

APPENDIX 5: FLORA AND VEGETATION SURVEY

Reconnaissance and Targeted Flora and Vegetation Survey

Proposed Yalyalup Mine Northern Extension Yalyalup, Western Australia



Prepared for Doral Mineral Sands
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Executive Summary

Ecoedge Environmental Services (Ecoedge) was engaged by Doral Mineral Sands (Doral) in October 2022 to undertake a Reconnaissance and Targeted Flora and Vegetation survey over a proposed northern extension to their mining operations in Yalyalup, Western Australia.

The survey area is approximately 1,606 hectares in size and is situated approximately 9 km south-east of the Busselton central business district, within the City of Busselton. The survey area occurs within an agricultural context and has itself been mostly cleared for agricultural purposes. Much of the approximately 33 ha of native vegetation that remains in the survey area occurs along roadsides, fence lines and sections of both the Abba and Sabina Rivers which flow intermittently through the survey area.

The survey was required to inform future mining opportunities across the landholding and to support environmental approval processes.

The survey was carried out on 7 and 10 October 2022 and 8 November 2022 in accordance with the EPA (2016) Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment.

Seventy-two taxa of vascular flora were identified within the survey area, of which 27 (38%) were introduced non-native taxa.

The presurvey likelihood of occurrence assessment identified 93 significant taxa as known, or potentially occurring within the survey area. Five of these were recorded in the survey area during the survey. The balance (88) of species were all regarded as unlikely to occur in the survey area following the post-survey likelihood of occurrence assessment.

One species of Threatened flora *Verticordia plumosa* var. *vassensis* T(EN) (26 plants) and four Priority flora, *Acacia flagelliformis* P4 (13 plants), *Calothamnus quadrifidus* subsp. *teretifolius* P4 (17 plants), *Grevillea brachystylis* subs. *brachystylis* P3 (2 plants) and *Loxocarya magna* P3 (4 plants) were found within the survey area.

Two declared pest plant species were found within the survey area, Bridal Creeper (*Asparagus asparagoides*) and Arum lily (*Zantedeschia aethiopica*).

Seven vegetation units were recognised in the survey area. Six of these (units A1, B1, B2, C1, C2, C3) were native (30.3 ha) and one was non-native (PL - planted) 17.8 ha. Units A1 and C1 comprised Marri and Jarrah woodland on heavy soils, units B1 and B2 comprised of mixed shrublands on ironstones and units C1, C2 and C3 comprised mixed shrublands on clay flats.

Units A1 and C1, where they were in Degraded or better condition, are recognised as occurrences of the State listed Threatened Ecological Community (TEC) *Corymbia calophylla* woodlands on heavy soils of the southern Swan Coastal Plain. The total area of this TEC occurrence is 2.17 ha (0.21 ha Good, 1.96 ha Degraded).

Units B1 and B2, where they are in Degraded or better condition, are recognised as occurrences of the State and Federally listed Threatened Ecological Community (TEC) Shrublands on southern Swan Coastal Plain (SCP) Ironstones (Busselton area) (SCP10b). The total area of this TEC occurrence is 0.8 ha (0.2 ha Very Good, 0.4 ha Good, 0.2 Degraded).

The DEC (2005) recovery plan for this community recognises all known occurrences of the community, and the catchments for the surface and groundwater that support this wetland habitat as critical to the survival of the community. The known occurrences in the survey area were assessed to comprise all areas of Units B1 and B2 including Completely Degraded vegetation with a total critical habitat area of 3.8 ha. The catchment area for these occurrences was not assessed, being beyond the scope of this report.

Unit C3 which is in a Good condition is recognised as an occurrence of the State listed Dense shrublands on clay flats (SCP09) TEC which is part of the Federally listed Claypans of the SCP TEC. The total area of this TEC occurrence is 0.07 ha.

Only 1.8% of vegetation in the survey area is in Good or Very Good condition due to the high perimeter to area ratio of the small, linear parcels of roadside vegetation and ongoing impacts of agricultural activities, such as grazing on larger parcels within paddocks.

The remnant vegetation described and mapped within the survey area broadly conforms to the description of the Abba vegetation complex and the two Beard vegetation associations, Association 1136 and Association 973, mapped for the area. The Abba complex retains less than 10% of its pre-European extent both on the SCP and within the City of Busselton. Association 1136, which is dominant across the survey area has less than less than 10% of its pre-European extent across the SCP IBRA region, the Perth IBRA sub-region and within the City of Busselton. However, it exceeds the 30% retention target at a state level. Association 973 has less than less than 10% of its pre-European extent across the SCP IBRA region, the Perth IBRA sub-region and within the City of Busselton. However, it exceeds the 30% retention target at a state level.

Almost all of the survey area is classified as a 'Multiple Use' palusplain wetland, with each of the vegetation units being regarded as representative of wetland vegetation because they contain species which are either fully or partially phreatophytic or ground-water dependent.

The survey area vegetation is poorly linked to the regional ecological axis lines which occur in the region with only several parcels of vegetation assigned low 3b and 3c linkage values. This is due to the highly cleared nature of the majority of the site.

Approximately 170.4 ha of land in the east portion of the survey area intersects with an ESA associated with a known occurrence of the Shrublands on southern Swan Coastal Plain Ironstones TEC. This ESA covers only one of the four TEC occurrences for this community as identified in this report. All new TEC occurrences reported in this survey report are regarded as ESAs.

Three smaller ESAs associated with Threatened flora are also mapped in the survey area. One of these is identified to be current. This is associated with a population of the Threatened *Verticordia plumosus* var. *vassensis* in Very Good condition vegetation in Unit B1. The threatened flora associated with the other ESAs could not be relocated.

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Statement of limitations

Reliance on data

In the preparation of this report, Ecoedge Environmental Services has relied on data, surveys, analyses, designs, plans and other information provided by the Client and other individuals and organisations, most of which are referred to in the report. Unless stated otherwise in the report, Ecoedge has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report are based in whole or in part on the data, those conclusions are contingent upon the accuracy and completeness of the data. Ecoedge will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, unavailable, misrepresented or otherwise not fully disclosed to Ecoedge.

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The report has been prepared for the benefit of the Client and no other party. Ecoedge assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including, without limitation, matters arising from any negligent act or omission of Ecoedge or for any loss or damage suffered by any other party relying on the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions and should make their own enquiries and obtain independent advice in relation to such matters.

1 Introduction

Ecoedge Environmental Services (Ecoedge) was engaged by Doral Mineral Sands (Doral) in October 2022 to undertake a Reconnaissance and Targeted Flora and Vegetation survey over a proposed northern extension to mining operations in Yalyalup, Western Australia (hereafter referred to as the survey area) **Figure 1**.

The survey area is approximately 1,606 hectares (ha) in size and is situated approximately 9 km south-east of the Busselton central business district, within the City of Busselton. The survey area occurs within an agricultural context and has itself been mostly cleared for agricultural purposes. Much of the approximately 33 ha of native vegetation that remains in the survey area occurs along roadsides, fence lines and sections of both the Abba and Sabina Rivers which flow intermittently through the survey area (**Figure 2**).

Doral are planning to extend their current Yalyalup mining operations and required the flora and vegetation survey as part of their investigations into future mining opportunities across the landholding and to support environmental approval processes.

The flora and vegetation survey was undertaken in spring 2022, in accordance with the Environmental Protection Authority (EPA) *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016).

This report compiles the findings of the survey.

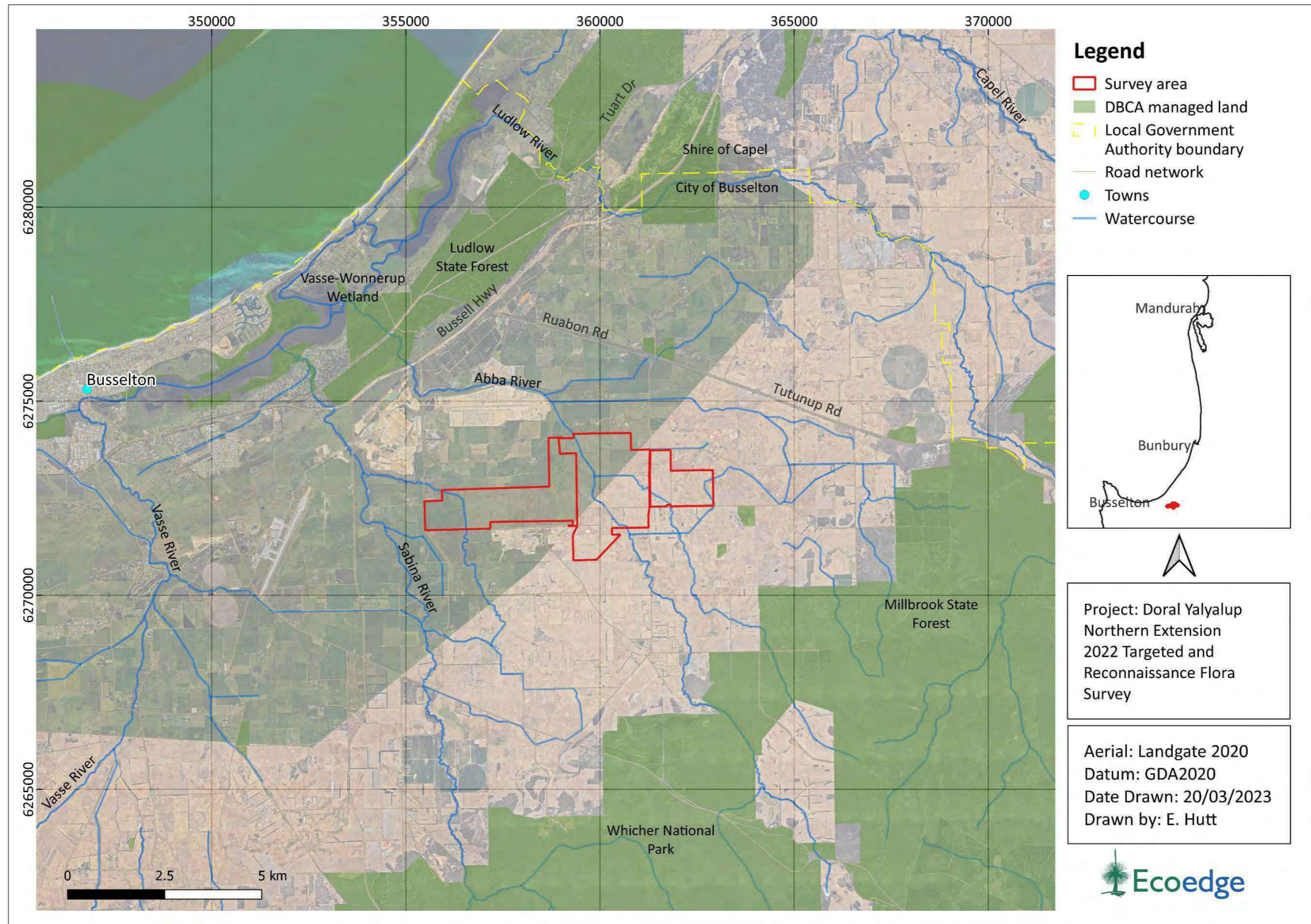


Figure 1. Aerial photograph showing the regional location of the survey area.

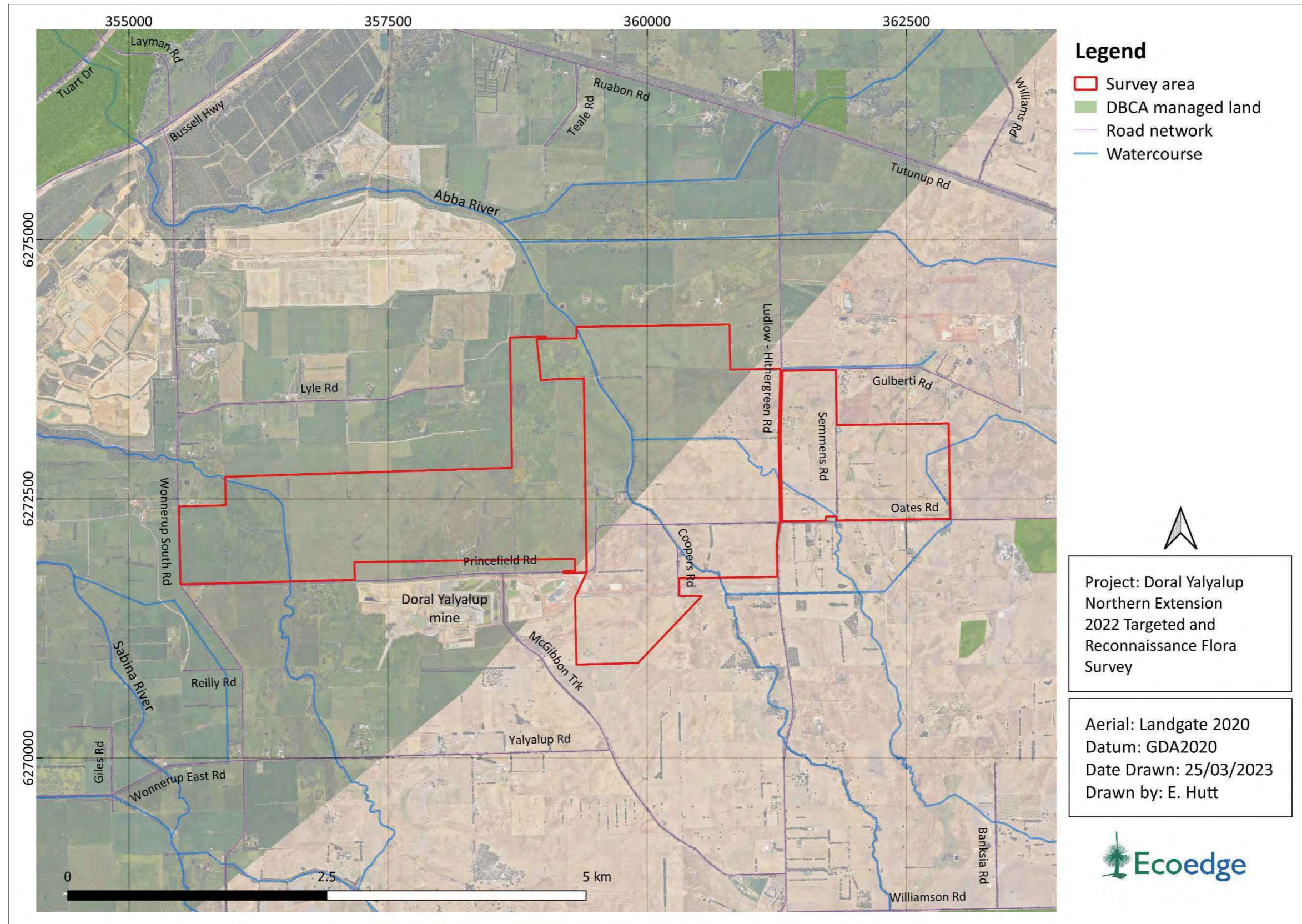


Figure 2. Aerial photograph showing the survey area.

2 Scope

The scope of the survey comprised two main parts, a desktop study and a field survey.

2.1 Desktop study

A desktop assessment over a 10 km radius of the survey area (the study area) was required prior to the field survey work to identify key features and constraints, which were in, or nearby the survey area, such as significant flora, significant vegetation/ecological communities, unusual or rare soil/landscape systems, surface water values, conservation estate, poorly represented vegetation associations and or vegetation complexes and environmentally sensitive areas (ESA).

2.2 Field survey

The reconnaissance and targeted field survey was required to ground-truth outcomes of the desktop assessment, with a focus on the delineation of all significant flora and significant vegetation, vegetation condition, mapping of weeds of national significance (WONS), declared pest plants listed under the *Biosecurity and Agriculture Management Act 2007* (BAM Act) and mapping of riparian vegetation.

The survey and report were required to be undertaken in accordance with the Environmental Protection Authority (EPA) Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016) and other State and Commonwealth guidelines for threatened species and communities, such as approved conservation advice for *Environmental Protection and Biodiversity Act 1999* (EPBC Act) threatened species and communities.

3 Methods

3.1 Desktop assessment

Prior to the field survey, a desktop assessment within a 10 km buffer of the survey area was undertaken to provide contextual information on the flora and vegetation within the survey area. The desktop study included a review of the following information.

- Regional geology and soil mapping (Tille and Lantzke 1990, DPIRD 2017).
- Vegetation complex mapping of the South West Forest Region of Western Australia (Mattiske and Havel 1998) as updated by Webb et al. (2016).
- Beard's Pre-European Vegetation Association mapping dataset (DPIRD-006) (Beard et al. 2013, DPIRD 2019).
- WA Threatened and Priority Ecological Communities DBCA database extracts (DBCA 2022a) and TEC and PEC listings (DBCA 2018, DBCA 2021a).
- WA Threatened and Priority Flora list (DBCA 2022b)
- Federal Protected Matters Search Tool results (DCCEEW 2022a).
- NatureMap search results (DBCA 2022c).
- Extract from the Department's Threatened Flora database and the WA Herbarium database (DBCA 2022d).
- Geomorphic Wetlands, Swan Coastal Plain dataset DBCA-019 (DBCA 2022e).
- Environmentally sensitive areas distribution maps and data (DWER 2021).
- Surface Hydrology Lines (National) (Crossman & Li 2015).
- Regional Ecological Linkages (Molloy et al. 2009).
- DBCA legislated lands and waters data set DBCA-11 (DBCA 2017a).

The assessment also included a review of the following surveys.

- Ecoedge (2016:2020) Report of a Level 1 Flora and Vegetation survey at the Yalyalup Proposed Mine Area. Prepared for Doral Mineral Sands Pty Ltd.
- Ecoedge (2019a). A Review and Impact Assessment of Potential Water Drawdowns on Groundwater Dependent Ecosystems at the Proposed Yalyalup Mineral Sands Project. Prepared for Doral Mineral Sands Pty Ltd.
- Ecoedge (2019b). Supplementary Reconnaissance and Targeted Flora and Vegetation survey. Yalyalup Proposed Mine Area. Prepared for Doral Mineral Sands Pty Ltd.

3.2 Significant flora likelihood of occurrence

Prior to undertaking the survey, an assessment of the likelihood of occurrence of Threatened and Priority flora taxa identified from the desktop assessment was undertaken. The rationale for determining the pre- and post-likelihood of occurrence is provided in **Appendix 1**.

3.3 Field survey

The field survey was carried out on 7 and 10 October 2022 and 8 November 2022 by Russell Smith (flora permit FB62000500) in accordance with the requirements of EPA (2016). All areas of remnant native vegetation within the survey area were visited on foot or by vehicle.

Data on all plant species, including significant flora, vegetation structure and vegetation condition was collected across the survey area. Threatened and Priority Flora known and potentially occurring within a 10 km distance of the study area were targeted during the search. Taxa not able to be identified with certainty in the field were photographed or collected for later identification. Taxonomy and conservation status was checked against the WA Herbarium Census of WA Plants Database (WACENSUS) (DBCA 2023). Vegetation condition was assessed using the method of the EPA (2016). (**Appendix 2**).

Vegetation condition and vegetation units were mapped using aerial photography and notes taken during the survey. Data on vegetation condition was recorded from 64 sites and notes on vegetation recorded from 88 sites.

The location of data collection points and survey track files was recorded on a handheld global position system receiver (GPS). The location of these points and track files is shown in **Appendix 3**.

4 Survey limitations

The limitations with regards to the survey are addressed in **Table 1**.

Table 1. Limitations of the field survey with regard to assessment adequacy and accuracy.

