Pre-survey likelihood of occurrence	Post-survey likelihood of occurrence
Actinotus repens	3		Prostrate herb to 5 cm. Scattered ovate leaves with 5-13 teeth. Stalked flower heads. Flowers white. Summer flowering. sandy clay and mud in valleys along creek-lines	Moderate	Very low
Boronia exilis	T		Eresct perennial herb to 1m. Terminal cluster of bluish pink flowers (September). Staminal filaments strongly ciliate/fringed. Seasonally wet heath. Scott River.	Moderate	Very low
Calothamnus lateralis var. *crassus*	3		Shrub to 2.5m. Needle like leaves 50-170mm by 1mm. Flower spike usually cylindrical, deeply embedded in stem. Flower late winter to summer. Winter wet heath.	Moderate	Very low
Grevillea papillosa	3		Spreading, sprawling shrub to 1.2m. Linear/narrow hairless leaves entire to 3 lobes spiny tips. Flowers (variable Spring and Autumn) white/yelow and red short spike-like inflorescnce. Winter-wet swamps or sedgelands, brown peaty sandy clay, loam. Scott River.	Moderate	Very low
Hemigenia sp. Nillup (R.D. Royce 98)	2		Scott River. Limited information	Moderate	Very low
Hypolaena robusta	4		Perenial herb to 0.5m. Dioecious. Flowers September to October. White sands, sandplain.	Moderate	Very low
Juncus meianthus	3		Tufted perennial, herb, 0.05-0.2 m high, to 0.4 m wide. Fl. brown, Nov to Dec or Jan. Black sand, sandy clay. Creeks, seepage areas.	Moderate	Very low
Leptinella drummondii	3		Small creeping herb to 0.15m. Disc like flower (late spring - summer) heads yellow-cream. Clay loam, mud. Along rivers.	Moderate (check location details)	Low
Lepyrodia heleocharoides	3		Rhizomatous, slender, tufted perennial, herb (sedge-like), 0.15-0.25 m high. Fl. Dec. Moist peaty sand. Dry or seasonally inundated heath or woodland, swamps.	High	Low
Leucopogon wheelerae	3		Sprawling shrub to 0.8m. Leaves 3-8mm by 2.6-7mm. Base cordate/stemp clasping. Between the Hardy Inlet, near Augusta, and the Donnelly River. Heath or woodland edge on seasonally wet flats. Flowers August to October.	Moderate	Very low

Taxon	Status (WA)	Status (EPBC)	Description and Habitat†	Pre-survey likelihood of occurrence	Post-survey likelihood of occurrence
Netrostylis sp. Blackwood River (A.R. Annels 3043)	3		Limited information	Moderate	Low
Pimelea ciliata subsp*. longituba*	3		Erect shrub, 0.3-1 m high. Fl. pink, Oct to Dec. Grey sand over clay, loam	Moderate	Very low
Reedia spathacea	T		Robust, tufted perennial, grass-like or herb (sedge), 2-4 m high, clumps 1.5-2 m wide. Fl. brown, Nov to Dec or Jan. Peaty sand. Swamps, river edges.	Moderate	Very low
Stylidium lowrieanum	3		Rosetted perennial, herb, 0.25-0.65 m high, Leaves spreading, oblanceolate to spathulate, 2-5 cm long, 3-12 mm wide, apex subacute, margin crisped, glabrous. Scape glabrous at base, inflorescence axis sparingly glandular. Inflorescence racemose. Fl. white-pink, Oct to Nov. Sand or sandy loam over limestone. Eucalypt or Agonis woodland, forest, scrub.	Low	Very low
Synaphea macrophylla	1		Decumbent shrub. Gravelly loam Jarrah-Marri forest. Spring flowering.	High	Low
Verticordia lehmannii	4		Slender shrub, 0.2-1 m high. Fl. pink, Jan or Apr to Jun or Aug or Dec. Sandy clay. Winter-wet flats.	Moderate	Very low