Aspect	Constraint	Comment
Climatic and seasonal effects	Not a constraint	Rainfall at Busselton airport, the nearest weather station, was 95% of average for the period till the end of November 2022.
Proportion of flora identified	Not a constraint	The survey was carried out in October-November, which experience has shown to be within the main flowering season for plants on the southern Swan Coastal Plain. It is estimated that 95%+ of native species were identified.
Availability of contextual information	Not a constraint	Comprehensive regional surveys of remnant vegetation (e.g., Webb et al. 2009), as well as more localised surveys, have been carried out in the southern Swan Coastal Plain.
Completeness of the survey	Minor	Vegetation within the survey area was thoroughly search on foot. Further assessments outside the spring season would add to the completeness of the species list but probably only marginally affect the conclusions.
Skill and knowledge of the botanists	Not a constraint	The botanist conducting the survey has had extensive experience in botanical survey in southwest Australia over a period of 30 years.
Disturbance (fire, grazing, clearing etc.)	Minor	Much of the site has been historically cleared and impacted by ongoing agricultural activities, but there were no recent disturbances – such as from fire, or clearing impacting the delivery of the survey.

5 Results desktop assessment

5.1 Biogeographic region and location

The survey area is situated within the Swan Coastal Plain (SWA02) sub-region of the Swan Coastal Plain biogeographic region, as defined in the Interim Biogeographical Regionalisation for Australia (IBRA) (Commonwealth of Australia 2016).

5.2 Landform and soils

The survey area occurs on edge of the Swan Coastal Plain (SCP), which is bounded by the Darling Scarp to the east, Indian Ocean to the west, Moore River to the north and Dunsborough to the south. The SCP is built up of two belts of sediments that differ in origin: aeolian sediments in the west and alluvial sediments in the east. The aeolian sediments comprise three major dune systems: The Bassendean Dune System is the most easterly and oldest system; the Quindalup System is the most westerly and youngest system, with the Spearwood system located in between. These wind deposited dunes press up against the Pinjarra plain, which is built up of alluvium deposited by streams from the Darling Plateau. Its alluvial soils are predominantly clays and silts; in places, low dunes of aeolian sands from the west may overlay the alluvial soils (Seddon 1972). In the Busselton region, the Quindalup System fringes Geographe Bay and is adjoined in the east to the Spearwood and Vasse systems. The Ludlow Plain separates the Quindalup System from the Abba Plain land system, which in turn is bounded by the Blackwood Plateau to the east (Tille and Lantzke 1990).

The survey area occurs across the Abba system (213Ab), which is very flat, poorly drained and characterised by wet soils and semi-wet soils, pale deep sands, pale sandy earths and grey deep sandy duplexes (Tille and Lantzke 1990).

These systems have been divided into soil phases based on local soil conditions, with the soil phases found in the survey area described in **Table 2** and shown in **Figure 3**.

Table 2. Soil mapping units occurring within the survey area (Tille and Lantzke 1990).

System	Subsystem	Description
Abba (213Ab)	213AbAB1	Flats and low rises with sandy grey brown duplex (Abba) and gradational (Busselton) soils. Plain consisting of very low rises. Pale sandy earths, Semi-wet soils and Pale deep sands with some Grey deep sandy duplexes.
	213AbABvw	Small narrow swampy depressions along drainage lines. Alluvial soils. Shallow drainage depressions with swampy floors. Wet and Semi-wet soils.
	213AbABw	Winter wet flats and slight depressions with sandy grey brown duplex (Abba) and gradational (Busselton) soils. Poorly drained flats and depressions. Wet and Semi-wet soils with Pale sandy earths and Pale deep sands.
	213AbABwi	Winter wet flats and slight depressions with shallow red brown sands and loams over ironstone (i.e. bog iron ore soils). Poorly drained flats and depressions. Wet and Semi-wet soils (shallow loams and sands over bog iron) and red shallow loams.
	213AbABwy	Poorly drained depressions with some areas which become saline in summer. Shallow sands over clay subsoils (i.e. Abba Clays). Depressions susceptible to salinity. Wet and Semi-wet soils, Saline wet soils and Alkaline grey shallow sandy duplexes.
	213AbJD1	Well drained flats with sandy gradational grey brown (Busselton) soils, some red brown sands and loams (Marybrook Soils). Moderately well drained flats. Pale sandy earths, Semi-wet soils, Red/brown and Brown loamy earths with some Pale deep sands and Brown sandy earths.

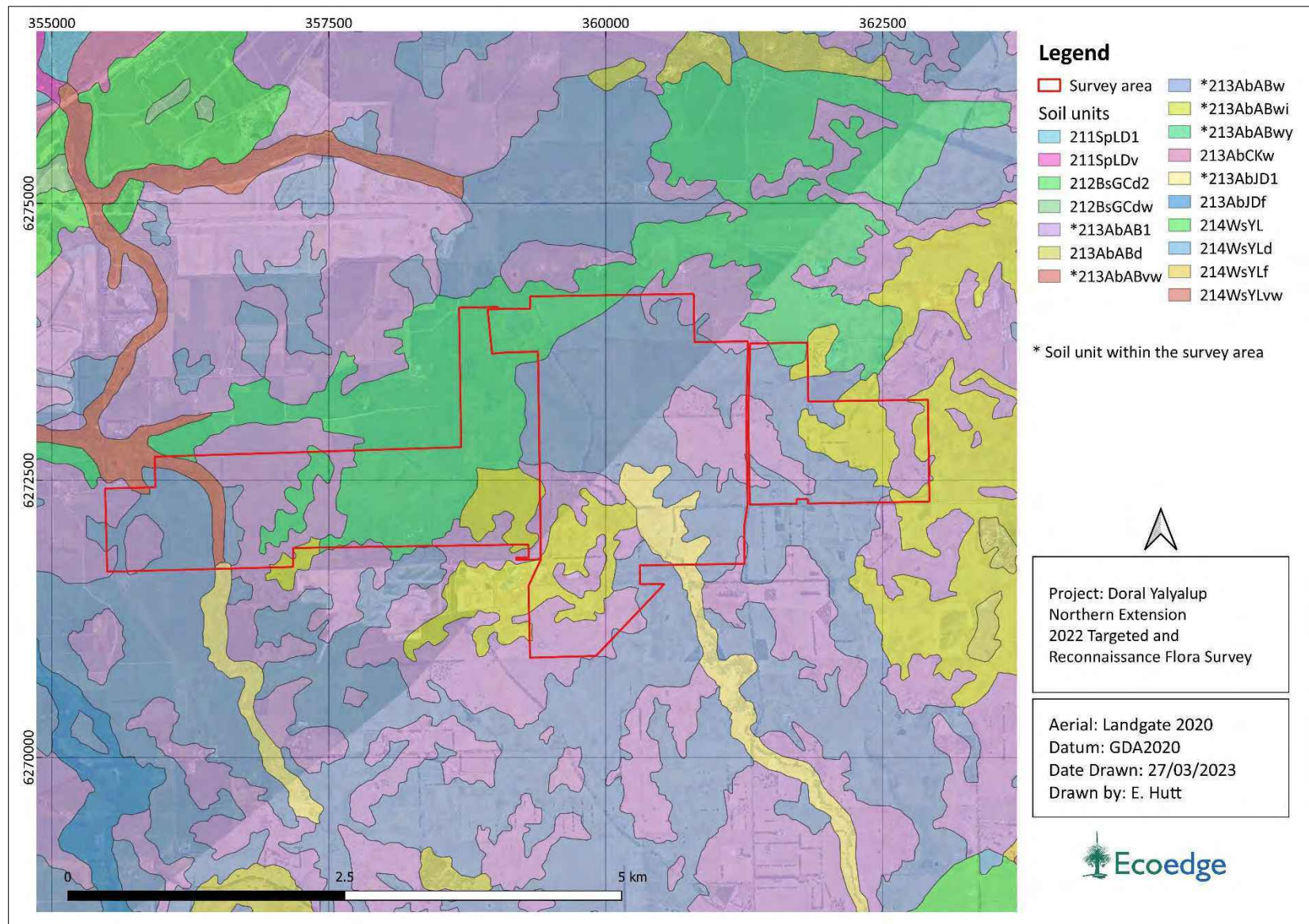


Figure 3. Soil units mapped in and nearby the survey area (Tille and Lantzke 1990).

5.3 Vegetation description according to pre-European mapping datasets

5.3.1 Vegetation complexes

Only one vegetation complex, the Abba Complex, occurs within the survey area according to the 1:50,000 mapping of South West Forest Region of Western Australia (Mattiske & Havel 1998) and the 1:250,000 mapping of vegetation complexes on the SCP (Hedde et al. 1980) as updated by Webb et al. (2016). This complex is described in **Table 3** and shown in **Figure 4**.

Table 3. Vegetation complex mapped for the survey area (Webb et al. 2016).

Vegetation Complex	Description
Abba Complex (30)	A mixture of open forest of <i>Corymbia calophylla</i> (Marri) - <i>Eucalyptus marginata</i> (Jarrah) - Banksia species and woodland of <i>Corymbia calophylla</i> (Marri) with minor occurrences of <i>Corymbia haematoxylon</i> (Mountain Marri). Woodland of <i>Eucalyptus rudis</i> (Flooded Gum) - Melaleuca species along creeks and on flood plains.

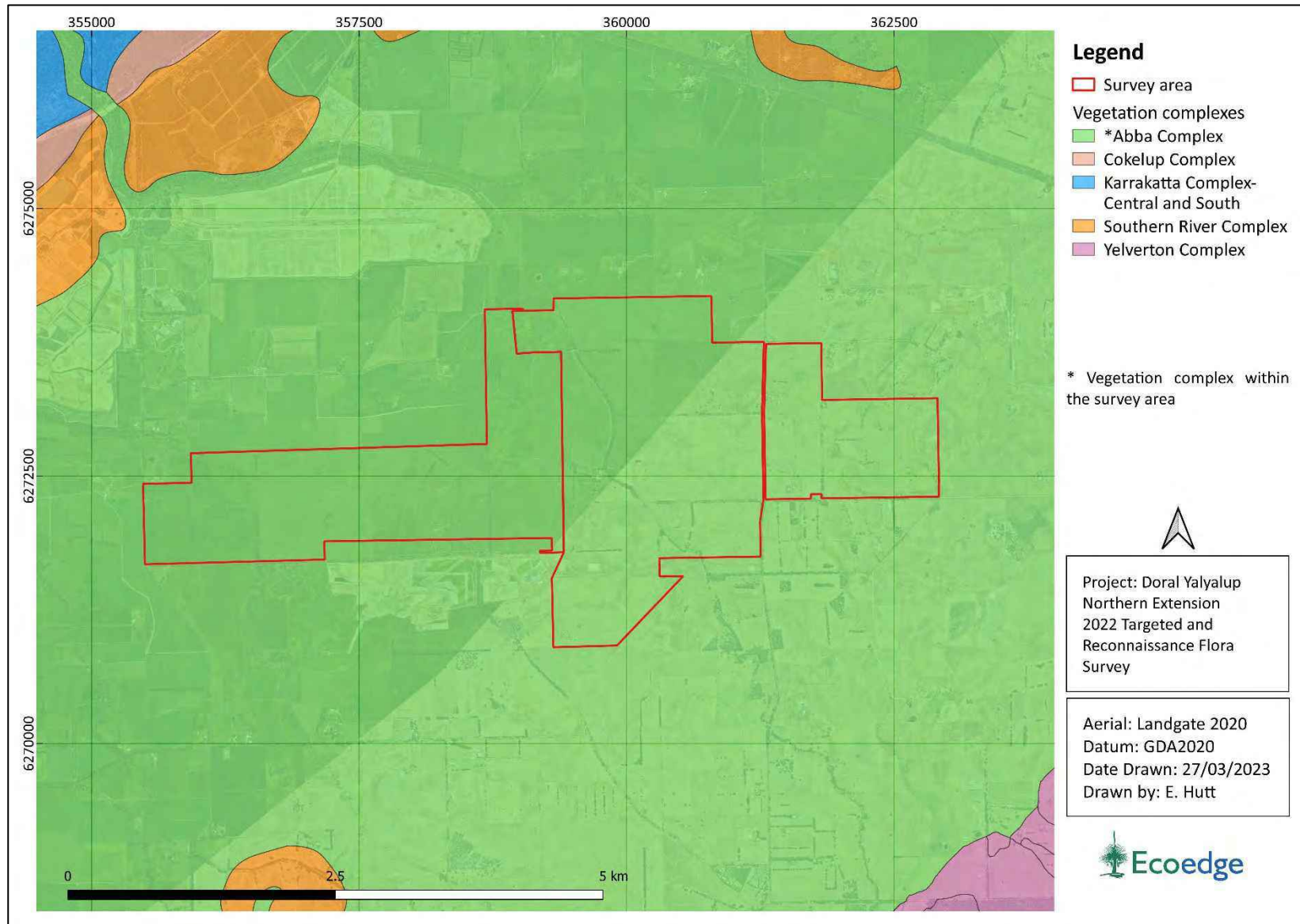


Figure 4. Vegetation complexes mapped in and nearby the survey area (Webb et al. 2016, DPaW 2018).

5.3.2 Vegetation associations

A systematic survey of native vegetation in Western Australia was undertaken by J. S. Beard (along with others) during the 1970s, which described vegetation systems in the southwest of WA at a scale of 1:250,000. Beard’s vegetation mapping attempted to depict the vegetation as it might have been prior to European settlement in terms of type and extent (Beeston et al. 2001). The Beard Vegetation Association dataset, also referred to as the pre-European native vegetation extent dataset, was digitised by Shepherd et al. (2002).

Beard Vegetation Associations have been described to a minimum standard of Level 3 ‘Broad Floristic Formation’ for the National Vegetation Inventory System (NVIS) (state-wide to regional scale)¹.

The survey area comprised of two Beard Vegetation Associations, which are described in **Table 4** and shown in **Figure 5**. The dominant association by area is Association 1136.

Table 4. Vegetation associations mapped for the survey area (Beard et al. 2013).

Vegetation Association	Description
973	Low forest; paperbark (<i>Melaleuca raphiophylla</i>)
1136	Medium woodland; marri with some jarrah, wandoo, river gum and casuarina

¹ Beard’s vegetation mapping units are referred to as ‘associations’ however these do not correspond to the NVIS Level 5 ‘Associations’. The NVIS system was developed long after Beard’s work was completed, and while both classification systems use the same term, NVIS ‘Associations’ describe vegetation in greater detail.

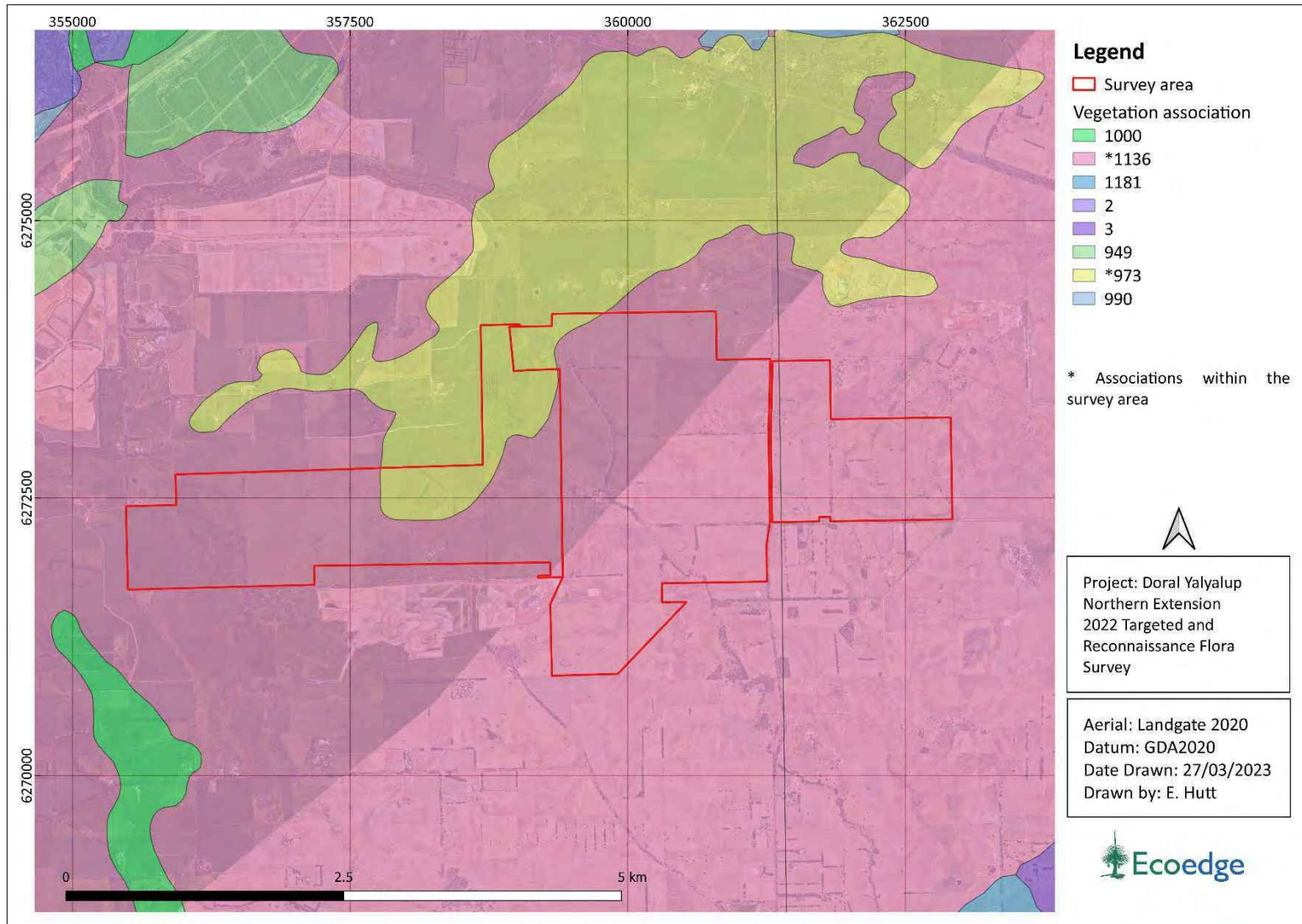


Figure 5. Vegetation associations mapped within and adjacent to the survey area (Beard et al. 2013).

5.3.3 Assessment of remaining extent against pre-European extent

In 2001, the Commonwealth of Australia stated National Targets and Objectives for Biodiversity Conservation, which recognised that the retention of 30%, or more, of the pre-clearing extent of each ecological community was necessary if Australia's biological diversity was to be protected (Environment Australia 2001).

In its report on the Statewide Vegetation Statistics incorporating the Comprehensive, Adequate and Representative (CAR) Reserve Analysis, the Government of Western Australia provides information on the pre-European and current extent of the ecological communities of Western Australia and reports on the status of the CAR reserve system for WA (Government of Western Australia, 2019a). This system is also based on the National retention targets of 30% overall. Only reserves managed by DBCA under the *Conservation and Land Management Act 1984* are considered for inclusion in the “CAR Reserve Analysis”.

An assessment of the Abba vegetation complex found within the survey area against the 2018 *South West Vegetation Complex Statistics* (Government of Western Australia 2019b) is presented in **Table 5**. The pre-European extent remaining of the Abba complex falls below the 30% Commonwealth retention target across the SCP and within the City of Busselton, with less than 10% remaining at both levels.

Table 6 presents similar statistics for the two Beard Vegetation Associations mapped across the survey area. While both associations are above the Commonwealth’s 30% retention target at a state-wide level, Association 1136 was poorly represented at IBRA region, IBRA sub region and local government levels with each falling below 10% extent remaining. Association 973 had less than 30% of extent vegetation remaining at IBRA region, IBRA sub region and local government levels.

The red, orange and yellow shading in the tables indicates the status of the Commonwealth 30% retention target.

Status of the Commonwealth retention target	>30%	<30%	<10%
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Table 5. Vegetation complex mapped within the survey area with regard to the Commonwealth retention targets (Government of Western Australia (GoWA) 2019a).

Vegetation Complex	Pre-European (ha)	Current Extent (ha)	% Remaining	% Remaining in DBCA Reserves
Abba Complex (30)				
Swan Coastal Plain	50,892.78	3,326.20	6.54	0.36
City of Busselton	41,535.96	2,756.41	6.64	-

* Excludes Crown Freehold Department Interest Lands that are managed under Section 8(a) of the CALM Act.

Table 6. The vegetation associations within the survey area with regards to the Commonwealth retention targets (GoWA 2019b).

Beard Vegetation Association	Pre-European (ha)	Current Extent (ha)	% Remaining	% remaining in DBCA Managed Land*
Association 973				
State-wide	5,003.27	1,895.60	37.89	5.00
IBRA region: Swan Coastal Plain (SWA)	2,510.53	410.22	16.34	6.89
IBRA sub-region Perth (SWA02)	2,510.53	410.22	16.34	6.89
City of Busselton	2,534.27	415.78	16.41	6.93
Association 1136				
State-wide	86,320.42	32,026.02	37.10	19.01
IBRA region: Swan Coastal Plain (SWA)	48,118.01	3,341.18	6.94	0.27
IBRA sub-region Perth (SWA02)	48,118.01	3,341.18	6.94	0.27
City of Busselton	38,946.49	2,640.77	6.78	0.21

* Excludes Crown Freehold Department Interest Lands that are managed under Section 8(a) of the CALM Act.

5.4 Threatened and Priority ecological communities

Ecological communities are defined by Western Australia’s DBCA as “...naturally occurring biological assemblages that occur in a particular type of habitat. They are the sum of species within an ecosystem and, as a whole, they provide many of the processes which support specific ecosystems and provide ecological services.” (DEC 2013).

Under Section 27 of the *Biodiversity Conservation Act 2016* (BC Act), the Western Australian Minister for Environment may list communities considered to be under significant threat as a Threatened ecological community (TEC). These TECs can be listed under one of three conservation categories: Critically Endangered (CR), Endangered (EN), Vulnerable (VU). The BC Act also provides for listing communities as collapsed ecological communities.

Possible TECs that do not meet survey criteria are added to the DBCA’s Priority ecological community lists under Priorities 1, 2 or 3 (referred to as P1, P2, P3). Ecological communities that are adequately known, are rare but not Threatened, or meet criteria for near Threatened, or that have been recently removed from the Threatened list, are placed in Priority 4 (P4). These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5 (P5) (DEC 2013).

The current listing of Threatened and Priority ecological communities is specified in BC Act (DBCA 2018, 2021a). The conservation categories for these Threatened and Priority ecological communities are defined in **Appendix 4**.

TECs can also be listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). There are three categories of TEC under the EPBC Act: Critically Endangered (CR), Endangered (EN) and Vulnerable (VU) (Department of Climate Change, Energy, the Environment and Water) (DCCEEW 2022b). These are defined in **Appendix 5**.

Under both the State BC Act and the Federal EPBC Act, ministerial authorisation is required where significant permanent modification to a TEC will occur.

Noting that if an occurrence of a TEC is found during a survey conducted under the auspices of the *Environmental Protection Act 1986* (EP Act), it must be mandatorily reported to the Chief Executive Officer of the DBCA under Section 49 of the BC Act.

The desktop assessment found nine EPBC Act listed TEC and seven BC Act listed TEC occurring within 10 km of the survey area, based on results generated from an extract from the DBCA databases (DBCA 2022a) and a 10 km radius Protected Matters Search Tool (PMST) query (DCCEEW 2022a). Fourteen PECs were recorded in the search area. These communities are listed in **Table 7**.

Of these communities, only the ‘Shrublands on southern Swan Coastal Plain Ironstones (Busselton area)’ TEC (Shrublands on southern SCP Ironstones) has a buffer over the survey area as shown in **Figure 6** (DBCA 2022a).

Copies of the NatureMap and PMST data searches are provided in **Appendix 6**.

Table 7. Threatened and Priority ecological communities occurring and possibly within 10 km of the survey area (DBCA 2022a, DCCEE 2022a).

Community Name	Status State (BC Act)	Status Cth (EPBC Act)
Shrublands on southern Swan Coastal Plain Ironstones (Busselton area) (SCP10b)	T (CR)	EN
Claypans of the Swan Coastal Plain – comprising of four state-listed ecological communities, all of which occur in the study area: <ul style="list-style-type: none"> • Herb rich saline shrublands in clay pans (SCP07) – Vulnerable • Herb rich shrublands in clay pans (SCP08) – Vulnerable • Dense shrublands on clay flats (SCP09) - Vulnerable • Shrublands on dry clay flats. (SCP10a) – Endangered. 	T (VU-EN)	CR
Southern wet shrublands, Swan Coastal Plain (SCP02)	T (EN)	na
<i>Corymbia calophylla</i> woodlands on heavy soils of the southern Swan Coastal Plain (SCP1b)	T (VU)	na
Tuart (<i>Eucalyptus gomphocephala</i>) woodlands and forests of the Swan Coastal Plain	P3	CR
‘Banksia Woodlands of the Swan Coastal Plain’ – a federally listed TEC which can occur in a number of State-listed communities, three of which occur in the study area: <ul style="list-style-type: none"> • Central Whicher Scarp Mountain Marri woodland (Whicher Scarp woodlands of grey/white sands) (Whicher Scarp A1) – Priority 1 • Whicher Scarp Jarrah woodland of deep coloured sands (Whicher Scarp C2) – Priority 1 • Southern <i>Banksia attenuata</i> woodlands (SCP21b) – Priority 3 	P1-P3	EN
Subtropical and Temperate Coastal Saltmarsh	P3	VU
Busselton Yate Community - <i>Eucalyptus cornuta</i> , <i>Agonis flexuosa</i> and <i>Eucalyptus decipiens</i> forest on deep yellow-brown siliceous sands over limestone	P1	na

<i>Eucalyptus rudis</i> , <i>Corymbia calophylla</i> , <i>Agonis flexuosa</i> Closed Low Forest (near Busselton)	P1	na
Central Whicher Scarp Jarrah woodland (Whicher Scarp woodlands of coloured sands laterites) (Whicher Scarp C1)	P1	na
Sabina River Jarrah and Marri woodland (Whicher Scarp F1)	P1	na
Shrublands of near permanent wetlands in creeklines of the Whicher Scarp (Whicher Scarp G2)	P1	na
Swan Coastal Plain Paluslope Wetlands (Whicher Scarp Paluslope Wetlands)	P1	na
Wooded wetlands that support colonial waterbird nesting areas (Wooded waterbird wetlands)	P2	na
<i>Eucalyptus haematoxylon</i> - <i>E. marginata</i> woodlands on Whicher foothills (SCP1a)	P3	na

Note: This table only includes formally recognised TECs that are known of and mapped and included in the DBCA's database.

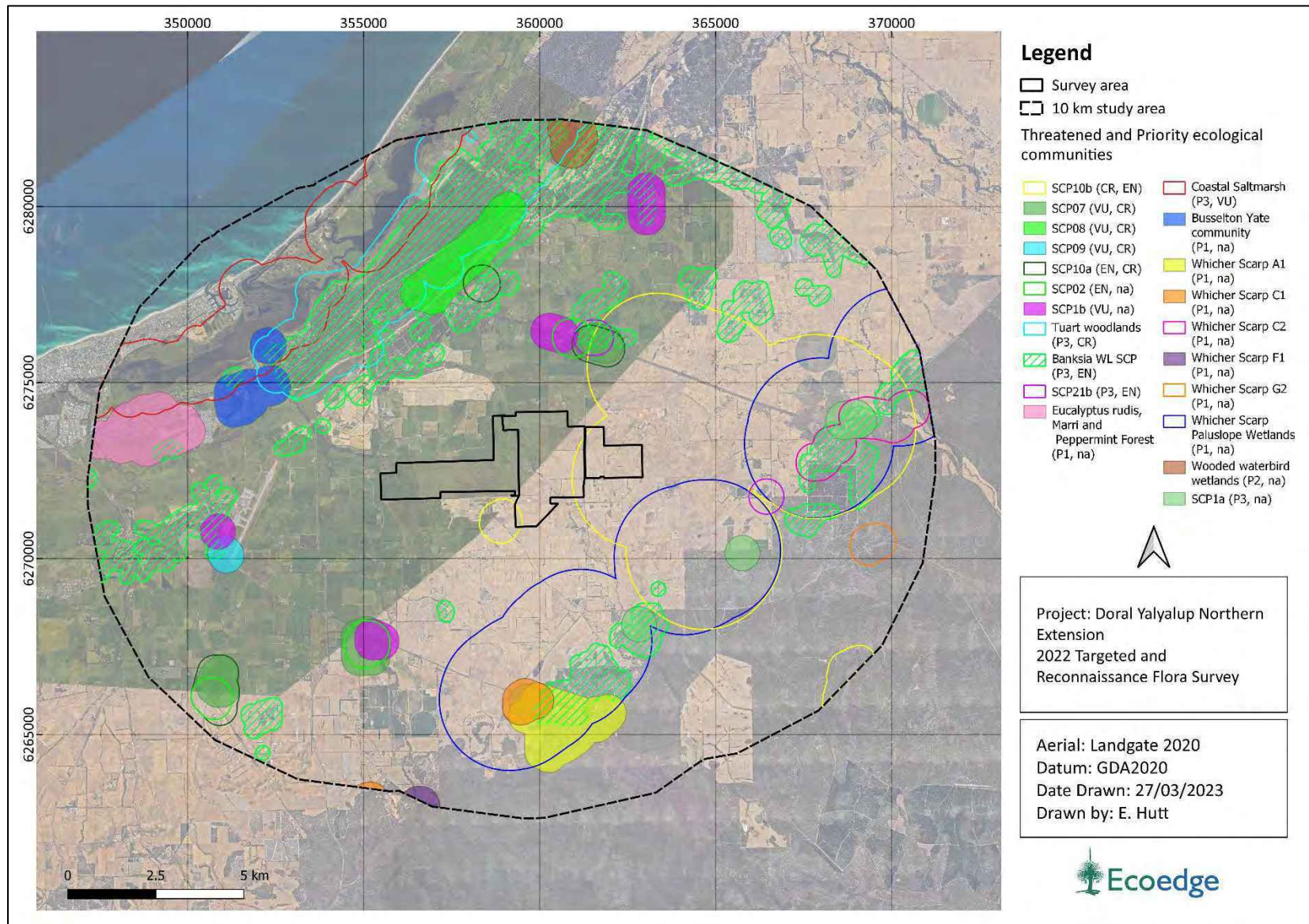


Figure 6. Location of TECs and PECs within a 10 km radius of the survey area (DBCA 2022a).

5.5 Threatened and Priority flora

Species of flora are defined as having a Threatened or Priority conservation status where their extant populations are restricted geographically and/or under threat of possible extinction. The DBCA recognises these threats and consequently applies regulations towards population and species protection.

Threatened extant flora species are listed under Section 19 of the BC Act. They are ranked according to their level of threat using the International Union for Conservation of Nature (IUCN) Red List categories and criteria of Critically Endangered (CR), Endangered (EN), Vulnerable (VU). It is an offence to “take” or damage Threatened flora without Ministerial approval. Section 5 of the Act defines “to take” as “... to gather, pluck, cut, pull up, destroy, dig up, remove, harvest or damage flora by any means”.

Priority flora is under consideration for future declaration as “Threatened flora”, dependent on more information. Species classified as Priority One to Three (referred to as P1, P2 and P3) require further survey to determine their status. Priority Four (P4) species are adequately known rare or Threatened species that require regular monitoring.

Threatened flora lists are formally reviewed annually, whilst the Priority flora list is subject to a less formal ongoing review. The current listing of Threatened and Priority flora was updated on the 6 October 2022 (DBCA 2022b).

Categories of Threatened and Priority flora as defined by the BC Act are presented in **Appendix 7** (DBCA 2019).

Threatened flora may also be protected under the Commonwealth EPBC Act and be listed in one of six categories; the definitions of these categories are summarised in **Appendix 8** (DCCEEW 2020).

Searches for significant flora occurring and possibly occurring within the study area were conducted with a Protected Matters Search Tool query (DCCEEW 2022a), Naturemap search (DBCA 2022c) and DBCA Threatened and Priority Flora data search query (DBCA 2022d). The results of the Protected Matters and Naturemap searches are provided in **Appendix 6**. Full results of all database searches are provided in a likelihood of occurrence table in **Appendix 9**.

Ninety-two significant flora and one significant fungi (*Amanita kalamundae*) were identified within the study area. Of these, eight taxa were recorded within in the survey area, 11 were considered ‘likely to occur’, 53 taxa were ‘possible’ and 21 ‘unlikely’ to occur within the survey area. The recorded and ‘likely’ occurring taxa are listed in **Table 8**. Eleven of these are Threatened species. **Table 9** provides a summary of the pre-survey likelihood of occurrence according to conservation status. The location of DBCA database (2022d) Threatened and

Priority flora within both the 10km study and survey area are shown in respectively in **Figure 7** and **Figure 8**.

Table 8. Significant flora assessed as likely to occur and recorded within the survey area.

No.	Species	Cons status	Recorded	Likely
1	<i>Banksia nivea</i> subsp. <i>uliginosa</i>	T (EN)	x	
2	<i>Chamelaucium roycei</i>	T (EN)	x	
3	<i>Darwinia whicherensis</i>	T (EN)		x
4	<i>Drakaea elastica</i>	T (EN)	x	
5	<i>Gastrolobium papilio</i>	T (EN)		x
6	<i>Grevillea elongata</i>	T (EN)	x	
7	<i>Grevillea maccutcheonii</i>	T (EN)		x
8	<i>Lambertia echinata</i> subsp. <i>occidentalis</i>	T (EN)		x
9	<i>Petrophile latericola</i>	T (EN)		x
10	<i>Verticordia plumosa</i> var. <i>vassensis</i>	T (EN)	x	
11	<i>Banksia squarrosa</i> subsp. <i>argillacea</i>	T (VU)		x
12	<i>Andersonia ferricola</i>	P1		x
13	<i>Amperea micrantha</i>	P2		x
14	<i>Calytrix retrorsifolia</i>	P2		x
15	<i>Hakea oldfieldii</i>	P3	x	
16	<i>Isopogon formosus</i> subsp. <i>dasylepis</i>	P3		x
17	<i>Loxocarya magna</i>	P3	x	
18	<i>Stylidium paludicola</i>	P3		x
19	<i>Calothamnus quadrifidus</i> subsp. <i>teretifolius</i>	P4	x	

Table 9. Likelihood of occurrence according to conservation status.

Likelihood of occurrence	Total number	Priority 1	Priority 2	Priority 3	Priority 4	Threatened
Previously Recorded	8	-	-	2	1	5
Likely	11	1	2	2	-	6
Possible	53	5	7	20	13	8
Unlikely	21	1	6	7	3	4
Total	93	7	15	31	17	23

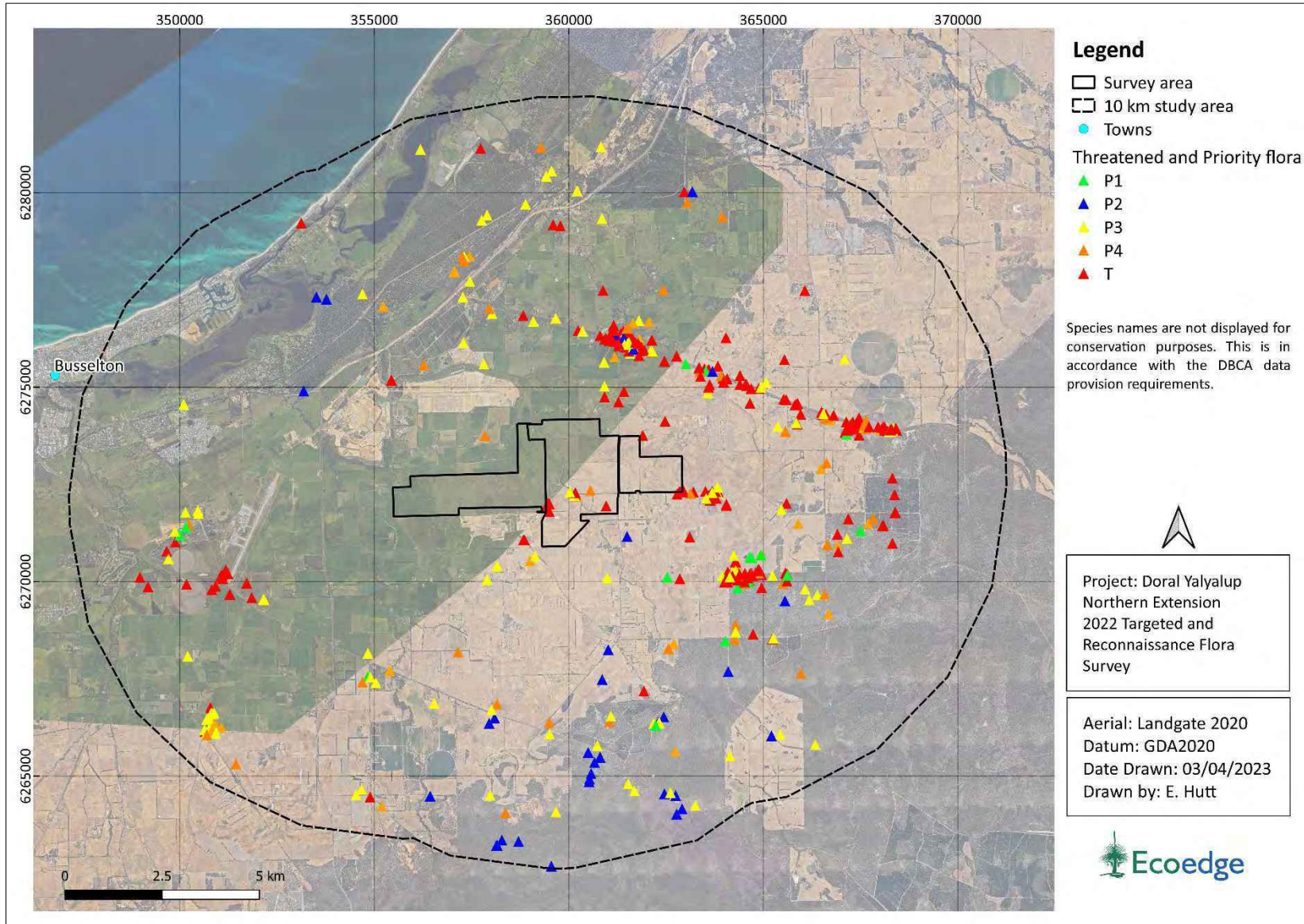


Figure 7. Location of Threatened and Priority flora occurring within the study area (DBCA 2022d).