Appendix G: Species List Site Matrix

Family			Weed	Cons. Status	1	2	3	4	5	6	7	8	9	10	11
Anarthriaceae	*Anarthria*	*prolifera*								+	+			+	+
	Anarthria	*scabra*					+								
Apiaceae	*Pentapeltis*	*peltigera*								+	+				
	Platysace	*tenuissima*									+				
	Xanthosia	*candida*				+				+	+				
	Xanthosia	*huegelii*									+				
	Xanthosia	*tasmanica*												+	
Araceae	*Zantedeschia*	*aethiopica*	*							Opp.			Opp.	Opp.	
Asparagaceae	*Asparagus*	*asparagoides*	*									Opp.	Opp.		
	Lomandra	*hermaphrodita*								+					
	Lomandra	*integra*			+		+								
	Lomandra	*purpurea*												+	+
	Lomandra	*sonderi*												+	
	Thysanotus	*dichotomus*	*					+				+		+	
	Thysanotus	*?manglesianus*				+									
	Thysanotus	*manglesianus*								+					
Asteraceae	*Arctotheca*	*calendula*	*												
	Craspedia	sp.				+									
	Hypochaeris	*glabra*	*												
	Lagenophora	*huegelii*				+									
	Quinetia	*urvillei*													+
	Senecio	sp.										+			
	Soliva	*sessilis*	*												
	Sonchus	*oleraceus*	*												
Colchicaceae	*Burchardia*	*congesta*					+								
Cyperaceae	*Chorizandra*	*cymbaria*							+						
	Cyathochaeta	*avenacea*								+		+			

Family					Weed	Cons. Status	1	2	3	4	5	6	7	8	9	10	11
	Isolepis	sp.												+			
	Lepidosperma	*effusum*									+			+			
	Lepidosperma	*?pubisquameum*						+		+							
	Lepidosperma	*pubisquameum*													+		
	Leptocarpus	*coangustatus*									+						
	Leptocarpus	*scariosus*									+						
	Machaerina	*vaginalis*									+						
	Mesomelaena	*graciliceps*										+					
	Mesomelaena	*tetragona*													+	+	
	Morelotia	*octandra*						+	+	+		+	+		+	+	
	Netrostylis	*capillaris*					+	+	+			+	+			+	+
	Netrostylis	sp.	Jarrah	Forest					+					+			
Dasypogonaceae	*Dasypogon*	*bromeliifolius*															+
Dasypogonaceae	*Kingia*	*australis*							+	+							
Dennstaedtiaceae	*Pteridium*	*esculentum*					+			+	+			+	+		
Dilleniaceae	*Hibbertia*	*amplexicaulis*								+							
	Hibbertia	*hypericoides*						+	+	+		+	+			+	+
Droseraceae	*Drosera*	*glandulifera*															+
	Drosera	*macrantha*	subsp.	*macrantha*			+					+	+				
	Drosera	sp.						+	+								+
Elaeocarpaceae	*Tremandra*	*diffusa*												+			
Ericaceae	*Andersonia*	*caerulea*											Opp.				
	Leucopogon	*australis*								+		+	+			+	+
	Leucopogon	*capitellatus*					+	+				+	+	+			
	Leucopogon	*obovatus*	subsp.	*revolutus*					+								
	Leucopogon	*propinquus*													+		
	Leucopogon	sp.									+			+			

Family					Weed	Cons. Status	1	2	3	4	5	6	7	8	9	10	11
	Leucopogon	*verticillatus*					+	+	+	+		+	+	+			
	Sphenotoma	*capitata*											+				
	Styphelia	*racemulosa*														+	
Fabaceae	*Acacia*	*browniana*	var.	*obscura*				Opp.				+	+				
	Acacia	*browniana*	var.	*browniana*				Opp.				Opp.					Opp.
	Acacia	*divergens*						+								+	
	Acacia	*extensa*					+										
	Acacia	*lateriticola*											Opp.				
	Acacia	*myrtifolia*						+				+		+			+
	Acacia	*pulchella*	var.	*glaberrima*							+						
	Acacia	*pulchella*	var.	*pulchella*						+		+	+	+			
	Acacia	*semitrullata*				P4		Opp.									
	Acacia	sp.					+										
	Acacia	*stenoptera*										+	+				
	Acacia	*tetragonocarpa*															+
	Acacia	*uliginosa*							+								
	Acacia	*urophylla*												+			
	Acacia	*varia*	var.	*varia*									Opp.				
	Bossiaea	*linophylla*					+	+	+			+	+				+
	Bossiaea	*ornata*					+	+	+			+	+				
	Bossiaea	*rufa*															+
	Chorizema	*nanum*						+									
	Gompholobium	*ovatum*											+				
	Hardenbergia	*comptoniana*													+		
	Hovea	*chorizemifolia*							+				+				
	Hovea	*elliptica*						+		+		+	+			+	
	Hovea	*trisperma*							+								

Family					Weed	Cons. Status	1	2	3	4	5	6	7	8	9	10	11
	Kennedia	*coccinea*										+					
	Mirbelia	*dilatata*							+	+						+	
	Pultenaea	*brachytropis*											Opp.				
	Templetonia	*retrusa*											+				
	Trifolium	sp.			*									+			
Goodeniaceae	*Dampiera*	*alata*						+		+		+					
	Dampiera	*hederacea*									Opp.						
	Dampiera	*linearis*							+	+		+				+	+
	Scaevola	*calliptera*						+		+			+				
Haemodoraceae	*Anigozanthos*	*flavidus*									+						+
	Anigozanthos	*manglesii*													+		
	Phlebocarya	*ciliata*															+
Hemerocallidaceae	*Agrostocrinum*	*scabrum*														+	+
	Caesia	*micrantha*					+							+			
	Johnsonia	*lupilina*								+		+	+				+
	Stypandra	*glauca*												+			
Iridaceae	*Gladiolus*	sp.			*												
	Orthrosanthus	*laxus*	var.	*laxus*								+		+			
	Patersonia	*occidentalis*								+	+						
	Patersonia	*umbrosa*	var.	*xanthina*			+	+	+	+		+	+	+		+	
	Romulea	*rosea*			*												
	Watsonia	*meriana*	var.	*bulbillifera*	*		Opp.					Opp.		Opp.	Opp.		
Juncaceae	*Juncus*	*pallidus*													+		
	Juncus	sp.															+
Lamiaceae	*Hemigenia*	*pritzelii*											+				
Lauraceae	*Cassytha*	sp.						+		+			+				
Lindsaeaceae	*Lindsaea*	*linearis*							+			+	+				+

Family			Weed	Cons. Status	1	2	3	4	5	6	7	8	9	10	11
Loganiaceae	*Logania*	*vaginalis*			+									+	
Menyanthaceae	*Liparophyllum*	*latifolium*										+			
Myrtaceae	*Agonis*	*flexuosa*			+	+						+	+	+	
	Astartea	*scoparia*							+						
	Corymbia	*calophylla*			+	+	+	+		+	+	+	+	+	+
	Eucalyptus	*diversicolor*			+										
	Eucalyptus	*marginata*			+	+	+	+		+	+	+		+	+
	Eucalyptus	*rudis*										+			
	Eucalytpus	*patens*						+							
	Hypocalymma	*angustifolium*									+				
	Hypocalymma	*cordifolium*							Opp.						
	Leptospermum	*laevigatum*	*						Opp.					Opp.	
	Melaleuca	*incana* subsp. *incana*							+						
	Taxandria	*linearifolia*							+						
	Taxandria	*parviceps*					+				+		+	+	+
Oleaceae	*Olea*	*europaea*	*												
Orchidaceae	*Caladenia*	*sp.*												Opp.	
	Lyperanthus	*serratus*													+
	Orchidaceae	sp.			+										
	Pterostylis	sp.					+				+				
Oxalidaceae	*Oxalis*	*incarnata*	*									+			
Phyllanthaceae	*Phyllanthus*	*calycinus*				+									
Pittosporaceae	*Billardiera*	*variifolia*						+						+	
Poaceae	*Amphipogon*	*turbinatus*					+								
	Anthoxanthum	*odoratum*	*												
	Avena	sp.	*												
	Briza	*maxima*	*												