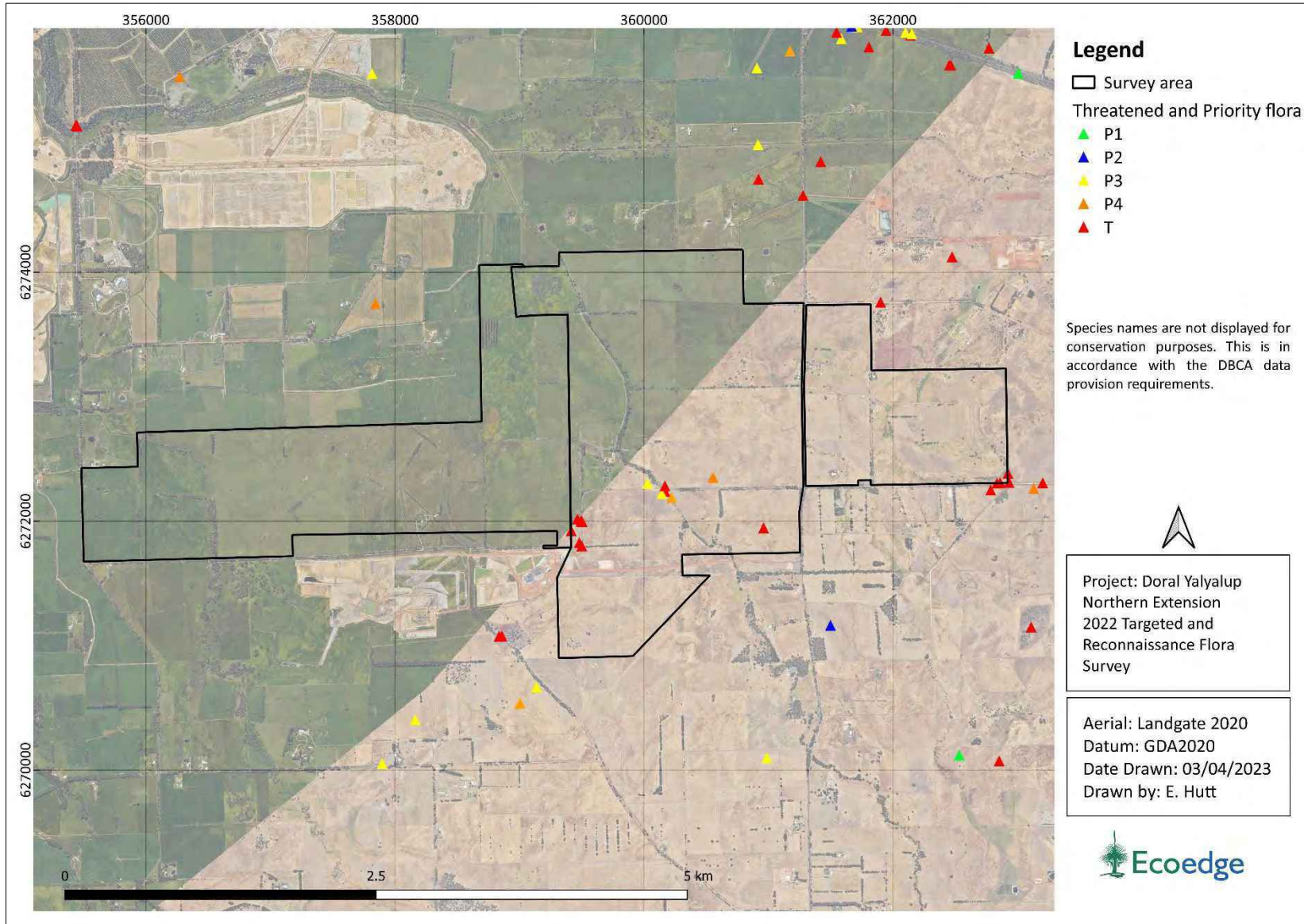


Figure 8. Location of Threatened and Priority flora occurring within the survey area (DBCA 2022d).

5.6 Wetlands and watercourses

Wetlands on the Swan Coastal Plain have been classified into types using the geomorphic wetland classification system of Semeniuk & Semeniuk (1995), which is based on the characteristics of landform and water permanence, for example, lakes, palusplains and damplands. These are described in **Table 10**. The Swan Coastal Plain wetlands have also been evaluated and assigned an appropriate management category and corresponding category objective, providing guidance on the nature of the management and protection the wetland should be afforded. These categories are described in **Table 11**.

Table 10. Wetland types (adapted from Semeniuk & Semeniuk, 1995).

Management Category	Basin	Flat	Channel	Slope	Highland
Permanently inundated	Lake	-	River	-	-
Seasonally inundated	Sumpland	Floodplain	Creek	-	-
Intermittent inundation	Playa	Barlkarra	Wadi	-	-
Seasonally waterlogged	Dampland	Palusplain	Trough	Paluslope	Palusmont

Table 11. Definitions of and objectives for the different wetland management categories (EPA 2008).

Management Category	Definition	Category Objective
Conservation	Wetlands with high conservation value for both natural or human use.	To preserve wetland (natural) attributes and functions.
Resource Enhancement	Wetlands with moderate natural and human use attributes that can be restored or enhanced.	To restore wetlands through maintenance and enhancement of wetland functions and attributes.
Multiple Use	Wetlands that score poorly on both natural and human use attributes.	To use, develop and manage wetlands in the context of water, town and environmental planning.

A system of wetlands is mapped across almost the entire survey area, expressed as seasonally waterlogged flat palusplain covering most of the northern and eastern portions of the survey area, changing into seasonally inundated floodplains to the west and southern portions of the

survey area (**Figure 9**). There are areas sloping into damplands and sumpland between the tributaries of the Abba River which flows seasonally through the middle of the survey area (**Figure 9**). These wetlands have all been categorised as Multiple Use (**Figure 10**). There are no conservation category wetlands nor any other wetland of significance within or within close proximity to the survey area. The nearest conservation category wetland occurs 2.1 km NW of the survey area and the Vasse-Wonnerup Wetland (Ramsar Site 484) is located approximately 5 km to the north west of the survey area (DCCEEW 2021) with the Abba and Sabina river tributaries running through the survey area towards the wetland (**Figure 10**).

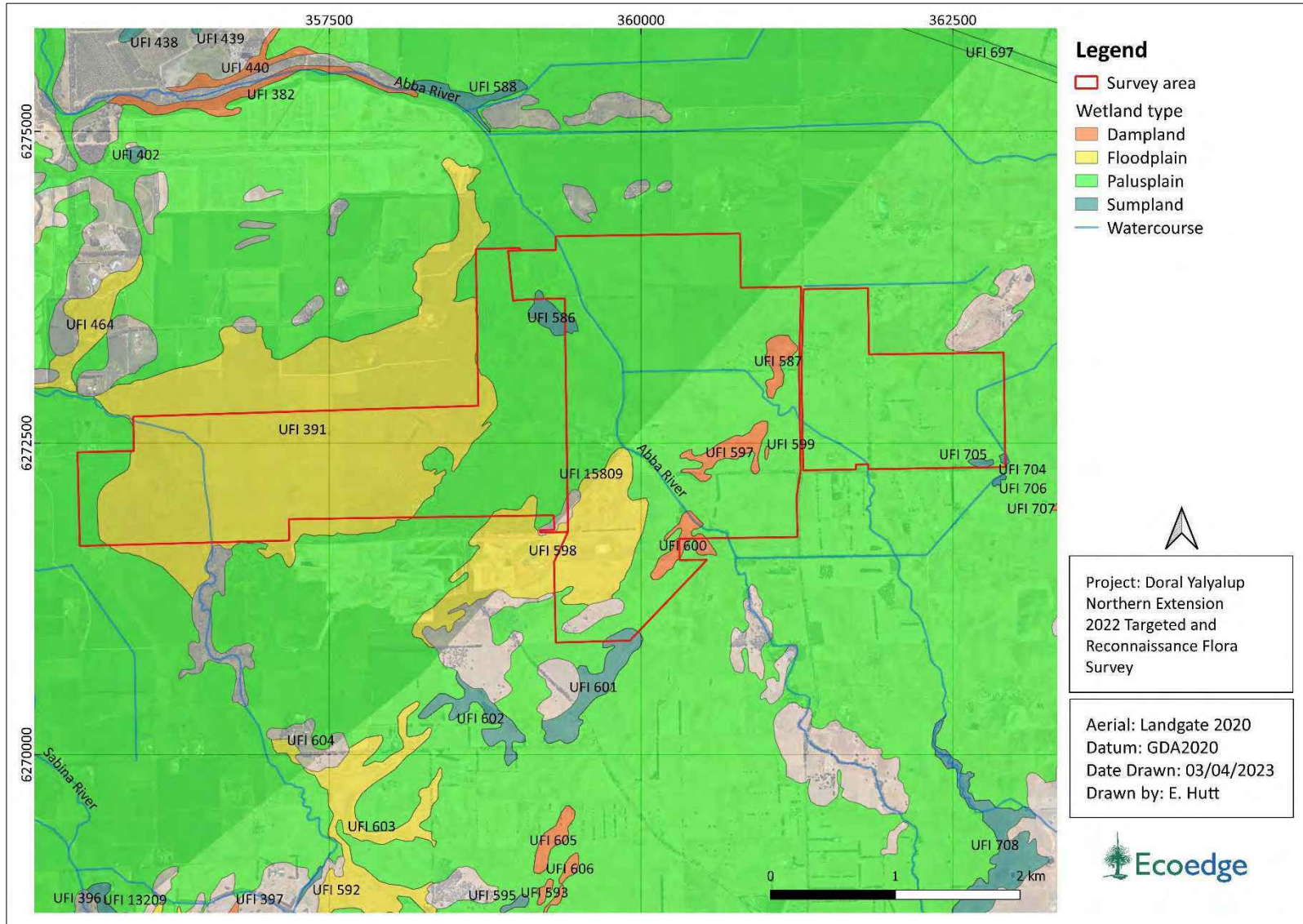


Figure 9. Geomorphic wetlands within and in proximity to the survey area (DBCAs 2022e).

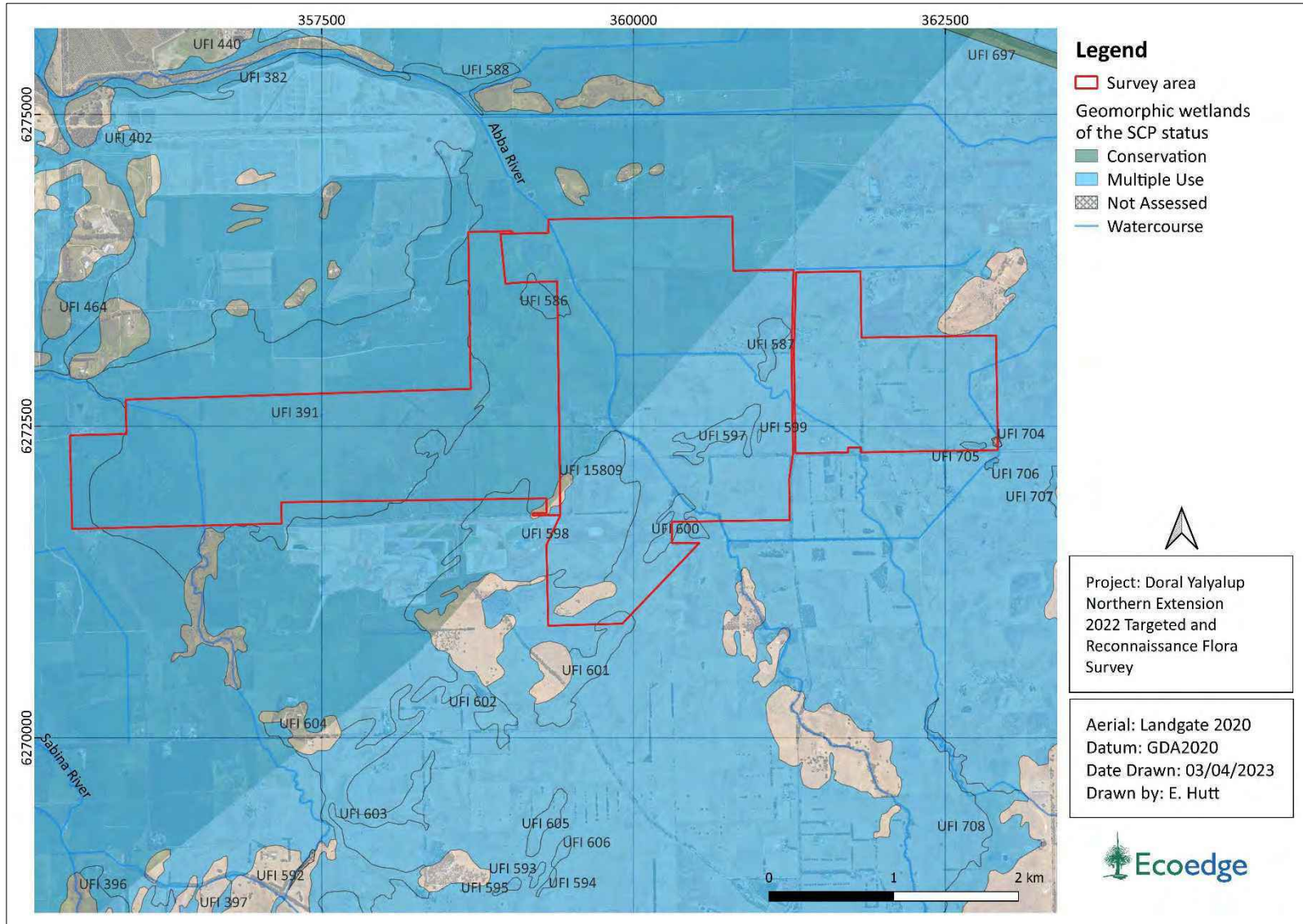


Figure 10. Geomorphic wetland status within and in proximity to the survey area (DBCA 2022e).

5.7 Regional ecological linkages

Regional ecological linkages “link protected patches of regional significance by retaining the best (condition) patches available as stepping stones for flora and fauna between regionally significant areas” (Molloy et al. 2009).

Regional ecological linkages have been mapped by Molloy et al. (2009) across the SW of WA in an area spanning between just north of Mandurah to Walpole in the southeast.

Molloy et al. (2009) assessed and assigned ‘proximity value’ (PV) ratings to all patches of remnant native vegetation as a way of indicating the value of their connectivity with regional ecological linkages. This was based on their distance from the nearest mapped regional ecological linkage axis line and connected parcels of remnant vegetation (**Table 12**).

Table 12. Linkage proximity values rating assigned to patches of remnant vegetation within a landscape by Molloy et al. (2009).

Proximity value	Description
1a	with an edge touching or < 100 m from a linkage
1b	with an edge touching or < 100 m from a natural area selected in 1a
1c	with an edge touching or < 100 m from a natural area selected in 1b
2a	with an edge touching or < 500 m from a linkage
2b	with an edge touching or < 500 m from a natural area selected in 2a
2c	with an edge touching or < 500 m from a natural area selected in 2b
3a	with an edge touching or < 1000 m from a linkage
3b	with an edge touching or < 1000 m from a natural area selected in 3a
3c	with an edge touching or < 1000 m from a natural area selected in 3b

The survey area is located within a network of regional ecological axis lines linking the Millbrook State Forest and Whicher National Park in the south to the Vasse-Wonnerup Wetlands and Ludlow State Forest to the north. There are few vegetation parcels within the survey area with a linkage PV rating due to the cleared and grazed condition of the vegetation. These patches of remnant vegetation have a PV rating of 3b and 3c based on their levels of separation from the axis lines and proximity to the Abba River tributaries (**Figure 11**).

5.8 Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are protected under the Environmental Protection (Clearing of Native Vegetation) Regulations 2004. They are selected for their environmental values at State or National levels (Government of Western Australia 2005). They include:

- Defined wetlands and riparian vegetation within 50 m,
- Areas covered by Threatened ecological communities,
- Area of vegetation within 50 m of Threatened flora,
- Bush Forever sites,
- Declared World Heritage property sites.

There are three ESAs within the survey area that are linked to Threatened flora locations and there is one ESA which is associated with the 'Shrublands on southern SCP Ironstones TEC. This intersects the survey area in the eastern portion and covers approximately 170.4 ha of the survey area (**Figure 12**).

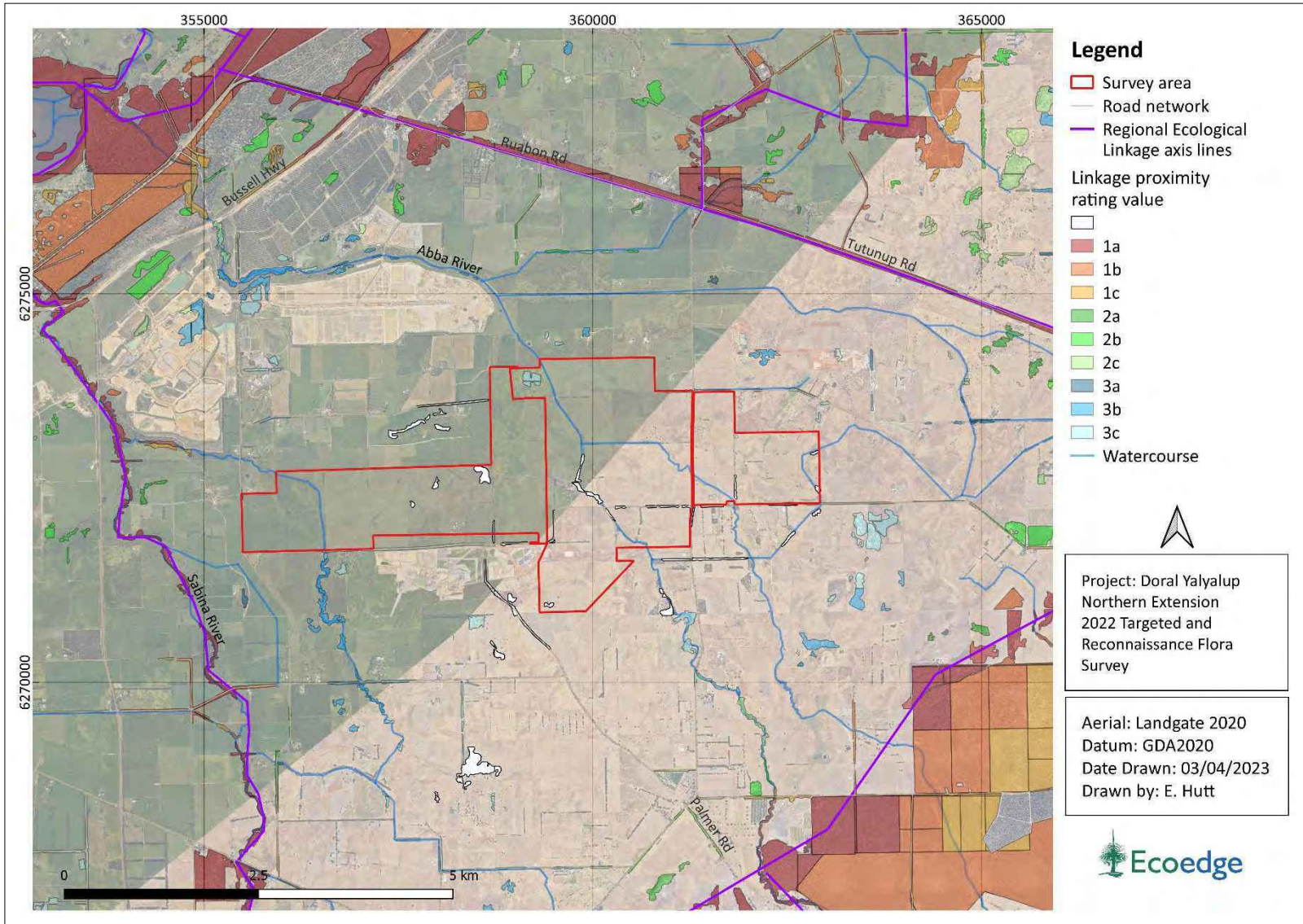


Figure 11. The survey area in relation to regional ecological linkages (Molloy et al. 2009).