Family			Weed	Cons. Status	1	2	3	4	5	6	7	8	9	10	11
	Cenchrus	*clandestinus*	*												
	Eragrostis	*curvula*	*												
	Rytidosperma	*caespitosum*				+									
	Rytidosperma	sp.					+								
	Sporobolus	*africanus*	*												
	Tetrarrhena	*laevis*			+	+	+	+		+		+		+	
Podocarpaceae	*Podocarpus*	*drouynianus*			+	+	+	+				+			+
Proteaceae	*Adenanthos*	*obovatus*													+
	Banksia	*grandis*					+					+			+
	Hakea	*amplexicaulis*			+	+	+	+		+	+			+	
	Hakea	*lasianthoides*									Opp.				
	Hakea	*lissocarpha*			+	+				+	+				
	Hakea	*ruscifolia*					+								
	Persoonia	*elliptica*					+								
	Petrophile	*diversifolia*								Opp.	Opp.				
	Synaphea	*petiolaris* subsp. *?petiolaris*								Opp.					
	Xylomelum	*occidentale*													+
Pteridaceae	*Adiatum*	*aethiopica*										+			
Ranunculaceae	*Clematis*	*pubescens*				+						+			
Restionaceae	*?Loxocarya*	*cinerea*				+									
	Desmocladus	*fasciculatus*					+								
	Desmocladus	*flexuosus*						+				+	+		+
	Hypolaena	*exsulca*					+		+				+	Opp.	+
	Hypolaena	*?viridis*												Opp.	
	Loxocarya	*cinerea*											+	+	
	Tyrbastes	*glaucescens*							+						
Rosaceae	*Rubus*	*anglocandicans*	*									Opp.			

Family		Weed	Cons. Status	1	2	3	4	5	6	7	8	9	10	11
Rubiaceae	*Opercularia hispidula*			+	+		+				+	+	+	+
Rutaceae	*Philotheca spicata*								+	+				
Stylidiaceae	*Stylidium amoenum*								+					
Thymelaeaceae	*Pimelea ?lehmanniana* subsp. *nervosa*									Opp.				
	Pimelea sp.				+				+				+	
Xanthorrhoeaceae	*Xanthorrhoea preissii*						+					+	+	
Zamiaceae	*Macrozamia riedlei*			+	+		+				+	+		

Appendix H: Site Photos and Releve Data

Releve			
Site	1	**Easting**	325511
Date	20/09/2021	**Northing**	6227354
Recorder	JW	**Landscape position**	Mid Slope
Soil	Brown clay loam	**Condition**	Good
Fire Age	>3 years	**Habitat**	Forest
Community	Open forest of *Corymbia calophylla, Eucalyptus marginata* and *Eucalyptus diversicolor* over open woodland of *Agonis flexuosa* over sparse shrubland of *Bossiaea linophylla, Podocarpus drouynianus* and *Leucopogon verticillatus* over shrubland of *Patersonia umbrosa* var. *xanthina, Lomandra integra* and *Opercularia hispidula*.		
Vegetation unit	EdCcAf		
Species	**Introduced**	**Height**	**% Cover**
Corymbia calophylla		25	60
Eucalyptus marginata		25	5
Eucalyptus diversicolor		30	1
Agonis flexuosa		8	4
Leucopogon verticillatus		1.5	0.3
Podocarpus drouynianus		1	0.5
Hakea amplexicaulis			+
Patersonia umbrosa var. *xanthina*		0.5	1
Macrozamia riedlei			+
Lomandra integra		0.3	0.5
Opercularia hispidula		0.3	0.5
Bossiaea linophylla		1.6	1
Anthoxanthum odoratum	*	0.3	2
Briza maxima	*	0.3	0.5
Oxalis incarnata	*		+
Drosera macrantha subsp. *macrantha*			+
Netrostylis capillaris			+
Orchidaceae sp.			+
Sonchus oleraceus	*		+
Tetrarrhena laevis			+
Acacia sp.			+
Hakea lissocarpha			+
Leucopogon capitellatus			+

Cenchrus clandestinus	*		+
Acacia extensa			+
Hypochaeris glabra	*		+
Olea europaea	*		+
Bossiaea ornata			+
Romulea rosea	*		+
Caesia micrantha			+
Logania vaginalis			+
Sporobolus africanus	*		+
Pteridium esculentum			+

No site photo available.