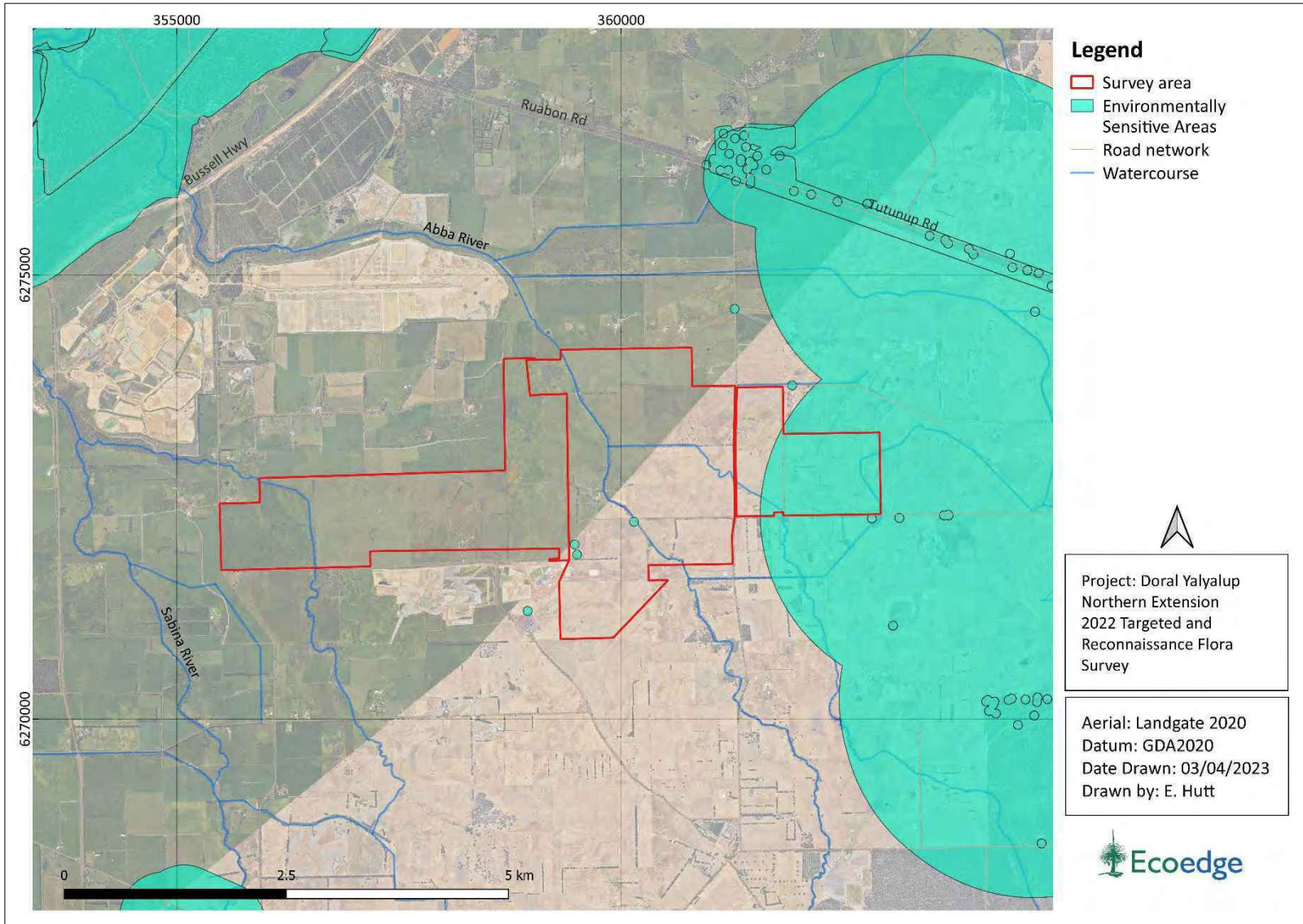


Figure 12. Environmental Sensitive Areas within and in proximity to the survey area (DWER 2021).

5.9 Other reports

Three flora and vegetation reports and one Groundwater Dependent Ecosystem (GDE) relevant to the current survey area have been undertaken previously and are summarised below. These are relevant because they occur over or are directly adjacent to the survey area and present the most current assessment of the survey to date (**Figure 13**). They are presented in chronological order.

Ecoedge (2016). Report of a Level 1 Flora and Vegetation survey at the Yalyalup Proposed Mine Area. February 2016. Revised 2020.

- A Level 1 Flora and Vegetation Survey of remnant vegetation was carried out on the 16 September, 13 and 14 October 2015 and 18 February 2016.
- The survey area was 1,546 ha in size, with approximately 78 ha of remnant native vegetation.
- One hundred and forty-nine taxa of vascular plants were identified, of which 57 taxa (38%) were introduced species.
- Two taxa of Declared Rare (Threatened) Flora (*Banksia squarrosa* subsp. *argillacea* and *Verticordia plumosa* var. *vassensis*) and two Priority flora (*Loxocarya magna* and *Calothamnus quadrifidus* subsp. *teretifolius*) were found within the survey area.
- There were two declared pest plants found within the survey area (*Asparagus asparagoides** and *Zantedeschia aethiopica**).
- Eight vegetation units were recognised within the survey area. Vegetation Unit A1 (degraded form of SWAFCT01b), A2 (characteristics of SWAFCT01b and SWAFCT02), B1 (SWAFCT10b), B2 (severely degraded form of SWAFCT10b), C1 (Riverine Jindong Plant Communities), C2 (completely degraded condition), C3 (similarities to SWAFCT09 and in Degraded/Good or Good condition) and D (completely degraded SWAFCT21b).
- Report was updated in May 2020 to address the assessment of rare flora and threatened ecological communities at a regional level.

Ecoedge (2017). Yalyalup Mineral Sands Project. EP Act Supporting Document. Unpublished report prepared for Doral Mineral Sands Pty Ltd.

- Ecoedge conducted a flora and vegetation survey in 2016 to provide Doral information to supplement the company's proposal to the EPA.
- One hundred and forty-nine taxa of vascular plants were identified, of which 57 taxa were introduced species.
- Two Threatened flora species were recorded in the survey area - *Banksia squarrosa* subsp. *argillacea* and *Verticordia plumosa* var. *vassensis*.

- There was a total of nine individuals in the *B. squarrosa* subsp. *argillacea* population, a decline of five individuals from 2003.
- The *V. plumosa* var. *vassensis* population was estimated to be 30 individuals, a decline from 200+ plants in 1996 and 100+ in 2006.
- Two Priority flora species were recorded in the survey area – *Loxocarya magna* (P3) and *Calothamnus quadrifidus* subsp. *teretifolius* (P4).
- Two declared pest plant taxa were recorded in the survey area – *Asparagus asparagoides* and *Zantedeschia aethiopica*. *Z. aethiopica* was observed to widespread throughout the survey area and *A. asparagoides* was restricted to four locations.

Ecoedge (2019a). A Review and Impact Assessment of Potential Water Drawdowns on Groundwater Dependent Ecosystems at the Proposed Yalyalup Mineral Sands Project. Unpublished report prepared for Doral Mineral Sands Pty Ltd.

- There were occurrences of TECs ‘Southern Wet shrublands’ (SCP02), ‘Shrublands on southern ironstones’ (SCP10b) and ‘Southern *Corymbia calophylla* woodlands on heavy soils’ (SCP01b).
- Survey describes seven vegetation units its survey area – A1, A2, B1, B2, C1, C2 and C3. These vegetation units were classified as mostly in Degraded or Completely Degraded condition.

Ecoedge (2019b). Supplementary Reconnaissance and Targeted Flora and Vegetation survey. Yalyalup Proposed Mine Area. Unpublished report prepared for Doral Mineral Sands Pty Ltd.

- Supplementary surveys were conducted in May and September 2019 as an addendum to reports for Ecoedge in 2017.
- Two Threatened flora taxa were recorded within the survey area - *Banksia squarrosa* subsp. *argillacea* and *Verticordia plumosa* var. *vassensis*.
- Four Priority flora taxa were recorded within the survey area - *Loxocarya magna* (P3), *Grevillea brachystylis* subsp. *brachystylis* (P3), *Calothamnus quadrifidus* subsp. *teretifolius* (P4) and *Acacia flagelliformis* (P4).

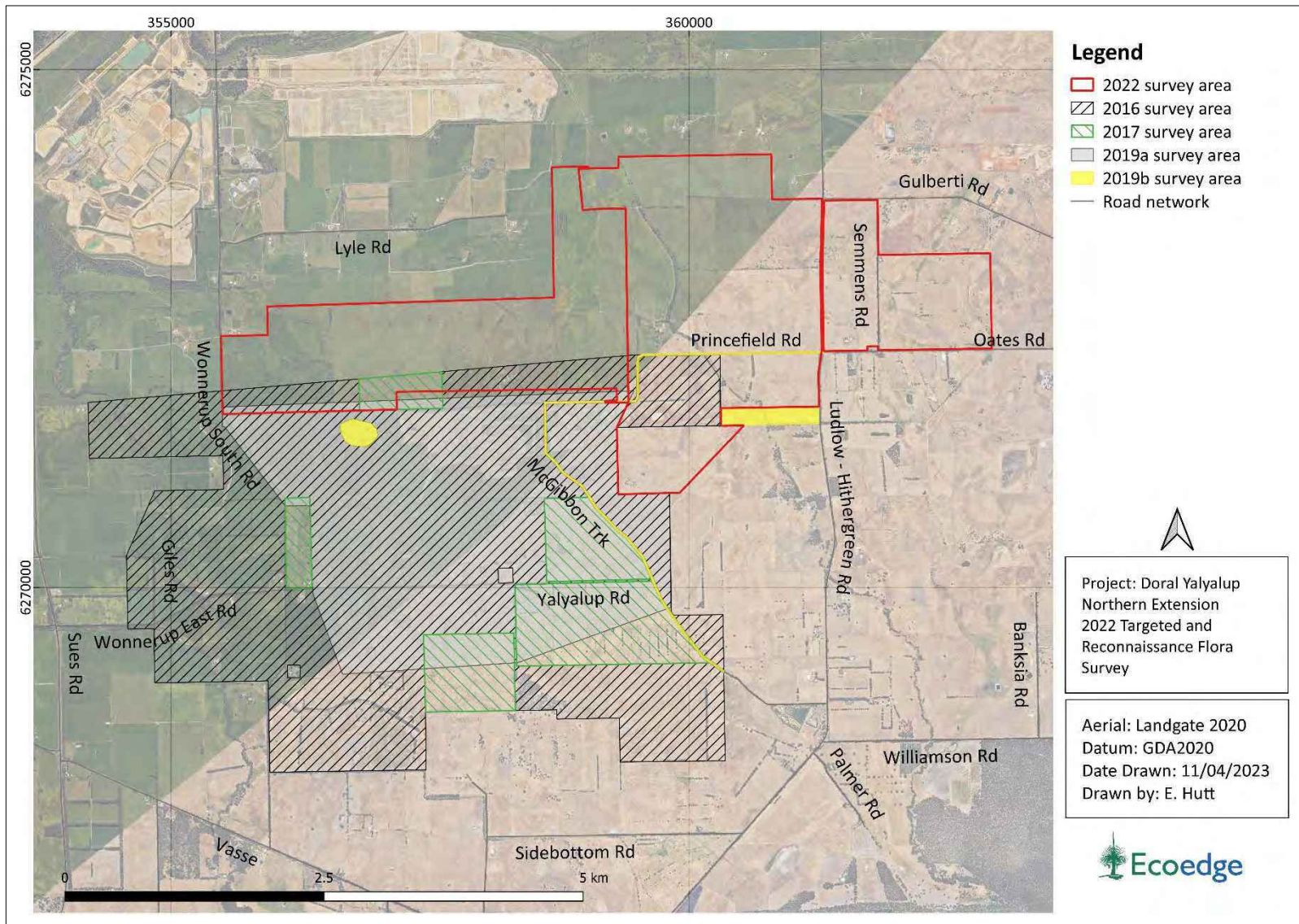


Figure 13. The survey area in relation to other previous relevant flora and vegetation surveys (Ecoedge 2016, Ecoedge 2017, Ecoedge 2019a & 2019b).

6 Survey results

6.1 Flora

Seventy-two taxa of vascular plants were identified during the survey, of which 27 taxa (38%) were introduced species. The relatively low number of native species found within the approximately 30.5 ha of native vegetation in the survey area is a result of many years of degradation of the small fragments of native bush.

The Fabaceae with 11 taxa (including four introduced species), Proteaceae with 16 taxa, and Myrtaceae with 17 taxa (four of them being planted tree species) were the dominant genera.

A list of species found during this survey is provided in **Appendix 10**.

6.2 Threatened and Priority flora

One species of Threatened Flora (*Verticordia plumosa* var. *vassensis*) was found in the survey area (**Figure 14**). These species were found in the same location as those reported in (Ecoedge 2019b). Four Priority flora (*Acacia flagelliformis*, *Calothamnus quadrifidus* subsp. *teretifolius*, *Grevillea brachystylis* subsp. *brachystylis*, and *Loxocarya magna*) were found within the survey area (**Table 13**) The location of these species is shown on **Figure 15**, **Figure 16** and **Figure 17**.

Table 13. Locations of Threatened and Priority Flora within the survey area.

Taxon	Cons Status	Number	Location
<i>Acacia flagelliformis</i>	P4	13	Princefield Road
<i>Calothamnus quadrifidus</i> subsp. <i>teretifolius</i>	P4	12	Cooper's Road Drain Reserve
		5	Oates Road
<i>Grevillea brachystylis</i> subsp. <i>brachystylis</i>	P3	2	Princefield Road
<i>Loxocarya magna</i>	P3	1	Cooper's Road Drain Reserve
		3	Princefield Road
<i>Verticordia plumosa</i> var. <i>vassensis</i>	T (EN)	26	Princefield Road

The DBCA (2022d) database recorded several other populations of Threatened and Priority species within the survey, including *Chamelaucium roycei* (T, EN), *Banksia nivea* subsp. *uliginosa* (T, EN), *Verticordia plumosa* var. *vassensis* (T, EN), *Grevillea longate* (T, EN), ²*Drakaea elastica* (T, EN) and *Hakea oldfieldii* (P3). These species were searched for but were not able to be re-located. It appeared that these populations had disappeared because of ongoing degradation of the site. Information on the absence of *Chamelaucium roycei* and *Hakea oldfieldii*, previously recorded in the Cooper's Road Drain Reserve is given in Ecoedge (2019b).

Copies of the DBCA threatened and priority reporting forms are provided in **Appendix 11**.

6.2.1 Post-survey likelihood assessment

Of the 93 significant taxa known or potentially occurring within the survey area, five were recorded during the survey (**Table 14**). The remaining 88 taxa were deemed to have an 'unlikely' residual likelihood of occurring within the survey area. The residual likelihood rating and rationale for the rating for each species is provided in **Appendix 8**.

Seven of the 88 species were given an Unlikely rating because no suitable habitat occurred within the survey area. For the majority of the cases (81) the reason for the 'unlikely' residual likelihood was because whilst suitable or potential habitat was present in the survey area, and appropriately searched the taxon was not observed. Seventy-five of these 81 species were within their optimum identification period at the time of survey and could have been readily identified from material observed during the survey period. Six of the 81 species, however, were outside of their optimum identification period. These species include the Threatened orchid *Drakaea elastica* and five verticordia species. These six species are all listed in **Table 14** together with the reason why they were also given a post survey Unlikely to occur rating.

² In the instance of *Drakaea elastica* the known occurrence was not investigated because it occurred within the middle of a cleared paddock hundreds of metres from any native vegetation and because the location of the record was uncertain being dated at 1986 with a vague written description.

Table 14. Post survey likelihood assessment for potentially occurring species that were within their suboptimum identification period during survey.

No.	Species	Status	Optimum survey time	Presurvey likelihood	Post survey likelihood	Rationale
1	<i>Drakaea elastica</i>		Late winter	Likely	Unlikely (U2)	The survey period was outside of the optimum Late winter survey period for <i>D. elastica</i> , however it could be observed and identified, if present, by close attention to potential habitat with commonly co-occurring 'indicator' species such as <i>Drakaea glyptodon</i> and <i>Paracaleana nigrita</i> . A search of potential habitat areas, such as vegetated areas with grey sandy infertile soils adjacent to damplands such as some parts of vegetation unit A1 showed no evidence of <i>D. elastica</i> or associated indicator species and that the small open spaces typically occupied by the orchid were generally aggressively occupied by weeds.
2	<i>Verticordia attenuata</i>	P3	Dec-May	Possible	Unlikely (U2)	<p>These species of verticordia have a fairly distinct upright growth form, leaf and leaf arrangement meaning that plants can be reasonably identified as representative of the Verticordia genus in the field when not in flower. Further flowering material would be required to confirm the species.</p> <p>During the survey, there were no plants observed to be representative of Verticordia, other than the population of <i>Verticordia plumosa</i> var. <i>vassensis</i>.</p>
3	<i>Verticordia densiflora</i> var. <i>pedunculata</i>	T (EN)	Dec-Jan	Possible	Unlikely (U2)	
4	<i>Verticordia lehmannii</i>	P4	Jan, Apr-June, Aug or Dec	Possible	Unlikely (U2)	
5	<i>Verticordia lindleyi</i> subsp. <i>lindleyi</i>	P4	May or Nov-Dec or Jan	Possible	Unlikely (U2)	
6	<i>Verticordia plumosa</i> var. <i>ananeotes</i>	T (EN)	Nov-Dec	Possible	Unlikely (U2)	

U2: Suitable or potential habitat was present and appropriately searched but the taxon was not observed.

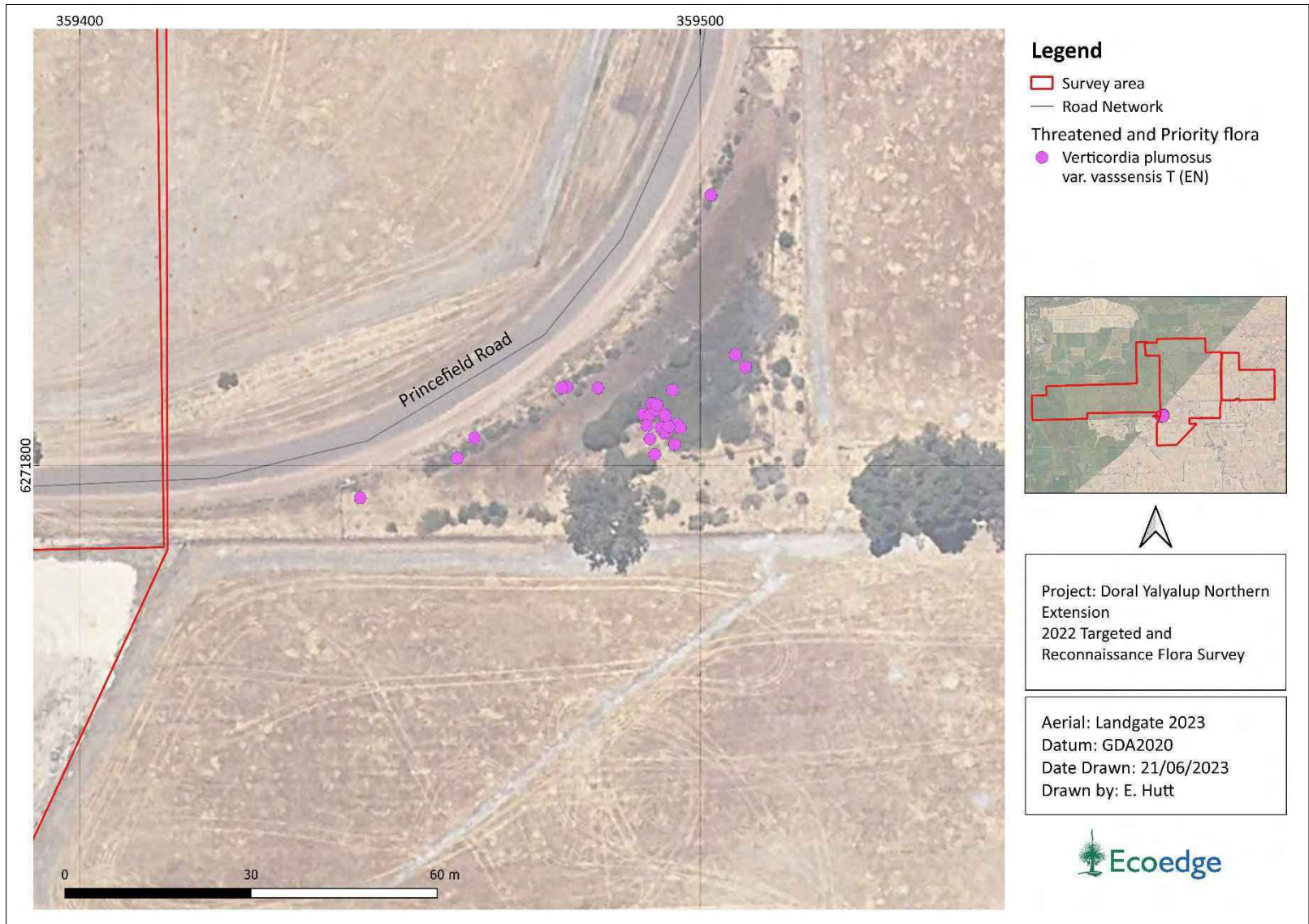


Figure 14. Location of the 26 significant flora (*Verticordia plumosus* var. *vassensis* (T, EN)) within the survey area.