Releve			
Site	2	**Easting**	326682
Date	20/09/2021	**Northing**	6227425
Recorder	JW	**Landscape position**	Mid slope
Soil	Sandy brown loam	**Condition**	Excellent
Fire Age	>3	**Habitat**	Forest
Community	Open forest of *Corymbia calophylla* and *Eucalyptus marginata* over sparse shrubland of *Bossiaea linophylla* over shrubland of *Hibbertia hypericoides, Morelotia octandra* and *Macrozamia riedlei*.		
Vegetation unit	EmCcBl		
Species	**Introduced**	**Height**	**% Cover**
Corymbia calophylla		30	45
Eucalyptus marginata		30	25
Bossiaea linophylla		2	5
Macrozamia riedlei		1.2	2
Hibbertia hypericoides		0.6	10
Morelotia octandra		0.5	3
Hovea elliptica		0.5	0.5
Clematis pubescens			+
Hakea lissocarpha			+
Netrostylis capillaris			+
Patersonia umbrosa var. *xanthina*			+
Tetrarrhena laevis			+
Opercularia hispidula			+
Choizema nanum			+
Leucopogon capitellatus			+
Dampiera alata			+
Rytidosperma caespitosum			+
Cassytha sp.			+
Thysanotus ?manglesianus			+
?Loxocarya cinerea			+
Lagenophora huegelii			+
Scaevola calliptera			+
Acacia divergens			+
Xanthosia candida			+
Drosera sp.			+
Bossiaea ornata			+
Pimelea sp.			+

Lepidosperma ?pubisquameum			+
Podocarpus drouynianus			+
Acacia myrtifolia			+
Phyllanthus calycinus			+
Gladiolus sp.	*		+
Craspedia sp.			+
Agonis flexuosa			Opp.
Hakea amplexicaulis			Opp.
Leucopogon verticillatus			Opp.

Releve			
Site	3	**Easting**	328395
Date	20/09/2021	**Northing**	6227619
Recorder	JW	**Landscape position**	Upper slope
Soil	Grey brown sandy loam	**Condition**	Very good
Fire Age	>3	**Habitat**	Forest
Community	Open forest of *Corymbia calophylla* and *Eucalyptus marginata* over open shrubland of *Anarthria scabra, Bossiaea linophylla* and *Podocarpus drouynianus* over shrubland of *Hibbertia hypericoides* and *Morelotia octandra*.		
Vegetation unit	CcEmAs		
Species	**Introduced**	**Height**	**% Cover**
Corymbia calophylla		30	35
Eucalyptus marginata		30	30
Bossiaea linophylla		2	5
Anarthria scabra		1.2	8
Mirbelia dilatata		2	1
Morelotia octandra		0.5	1
Hibbertia hypericoides		0.3	2
Netrostylis capillaris			+
Hakea ruscifolia			+
Lindsaea linearis			+
Hovea trisperma			+
Dampiera linearis			+
Tetrarrhena laevis			+
Desmocladus fasciculatus		0.5	1
Hakea amplexicaulis			+
Podocarpus drouynianus		2	2
Hovea chorizemifolia			+
Taxandria parviceps		1.8	1
Netrostylis sp. Jarrah Forest			+
Drosera sp.			+
Hypolaena exsulca			+
Leucopogon verticillatus			+
Bossiaea ornata			+
Burchardia congesta			+
Lomandra integra			+
Rytidosperma sp.			+
Pterostylis sp.			+

Patersonia umbrosa var. *xanthina*			+
Leucopogon obovatus subsp. *revolutus*			+
Acacia uliginosa			+
Banksia grandis			Opp.
Amphipogon turbinatus			Opp.
Persoonia elliptica			Opp.
Kingia australis			Opp.

Releve			
Site	4	**Easting**	332865
Date	20/09/2021	**Northing**	6228118
Recorder	MB	**Landscape position**	Valley floor
Soil	Red brown clay loam	**Condition**	Excellent
Fire Age	>3	**Habitat**	Forest
Community	Forest of *Corymbia calophylla* and *Eucalyptus marginat*a over sparse shrubland of *Kingia australis, Hovea elliptica* and *Podocarpus drouynianus* over shrubland of *Lepidosperma ? pubisquameum* and *Pteridium esculentum*.		
Vegetation unit	CcEmKa		
Species	**Introduced**	**Height**	**% Cover**
Corymbia calophylla		35	45
Eucalyptus marginata		35	35
Kingia australis		3	1
Hovea elliptica		2	5
Macrozamia riedlei		1.5	3
Pteridium esculentum		1.5	4
Podocarpus drouynianus		2	1
Xanthorrhoea preissii		1	2
Desmocladus flexuosus		1	1
Lepidosperma ?pubisquameum		1	5
Leucopogon verticillatus			+
Hibbertia amplexicaulis			+
Opercularia hispidula		0.6	2
Tetrarrhena laevis			+
Thysanotus dichotomus			+
Patersonia umbrosa var. xanthina		1	2
Hakea amplexicaulis			+
Hibbertia hypericoides		0.3	2
Billardiera variifolia			+
Leucopogon australis			+
Morelotia octandra			+
Dampiera linearis			+
Hypochaeris glabra	*		+
Gladiolus sp.	*		+
Mirbelia dilatata			+
Oxalis incarnata	*		+
Acacia pulchella			+