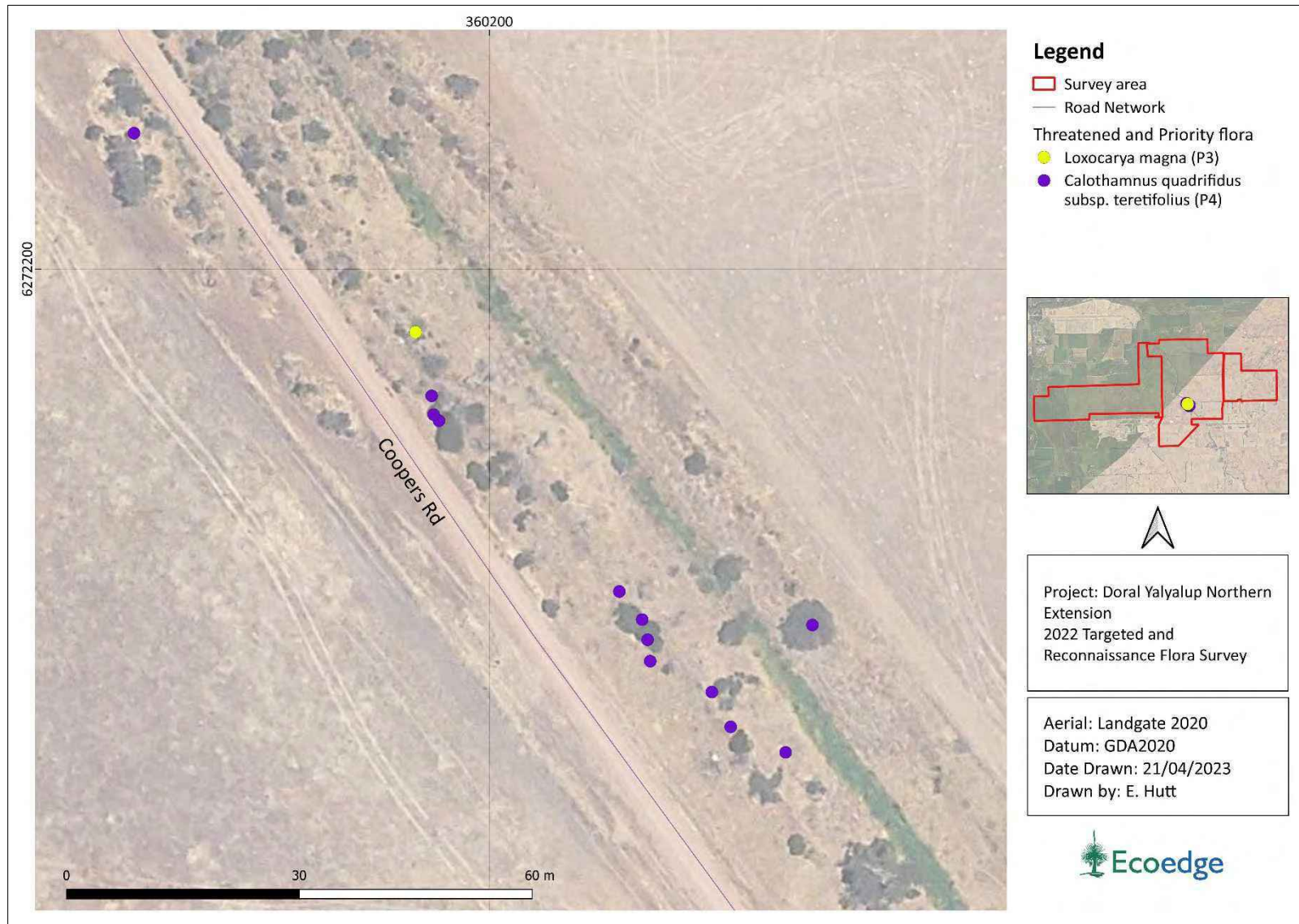


Figure 15. Location of significant flora (*Loxocarya magna* (P3) and *Calothamnus quadrifidus* subsp. *teretifolius* (P4)) within the survey area.

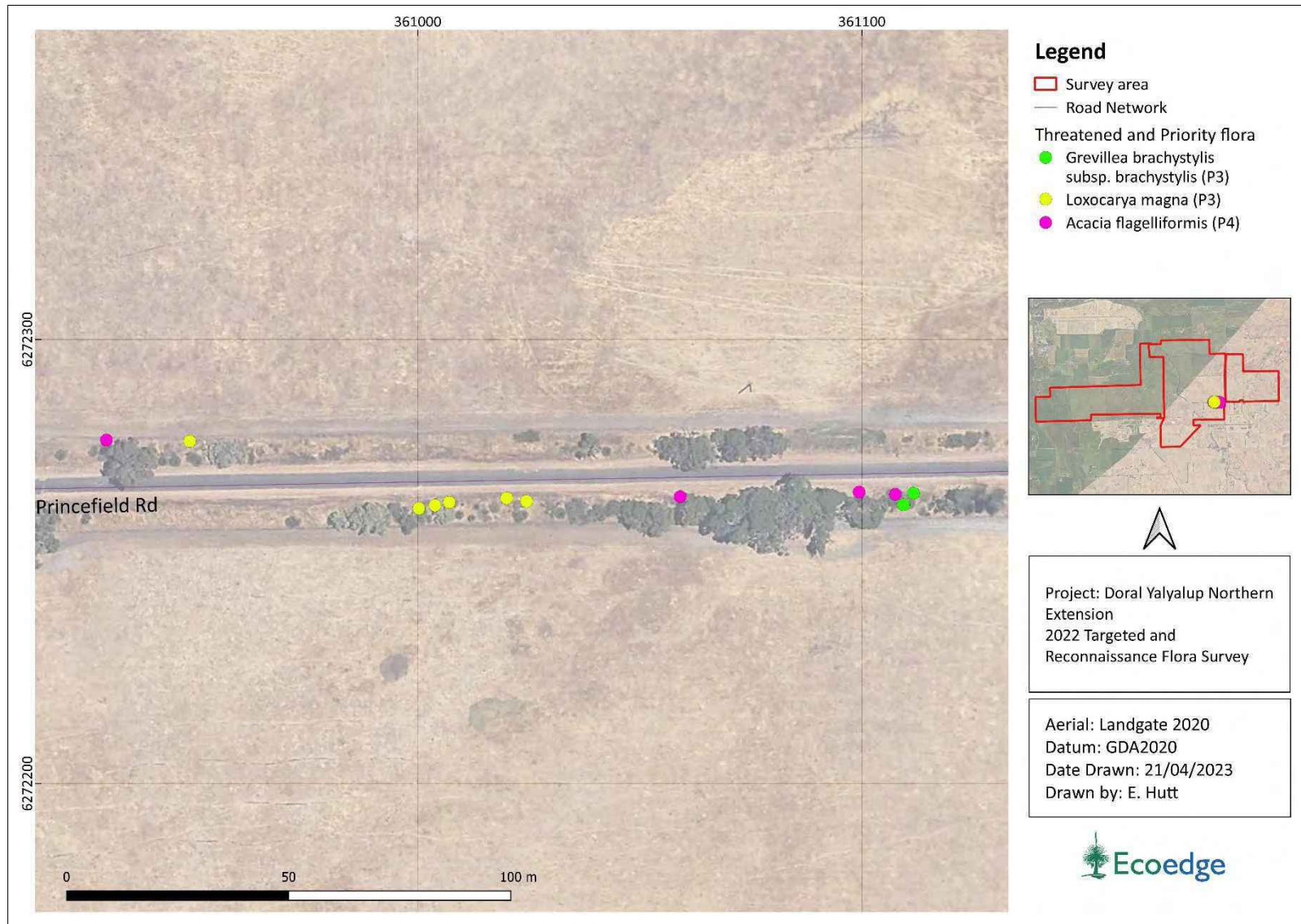


Figure 16. Location of significant flora (*Grevillea brachystylis* subsp. *brachystylis* (P3), *Loxocarya magna* (P3) and *Acacia flagelliformis* (P4) within the survey area.

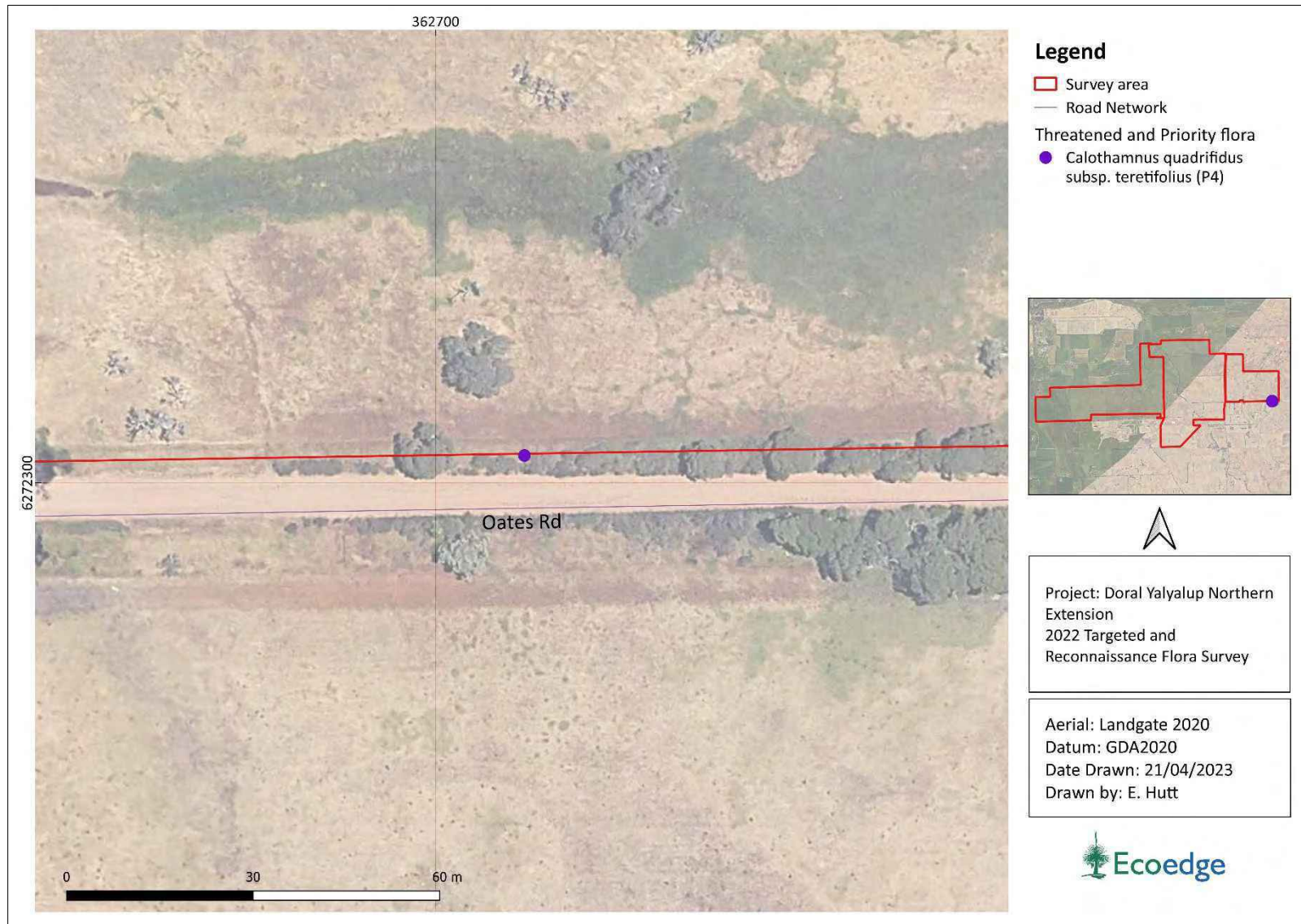


Figure 17. Location of significant flora (*Calothamnus quadrifidus* subsp. *teretifolius* (P4)) within the survey area.

6.3 Declared Pest plants

Two weeds found within the survey area, **Asparagus asparagoides* and **Zantedeschia aethiopica*, that are listed as Declared Pest plants under the *Biosecurity and Agriculture Management Act 2007*. Both species do not have an assigned category for their management under the Act. The occurrence of these species within the survey area is shown in **Figure 18**.

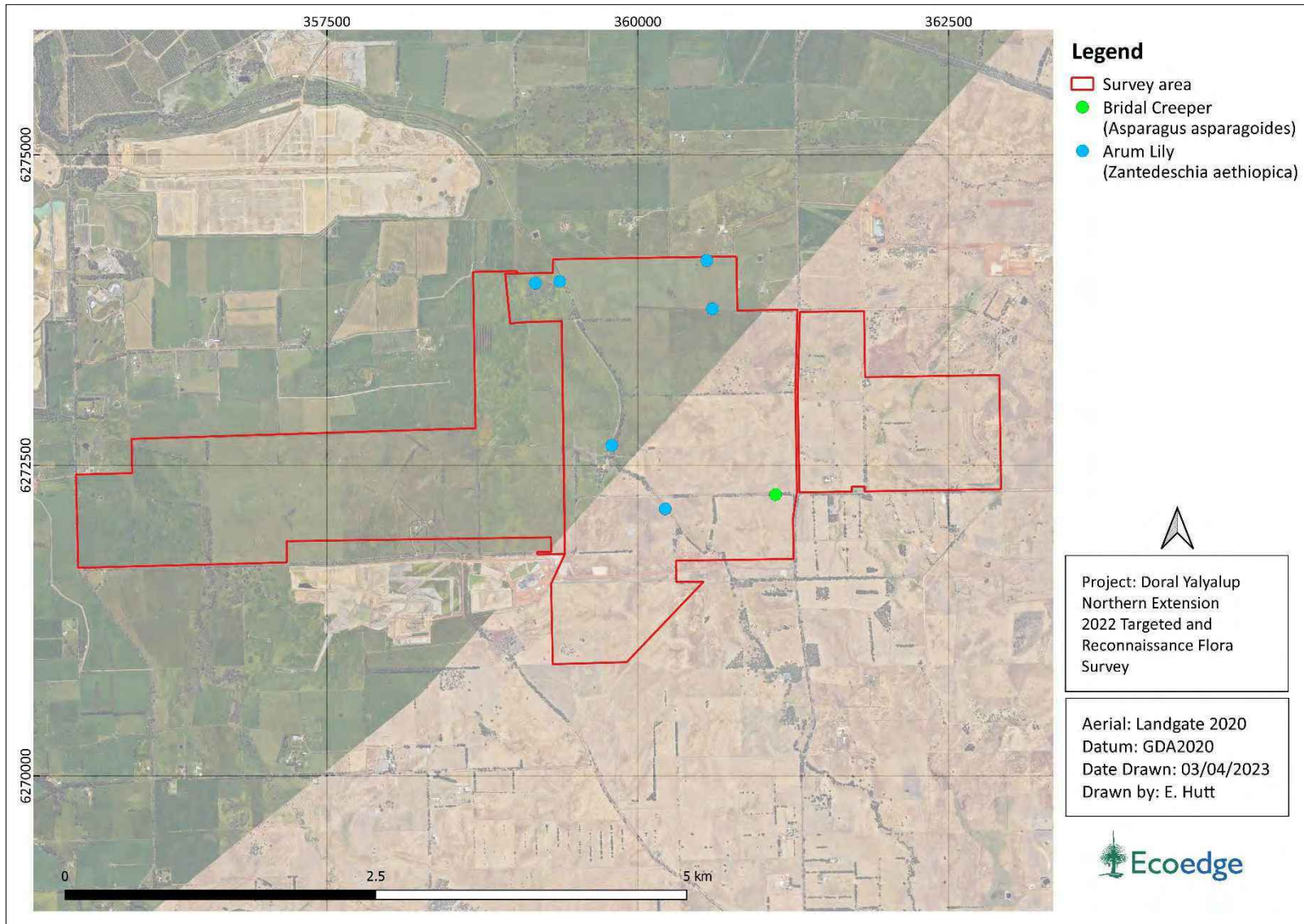


Figure 18. Location of Declared Pest plants within the survey area.

6.4 Vegetation units

Seven vegetation units were recognised in the survey area, six of which comprised native vegetation. and mapped in **Figure 19** to **Figure 21**. Photographs of the vegetation units are provided in **Appendix 12**. Most areas of remnant native vegetation within the survey area were in Degraded or Completely Degraded condition and consequently had low species diversity. Because of this it was generally only possible to separate several of the vegetation types by overstorey composition and to a lesser extent soil type. There was 30.3 ha of native vegetation with 17.8 ha of planted vegetation (PL) (**Table 15**). The vegetation units are described (with comments on their conservation status) in **Table 16**.

Table 15. Vegetation units within the survey area (ha).

Vegetation Unit	Area (ha)
A1	3.4
B1	0.5
B2	3.4
C1	18.4
C2	4.5
C3	0.1
Total native vegetation	30.3
PL	17.8

6.4.1 Vegetation Unit A1

Vegetation Unit A1 appears to be a degraded form of SCP01b (Southern *Corymbia calophylla* woodlands on heavy soils of the Swan Coastal Plain) (DBCA 2018), which is listed as a threatened ecological community under the BC Act 2016, with the threat status of 'Vulnerable'. It is generally dominated by both *Corymbia calophylla* and *Eucalyptus marginata* where it occurs on grey sands, but on heavier soils *C. calophylla* predominates, sometimes co-occurring with *E. rudis* or *E. patens*. On farmland there are no other native species present, however on road verges, the smaller trees *Agonis flexuosa*, *B. grandis*, *Nuytsia floribunda*, *Persoonia longifolia* or *Xylomelum occidentale* may be present as a mid-storey layer. The shrub-layer is usually dominated by *Xanthorrhoea preissii*.

Where unit A1 is in Degraded or better condition³ it is inferred to constitute an occurrence of the TEC SCP01b.

6.4.2 Vegetation Units B1 and B2

Both vegetation units B1 and B2 are associated with the 'Abba Wet Ironstone Flats' (ABwi) soil-landscape mapping unit of Tille and Lantzke (1990), which are described as 'winter wet flats and slight depressions with shallow red brown sands and loams over ironstone (i.e. bog iron ore soils)'.

Vegetation Unit B1 is recognised as a threatened ecological community, this being 'SCP10b - Shrublands on southern Swan Coastal Plain Ironstones (Busselton area)' (Gibson et al. 1994; DEC 2005). The Shrublands on the southern SCP Ironstones ecological community are listed as Critically Endangered under the BC Act. The community is also listed as Endangered under the EPBC Act.

There are three occurrences of Vegetation Unit B1. One occurrence of Vegetation Unit B1 is situated on Princefield Road. It is severely degraded and consists of only a few typical Busselton Ironstone community species. Another is the small area of vegetation on the corner of Princefield Road 890 m east of McGibbon Track which is comprised almost entirely of *Astartea scoparia* with 26 shrubs of the threatened *Verticordia plumosus* subsp. *vassensis*. The third occurrence is a narrow strip on the verge of Oates Road in Very Good condition.

Vegetation Unit B2 appears to be a severely degraded variant of the previous community, recognisable by the presence of massive ironstone and lateritic boulders at or near the soil surface. Generally, the only native species still present are the trees *Eucalyptus rudis* and *Melaleuca raphiophylla*. In one small part of an occurrence of this unit the presence of the native forbs *Brachyscome iberidifolia*, *Chamaescilla corymbosa* and *Cotula australis* lead to Degraded and Good condition ratings being applied.

Those parts of units B1 and B2 in Degraded or better condition⁴ are inferred to constitute an occurrence of the TEC SCP10b.

³ Department of Environment and Conservation (DEC) (2011). Threatened ecological community occurrence report form - field manual (page 2)

⁴ Department of Environment and Conservation (DEC) (2011). Threatened ecological community occurrence report form - field manual (page 2)

6.4.3 Vegetation Units C1, C2 and C3

Vegetation Unit C1 is associated with the winter streams that flow northwards through the western half of the survey area and which empty into the Sabina River and also lower-lying areas with clay-loam soils. Mostly this unit consists only of the overstorey of *Eucalyptus rudis* or *Corymbia calophylla* and an understorey of pasture species, but occasionally along the Sabina River native understorey shrubs such as *Acacia saligna* and *Astartea scoparia* are found, and *Xanthorrhoea preissii* is sometimes found in road verge occurrences.

Unit C1 has affinities both to FCT01b (Southern *Corymbia calophylla* woodlands on heavy soils), a TEC, and also to the 'Riverine Jindong Plant Communities' described in Webb et al. (2009). The unit has enough similarity to FCT01b to be regarded as an occurrence of that TEC when in Degraded or better condition.

Vegetation Unit C2, which consists of the small trees *Melaleuca preissiana* or *M. raphiophylla* over pasture, occurs in seasonally wet, shallow depressions with clay-loam soil. Unit C2 is all in Completely Degraded condition.

Vegetation Unit C3 is comprised a few small patches of wet shrubland on the 'Abba Wet Flats' soil-landscape mapping unit, in 'Degraded' or 'Good' condition, on the verges of Princefield Road⁵. It has similarities to the 'SCP09 - Dense shrublands on clay flats' (DBCA 2018) threatened ecological community and is regarded as an occurrence of that TEC.

⁵ The occurrence at the western end of Princefield Road is just outside the survey area and therefore is not mapped. It was previously identified and mapped by Ecoedge (2017).

Table 16. Description of Vegetation Units occurring in the survey area.

Vegetation Unit	Description	Comments	Qualify as TEC ⁶
A1	Woodland/open forest of <i>Corymbia calophylla</i> and <i>Eucalyptus marginata</i> , with scattered <i>Agonis flexuosa</i> , <i>B. grandis</i> , <i>Melaleuca preissiana</i> , <i>Nuytsia floribunda</i> , <i>Persoonia longifolia</i> or <i>Xylomelum occidentale</i> over <i>Xanthorrhoea preissii</i> over weeds on grey-brown or grey loamy sand or sand (on farmland usually only <i>C. calophylla</i> and <i>E. marginata</i> are present).	‘SCP01b – Southern <i>Corymbia calophylla</i> woodlands on heavy soils’ (TEC). Mostly in Degraded or Completely Degraded Condition.	No
B1	Tall shrubland of <i>Acacia saligna</i> , <i>Calothamnus quadrifidus</i> subsp. <i>teretifolius</i> , <i>Melaleuca incana</i> and <i>Kunzea micrantha</i> (with scattered emergent <i>Eucalyptus rudis</i>) over scattered native herbs including <i>Drosera glanduligera</i> and <i>Sowerbaea laxiflora</i> , the sedge <i>Loxocarya magna</i> , and weeds on shallow red sandy clay on massive ironstone.	‘SCP10b - Shrublands on southern Swan Coastal Plain Ironstones (Busselton area)’.	Yes
B2	Open woodland of <i>Melaleuca preissiana</i> over weeds (rarely with <i>Hyalosperma cotula</i>) on seasonally wet brown clay-loam over massive laterite.	‘SCP10b - Shrublands on southern Swan Coastal Plain Ironstones (Busselton area)’. Mainly Completely Degraded with only the overstorey remaining (not regarded as the TEC), with a very small area of Degraded/Good with some native understory spp. (Regraded as an occurrence of the TEC)	Only Good or better condition regarded as TEC
C1	Open forest of <i>Eucalyptus rudis</i> and/or <i>Corymbia calophylla</i> over scattered <i>Agonis flexuosa</i> and <i>Melaleuca raphiophylla</i> occasionally over <i>Acacia saligna</i> , <i>A. extensa</i> , <i>Astartea scoparia</i> , <i>Xanthorrhoea preissii</i> scattered shrubs over weeds on grey-brown clayey loams in drainage lines and on damp flats.	‘SCP01b – Southern <i>Corymbia calophylla</i> woodlands on heavy soils’ (TEC). Similar to Riverine Jindong Plant Communities (Webb et al. 2008). All in Degraded or Completely Degraded condition.	No
C2	Open woodland of <i>Melaleuca preissiana</i> over weeds on seasonally wet brown clay-loam.	Probably was originally ‘SCP09 - Dense shrublands on clay flats’. (TEC). Completely Degraded	No

⁶ Table 18 shows number of ha and % of TEC for each vegetation unit.

Vegetation Unit	Description	Comments	Qualify as TEC ⁶
C3	Tall Open Shrubland that may include <i>Acacia saligna</i> , <i>Jacksonia furcellata</i> , <i>Kingia australis</i> , <i>Melaleuca osullivanii</i> , <i>M. preissiana</i> , <i>M. viminea</i> and <i>Xanthorrhoea preissii</i> on seasonally wet grey-brown sandy loam.	'SCP09 - Dense shrublands on clay flats'. (TEC). A small area in Degraded/Good or Good condition on the verge of Princefield Road.	Yes
PL	Amenity plantings of <i>Eucalyptus</i> spp. or <i>Melaleuca</i> spp.		No

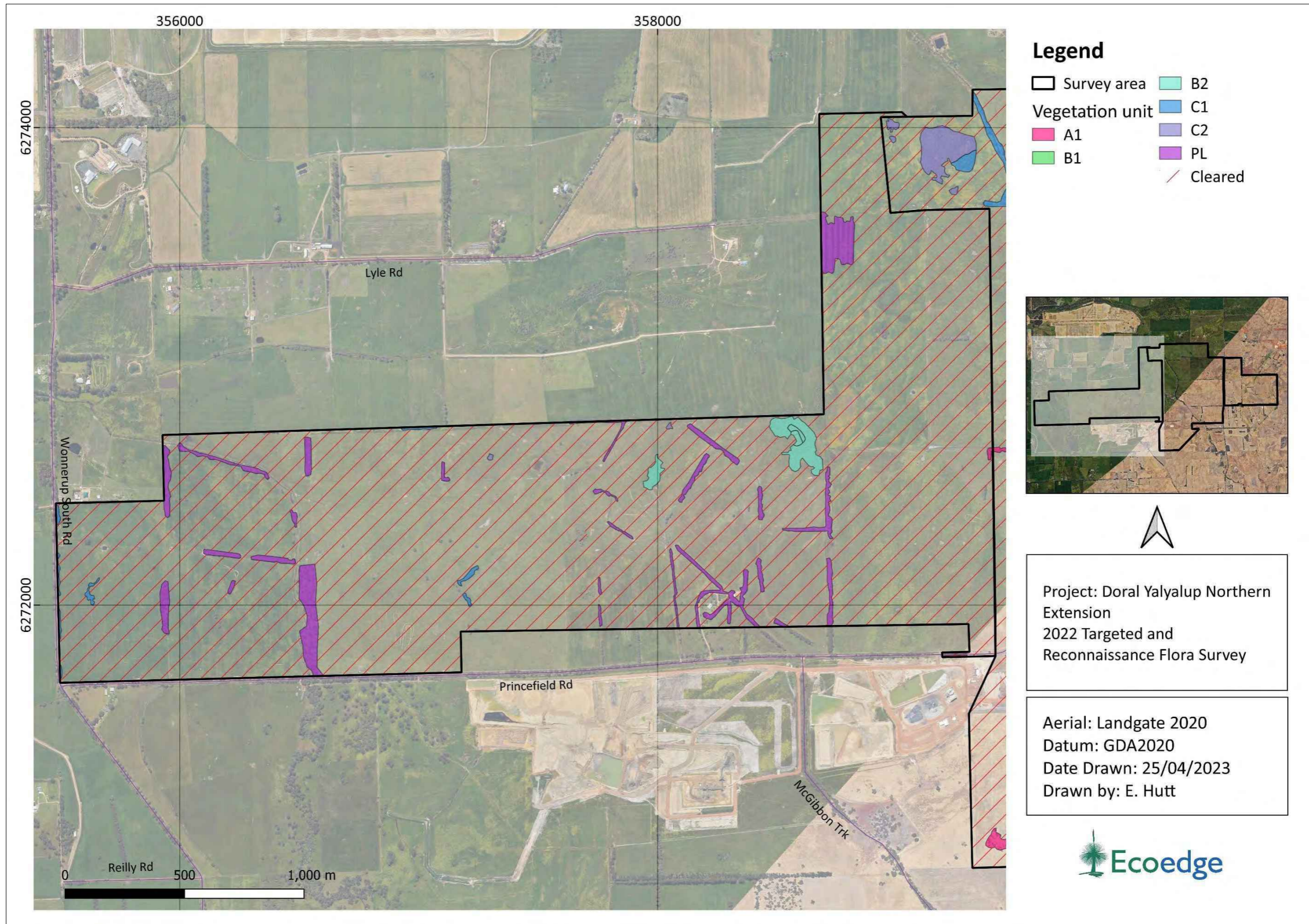


Figure 19. Vegetation units for the survey area.

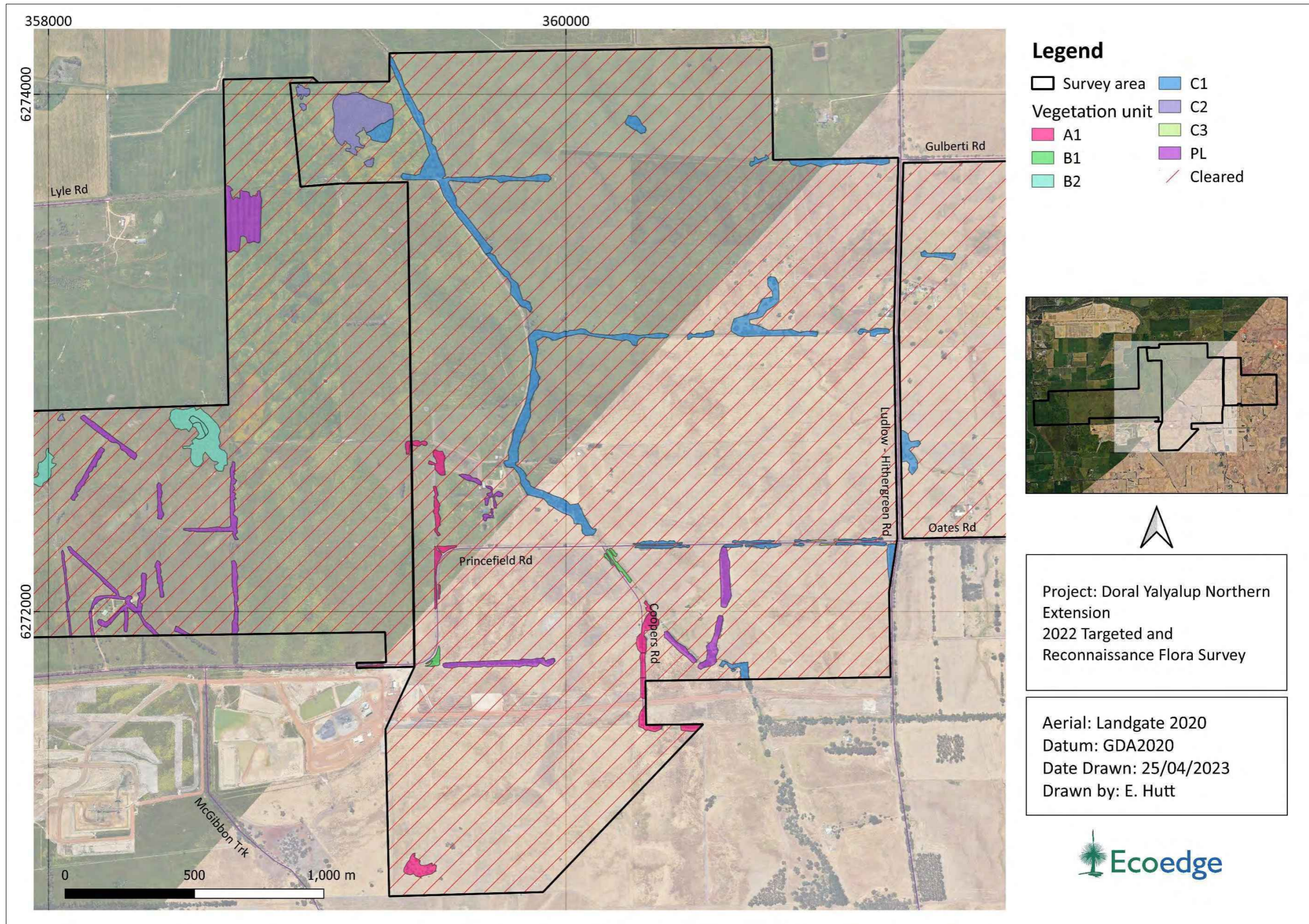


Figure 20. Vegetation units for the survey area.

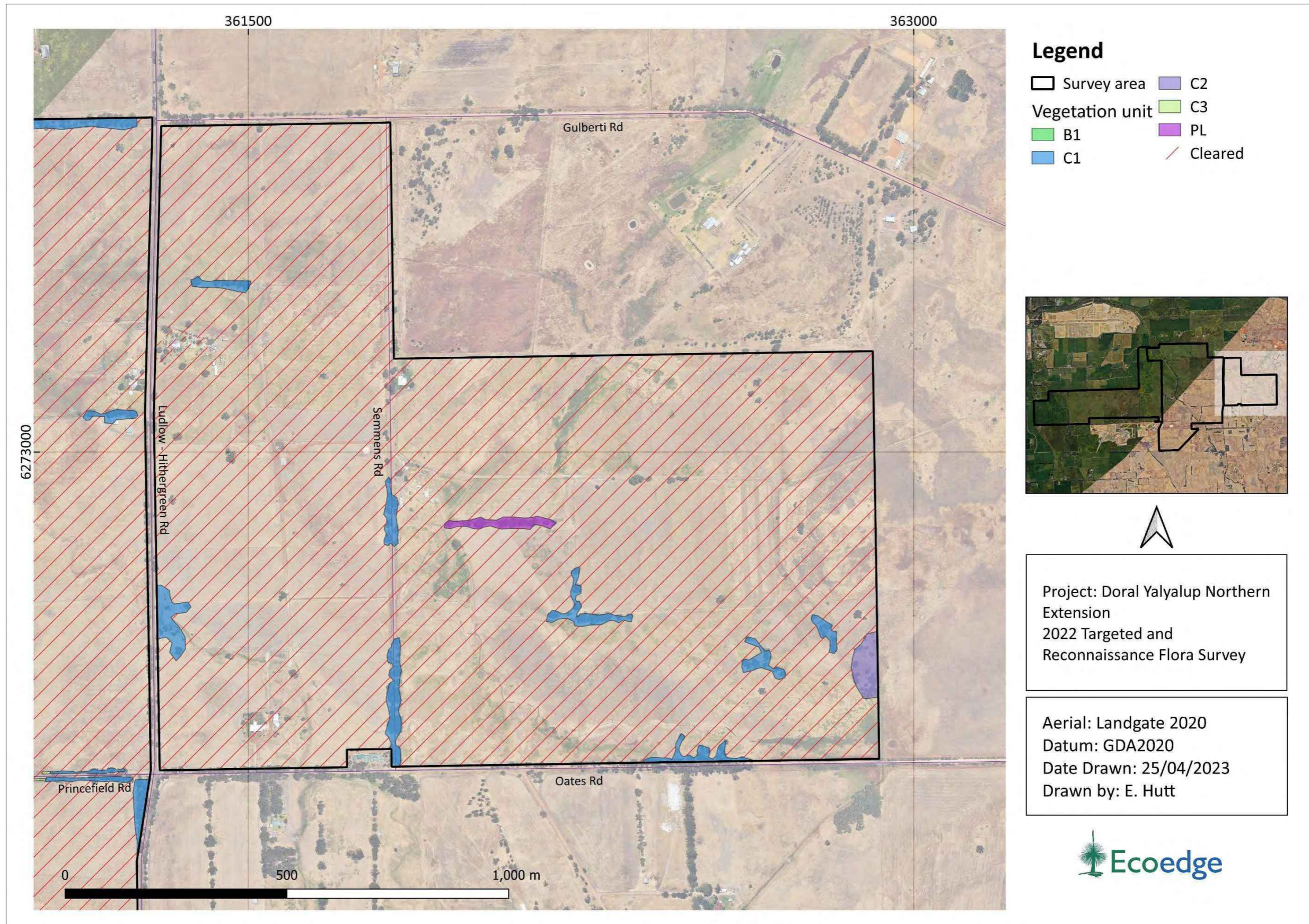


Figure 21. Vegetation units for the survey area.

6.5 Vegetation condition

Vegetation condition within the survey area is summarised in **Table 17** and mapped in **Figure 22** to **Figure 24**. Vegetation condition for each of the vegetation units is presented in **Table 18**.

Most remnant native vegetation in the survey area (94%), is in Completely Degraded condition. Only 1.8% of vegetation in the survey area is in Good or Very Good condition. The main reasons for the generally poor condition of remnant native vegetation in the survey area are the small size of the remnants that are not on farmland, and the fact that all of the remnants on farmland have been grazed for many years.

Small fragments remaining after land clearing are subject to new disturbance regimes, invasive species, disease, increased nutrient loads, and changes in physical edge effects, including changes in wind, temperature, light and humidity (Lindenmayer, 2007; pp. 236-237). In this altered environment native species, particularly herbaceous taxa, are usually outcompeted by agricultural weeds. Long-term grazing of native vegetation by livestock has been shown to cause eventual replacement of the native shrub and herbaceous components by exotic annual grasses and forbs (e.g., Pettit et al. 1998).

Table 17. Summary of vegetation condition in the survey area.

Vegetation Condition	Area (ha)	%
Very Good	0.21	0.44
Good	0.67	1.39
Degraded	2.16	4.50
Completely Degraded	44.99	93.67
Sub-total	48.03	100.00
Cleared	1,088.91	
Grand Total	1,136.93	

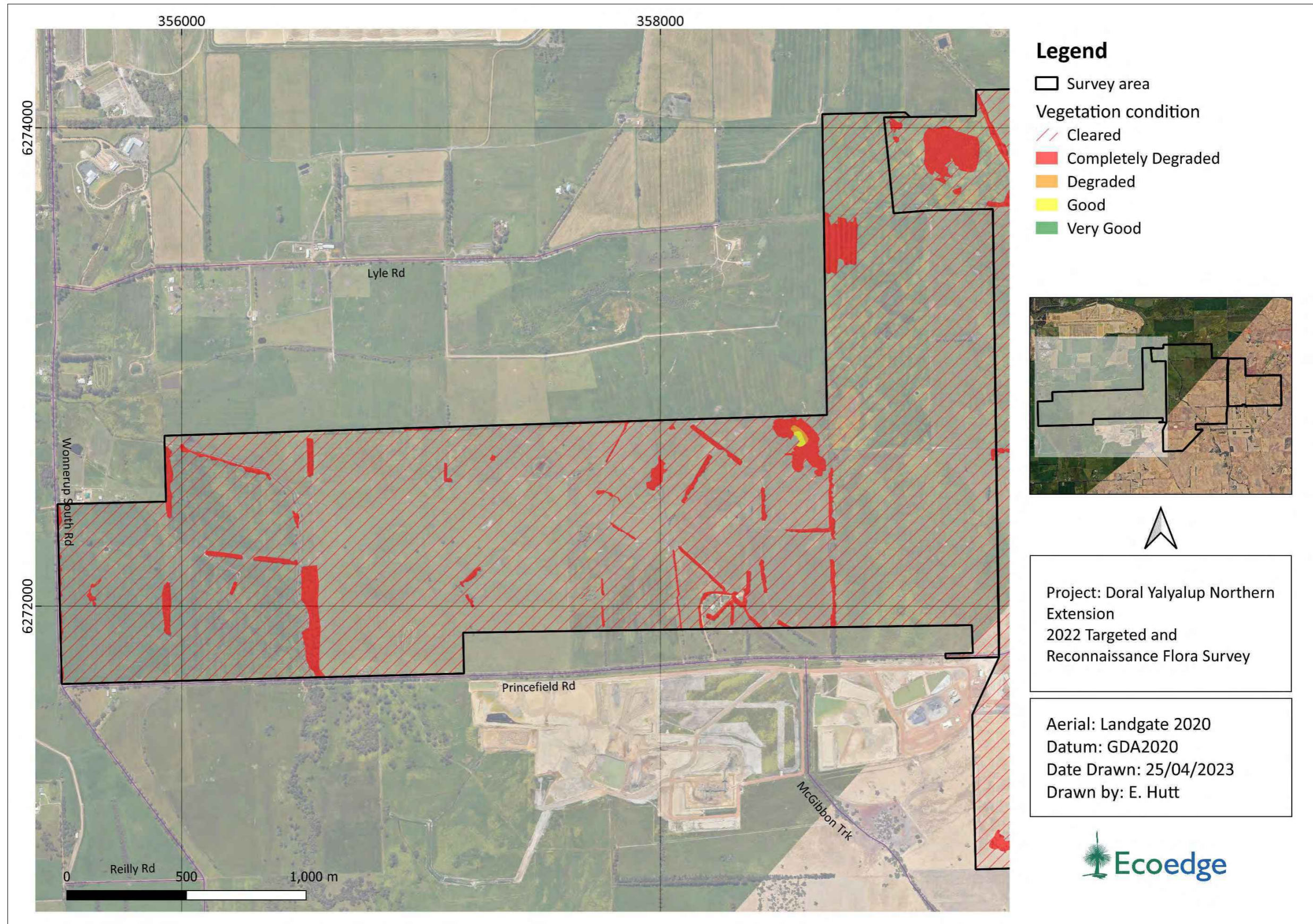


Figure 22. Vegetation condition for the survey area.