Cassytha sp.			+
Dampiera alata			+
Johnsonia lupulina			+
Scaevola calliptera			+
Patersonia occidentalis			+
Romulea rosea	*		+
Eucalyptus patens			Opp.

Releve			
Site	5	**Easting**	332826
Date	20/09/2021	**Northing**	6228146
Recorder	JW	**Landscape position**	Drainage line
Soil	Orange brown clay	**Condition**	Very good
Fire Age	>3	**Habitat**	Shrubland
Community	Shrubland of *Taxandria linearifolia* and *Melaleuca incana* subsp*. incana* over sedgeland *Hypolaena exsulca* and *Leptocarpus coangustatus*.		
Vegetation unit	TlMi		
Species	**Introduced**	**Height**	**% Cover**
Taxandria linearifolia		3	55
Melaleuca incana subsp. *incana*		3	15
Pteridium esculentum		2	3
Lepidosperma effusum		2	2
Hypolaena exsulca		1.2	5
Leptocarpus coangustatus		1.5	5
Baumea vaginalis		2.5	1
Astartea scoparia		2	2
Chorizandra cymbaria			+
Tyrbastes glaucescens		1.5	2
Anigozanthus flavidus			+
Acacia pulchella var. *glaberrima*			+
Leptocarpus scariosus			+
Leucopogon sp.			+
Patersonia occidentalis			+

Releve			
Site	6	**Easting**	333335
Date	20/09/2021	**Northing**	6228017
Recorder	JW	**Landscape position**	Mid slope
Soil	Yellow brown sandy loam	**Condition**	Very Good - Excellent
Fire Age	>3	**Habitat**	Forest
Community	Forest of *Eucalyptus marginata* and *Corymbia calophylla* over sparse shrubland of *Hovea elliptica* over shrubland of *Bossiaea ornata, Hibbertia hypericoides* and *Netrostylis capillaris.*		
Vegetation unit	EmCcBo		

Species	**Introduced**	**Height**	**% Cover**
Corymbia calophylla		30	30
Eucalyptus marginata		30	30
Hovea elliptica		1.5	3
Bossiaea linophylla			+
Bossiaea ornata		0.4	5
Patersonia umbrosa var. *xanthina*			+
Morelotia octandra			+
Netrostylis capillaris		0.5	1
Hakea amplexicaulis			+
Philotheca spicata			+
Lomandra hermaphrodita			+
Hibbertia hypericoides		0.5	4
Tetrarrhena laevis			+
Pimelea sp.			+
Acacia browniana var. *obscura*			+
Johnsonia lupilina			+
Pentapeltis peltigera			+
Lindsaea linearis			+
Acacia stenoptera			+
Leucopogon verticillatus			+
Hakea lissocarpha			+
Leucopogon australis			+
Stylidium amoenum			+
Dampiera linearis			+
Mesomelaena graciliceps			+
Drosera macrantha subsp. *macrantha*			+
Anarthria prolifera			+

Leucopogon capitellatus			+
Dampiera alata			+
Acacia pulchella var. *pulchella*			Opp.
Kennedia coccinea			Opp.
Cyathochaeta avenacea			Opp.
Thysanotus manglesianus			Opp.
Xanthosia candida			Opp.
Acacia myrtifolia			Opp.
Orthrosanthus laxus var. *laxus*			Opp.
Synaphea petiolaris subsp. *?petiolaris*			Opp.

Releve			
Site	7	**Easting**	334365
Date	20/09/2021	**Northing**	6227455
Recorder	JW	**Landscape position**	Upper slope
Soil	Brown sandy loam	**Condition**	Excellent - Very Good
Fire Age	>3	**Habitat**	Forest
Community	Forest of *Eucalyptus marginata* and *Corymbia calophylla* over sparse shrubland of *Hovea elliptica, Taxandria parviceps* and *Bossiaea linophylla* over shrubland of *Hibbertia hypericoides, Bossiaea ornata* and *Patersonia umbrosa.*		
Vegetation unit	EmCcHe		
Species	**Introduced**	**Height**	**% Cover**
Corymbia calophylla		30	35
Eucalyptus marginata		30	35
Hovea elliptica		1.8	5
Taxandria parviceps		1.8	2
Bossiaea linophylla		1.5	1
Bossiaea ornata		1.2	5
Hibbertia hypericoides		0.4	8
Hakea amplexicaulis			+
Patersonia umbrosa var. *xanthina*		0.6	2
Cassytha sp.			+
Leucopogon capitellatus			+
Lindsaea linearis			+
Netrostylis capillaris			+
Acacia stenoptera			+
Drosera macrantha subsp. *macrantha*			+
Acacia pulchella var. *pulchella*			+
Philotheca spicata			+
Hakea lissocarpha			+
Anarthria prolifera			+
Pterostylis sp.			+
Johnsonia lupilina			+
Hypocalymma angustifolium			+
Morelotia octandra			+

Platysace tenuissima			+
Leucopogon australis			+
Acacia browniana var. *obscura*			+
Sphenotoma capitata			+
Gompholobium ovatum			+
Scaevola calliptera			+
Xanthosia huegelii			+
Pentapeltis peltigera			+
Xanthosia candida			+
Templetonia retusa			+
Hovea chorizemifolia			+
Hemigenia pritzelii			+
Leucopogon verticillatus			+

Releve			
Site	8	**Easting**	335432
Date	20/09/2021	**Northing**	6226121
Recorder	MB	**Landscape position**	Lower slope
Soil	Brown sandy loam	**Condition**	Very Good
Fire Age	>3	**Habitat**	Forest
Community	Forest of *Corymbia calophylla* and *Eucalyptus marginata* over open woodland of *Agonis flexuosa* over shrubland of *Podocarpus drouynianus* and *Lepidosperma effusum*.		
Vegetation unit	CcAfLe		
Species	**Introduced**	**Height**	**% Cover**
Corymbia calophylla		40	30
Eucalyptus marginata		35	25
Agonis flexuosa		15	20
Banksia grandis		1.5	4
Podocarpus drouynianus		2	5
Lepidosperma effusum		1.5	5
Pteridium esculentum		1.5	3
Opercularia hispidula			+
Desmocladus flexuosus			+
Caesia micrantha			+
Tremandra diffusa			+
Hypochaeris glabra	*		+
Adiatum aethiopica		0.3	2
Liparophyllum latifolium			+
Clematis pubescens			+
Macrozamia riedlei			+
Cyathochaeta avenacea			+
Tetrarrhena laevis			+
Leucopogon capitellatus			+
Leucopogon verticillatus			+
Acacia urophylla			+
Patersonia umbrosa var. *xanthina*			+
Thysanotus dichotomus			+
Netrostylis sp. Jarrah Forest			+
Orthrosanthus laxus var. *laxus*			+
Stypandra glauca			+
Trifolium sp.			+

Oxalis incarnata			+
Acacia pulchella var. *pulchella*			+
Leucopogon sp.			+
Senecio sp.			+
Isolepis sp.			+
Acacia myrtifolia			+
Eucalyptus rudis			+

Releve			
Site	9	**Easting**	335442
Date	20/09/2021	**Northing**	6225882
Recorder	MB	**Landscape position**	Lower slope
Soil	Pale brown loamy sand	**Condition**	Good-Degraded
Fire Age	>3	**Habitat**	Forest
Community	Open forest of *Corymbia calophylla* over shrubland of *Pteridium esculentum*.		
Vegetation unit	CcPe		
Species	**Introduced**	**Height**	**% Cover**
Corymbia calophylla		30	30
Agonis flexuosa		5	2
Xanthorrhoea preissii		1.5	3
Pteridium esculentum		1.2	8
Anthoxanthum odoratum	*	0.3	1
Trifolium sp.	*	0.05	2
Cenchrus clandestinus	*	0.4	8
Sonchus oleraceus	*		+
Anigozanthos manglesii			+
Avena sp.	*		+
Macrozamia riedlei			+
Hardenbergia comptoniana			+
Desmocladus flexuosus			+
Opercularia hispidula			+
Gladiolus sp.	*		+
Morelotia octandra			+
Hypochaeris glabra	*		+
Lepidosperma pubisquameum			+
Juncus pallidus			+
Asparagus asparagoides	*		+
Loxocarya cinerea			+
Taxandria parviceps			+
Hypolaena exsulca			+
Mesomelaena tetragona			+
Leucopogon propinquus			+

Releve			
Site	10	**Easting**	334348
Date	20/09/2021	**Northing**	6218653
Recorder	MB	**Landscape position**	Valley floor
Soil	Grey brown clay sand	**Condition**	Very Good - Excellent
Fire Age	>3	**Habitat**	Woodland
Community	Woodland of *Eucalyptus marginata* and *Corymbia calophylla* over *Mirbelia dilatata, Xanthorrhoea preissii* and *Logania vaginalis* over shrubland of *Mesomelaena tetragona* and Hibbertia hypericoides.		
Vegetation unit	EmCcMt		
Species	**Introduced**	**Height**	**% Cover**
Eucalyptus marginata		30	20
Corymbia calophylla		30	20
Mirbelia dilatata		2	4
Logania vaginalis		2	2
Hibbertia hypericoides		0.4	5
Mesomelaena tetragona		0.6	8
Hakea amplexicaulis			+
Tetrarrhena laevis			+
Patersonia umbrosa var. *xanthina*		0.5	2
Lomandra purpurea			+
Xanthosia tasmanica			+
Dampiera linearis			+
Pimelea sp.			+
Leucopogon australis			+
Xanthorrhoea preissii		1.5	4
Anarthria prolifera			+
Morelotia octandra			+
Thysanotus dichotomus			+
Taxandria parviceps			+
Styphelia racemulosa			+
Opercularia hispidula			+
Hovea elliptica			+
Loxocarya cinerea			+
Netrostylis capillaris			+
Agonis flexuosa			+
Agrostocrinum scabrum			+
Lomandra sonderi			+

Billardiera variifolia			+
Acacia divergens			+

Releve			
Site	11	**Easting**	334708
Date	20/09/2021	**Northing**	6218931
Recorder	MB	**Landscape position**	
Soil	Grey brown sand	**Condition**	Very Good
Fire Age	>3	**Habitat**	Forest
Community	Open forest of *Corymbia calophylla* and *Eucalyptus marginata* over open woodland of *Banksia grandis* over open shrubland of *Podocarpus drouynianus, Bossiaea linophylla* and *Taxandria parviceps* over sedgeland/shrubland of *Phlebocarya ciliata, Hibbertia hypericoides* and *Anarthria prolifera*.		
Vegetation unit	CcBgPc		
Species	**Introduced**	**Height**	**% Cover**
Corymbia calophylla		35	20
Eucalyptus marginata		30	15
Bossiaea linophylla		2	8
Adenanthos obovatus		1.4	1
Podocarpus drouynianus		1.8	5
Taxandria parviceps		2	2
Dasypogon bromeliifolius		0.4	0.5
Anarthria prolifera		0.5	1
Desmocladus flexuosus		0.5	1
Hibbertia hypericoides		0.5	1
Lindsaea linearis			+
Johnsonia lupilina			+
Xylomelum occidentale			+
Dampiera linearis			+
Lyperanthus serratus			+
Banksia grandis		5	1
Phlebocarya ciliata		0.4	10
Netrostylis capillaris			+
Drosera sp.			+
Lomandra purpurea			+
Opercularia hispidula			+
Agrostocrinum scabrum			+
Leucopogon australis			+
Anigozanthos flavidus			+
Acacia myrtifolia			+
Bossiaea rufa			+
Hypolaena exsulca			+

Juncus sp.			+
Briza maxima	*		+
Drosera glandulifera			+
Quinetia urvillei			+
Eragrostis curvula	*		+
Hypochaeris glabra	*		+
Soliva sessilis	*		+
Trifolium sp.	*		+
Arctotheca calendula	*		+
Thysanotus dichotomus	*		+