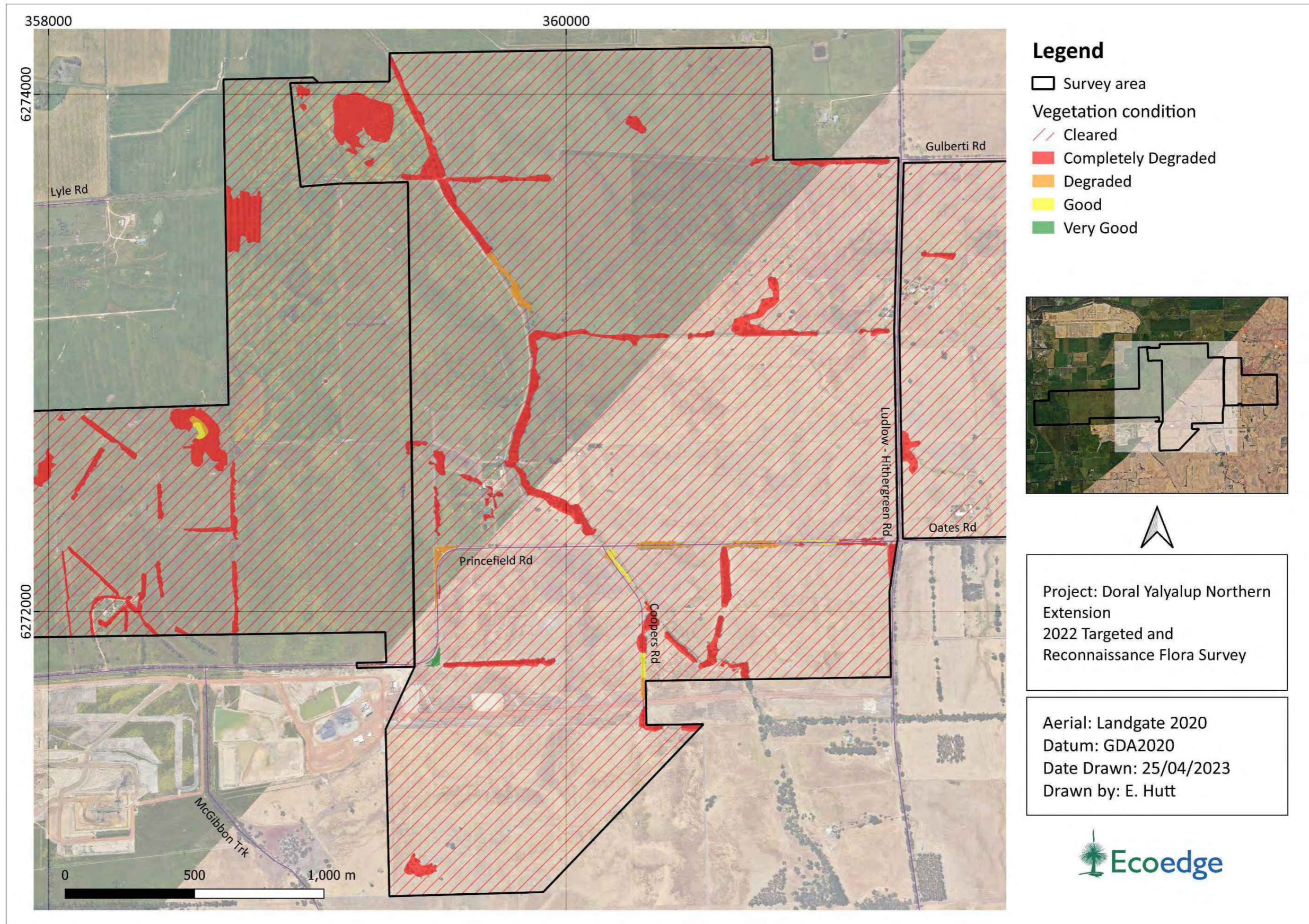


Figure 23. Vegetation condition for the survey area.

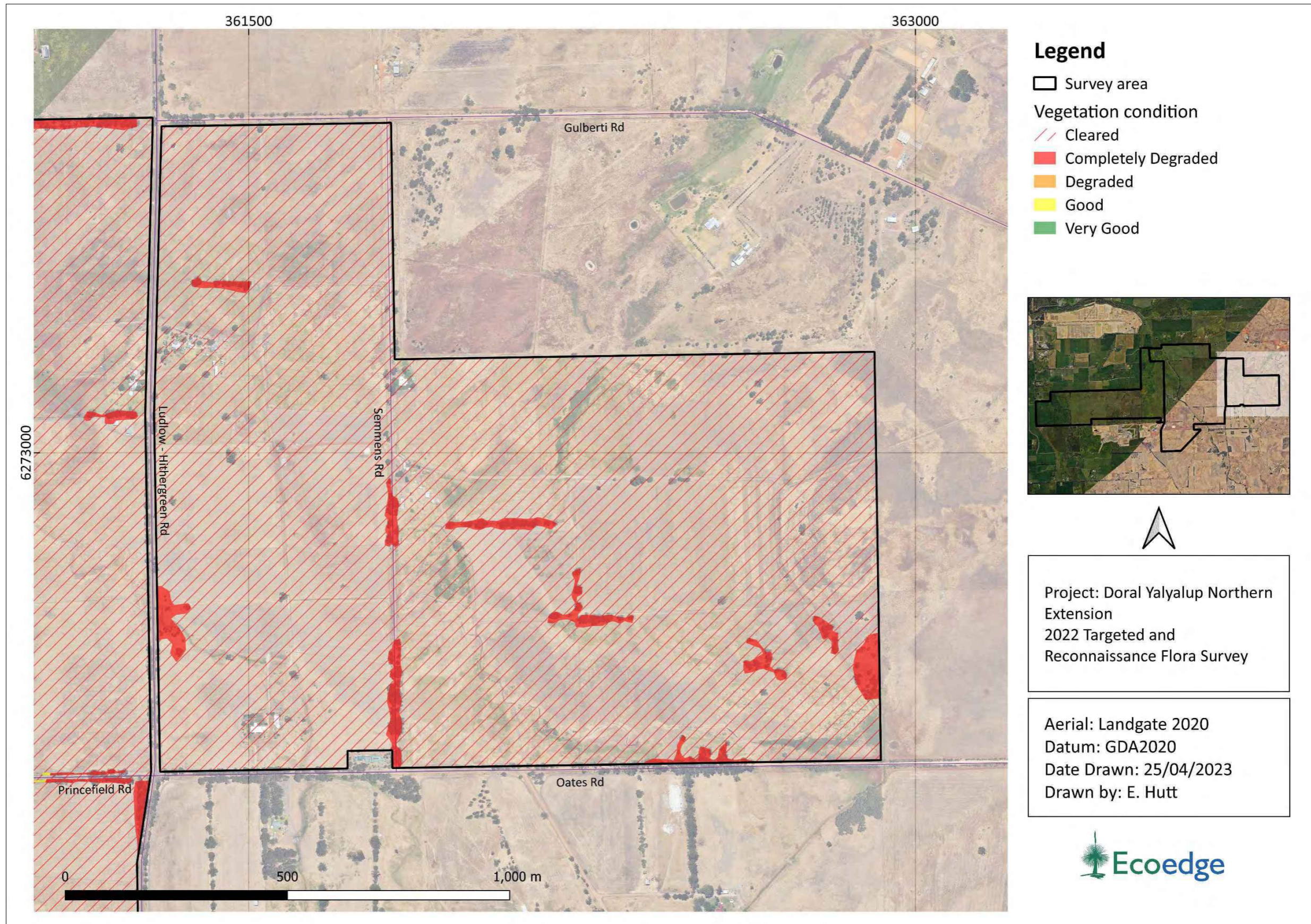


Figure 24. Vegetation condition for the survey area.

6.6 Threatened Ecological communities

All vegetation in Degraded or better condition within vegetation units A1, B1, B2, C1 and C3 are regarded as TEC occurrences. The total combined area of TEC within the survey area is 3.03 ha (**Table 18**). A breakdown of the vegetation units according to vegetation condition and TEC is shown in . A breakdown of the TECs according to vegetation condition is provided in **Table 19**. The occurrences of all TEC within the survey area is shown in **Figure 25** to **Figure 28**.

Completely degraded occurrences of these communities are not regarded as occurrences of the TEC in accordance with the DEC (2011) Threatened and Priority Ecological Communities Report Form - Field Manual.

The DBCA TEC PEC reporting forms are provided in **Appendix 13**.

Table 18. Vegetation condition by vegetation unit and assigned TEC, for the survey area.

Vegetation Unit	Condition	Area (ha)	%	TEC (ha)	TEC ID
A1	Good	0.18	5.23	Yes	FCT01b
	Degraded	0.63	18.32	Yes	FCT01b
	Completely Degraded	2.63	76.45	No	
	Sub-total	3.44	100.00	0.807	
B1	Very Good	0.21	44.61	Yes	FCT10b
	Good	0.22	47.41	Yes	FCT10b
	Degraded	0.04	7.98	Yes	FCT10b
	Sub-total	0.46	100.00	0.464	
B2	Good	0.17	5.13	Yes	FCT10b
	Degraded	0.16	4.77	Yes	FCT10b
	Completely Degraded	3.02	90.09	No	
	Sub-total	3.35	100.00	0.332	
C1	Good	0.03	0.18	Yes	FCT01b
	Degraded	1.33	7.21	Yes	FCT01b
	Completely Degraded	17.07	92.60	No	
	Sub-total	18.43	100.00	1.363	
C2	Completely Degraded	4.45	100.00	No	
	Sub-total	4.45	100.00		
C3	Good	0.07	100.00	Yes	FCT09
	Sub-total	0.07	100.00	0.069	
PL	Completely Degraded	17.83	100.00	No	

	Sub-total	17.83	100.00		
Cleared		1,088.91			
Area of TEC				3.035	
Total Survey Area		1,136.86			

Table 19. Breakdown of TEC occurrence by vegetation condition.

FCT and Vegetation unit	Condition	Area (ha)	%
FCT01b TEC Units A1 and C1	Good	0.211	9.72%
	Degraded	1.959	90.28%
	Subtotal	2.170	100.00%
FCT10b TEC Units B1 and B2	Very Good	0.207	26.01%
	Good	0.392	49.25%
	Degraded	0.197	24.75%
	Subtotal	0.796	100.00%
FCT09 TEC Unit C3	Good	0.069	100.00
	Subtotal	0.069	100.00%
	Total TEC	3.035	

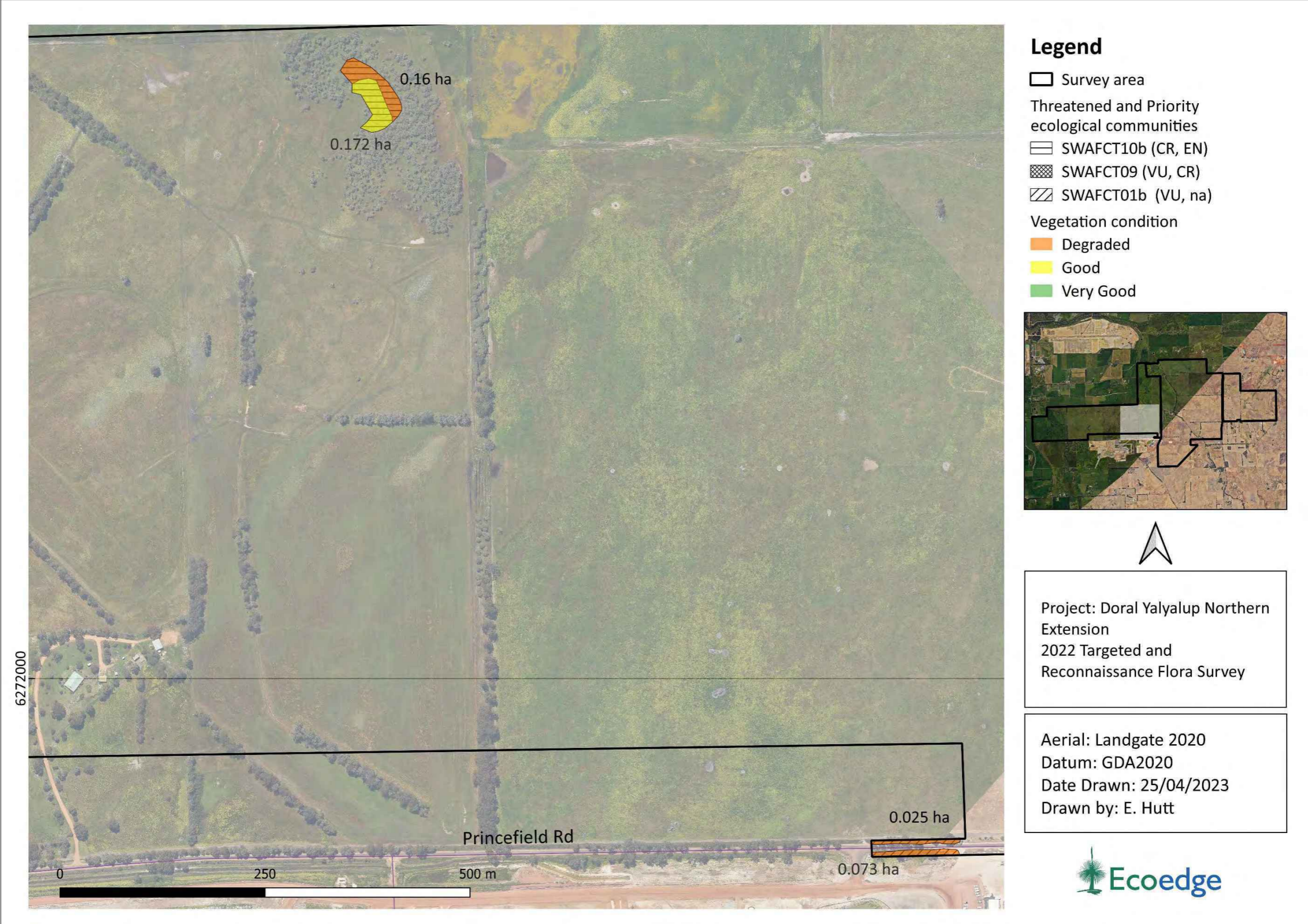


Figure 25. TECs found within the survey area.

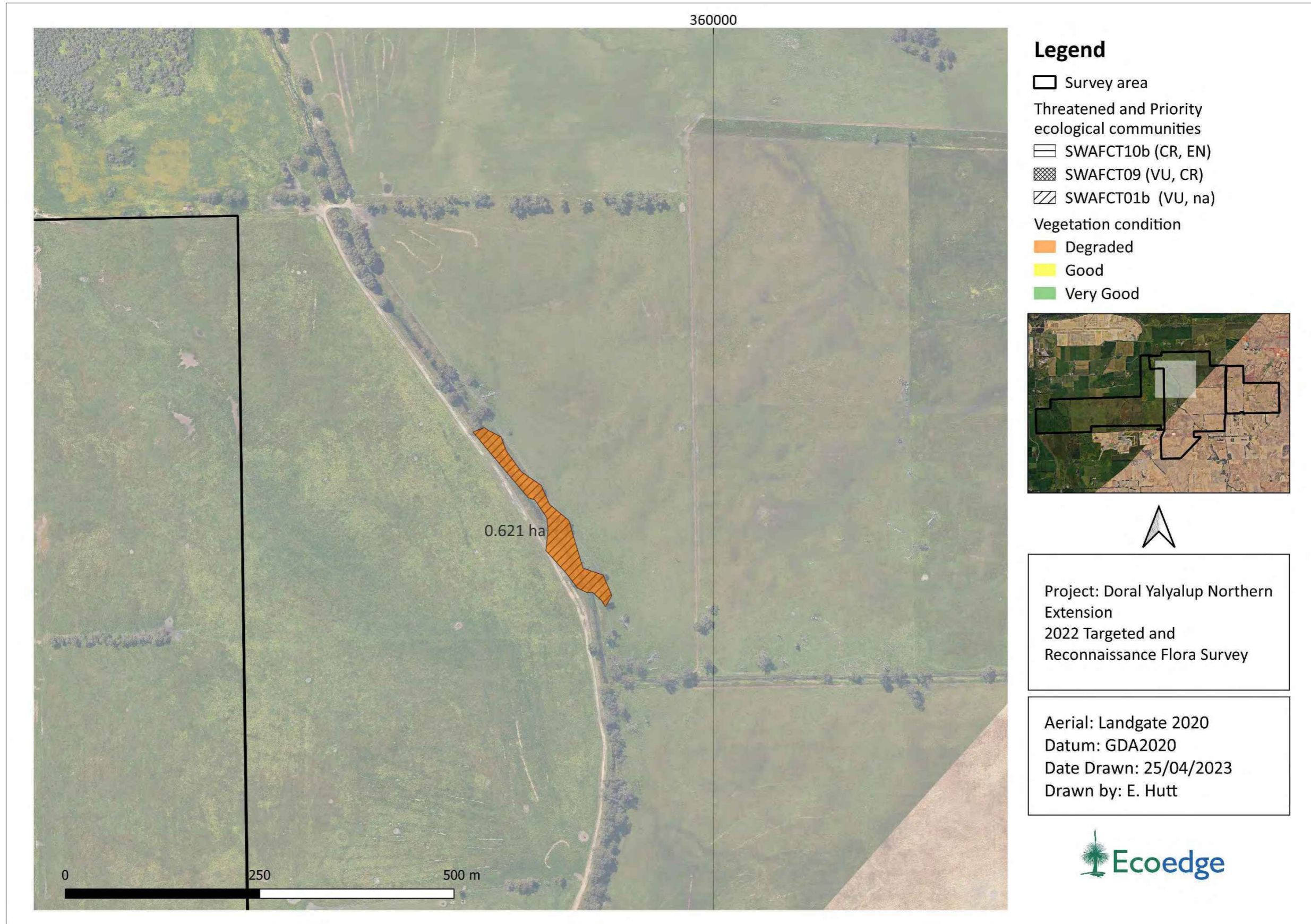


Figure 26. TECs found within the survey area.

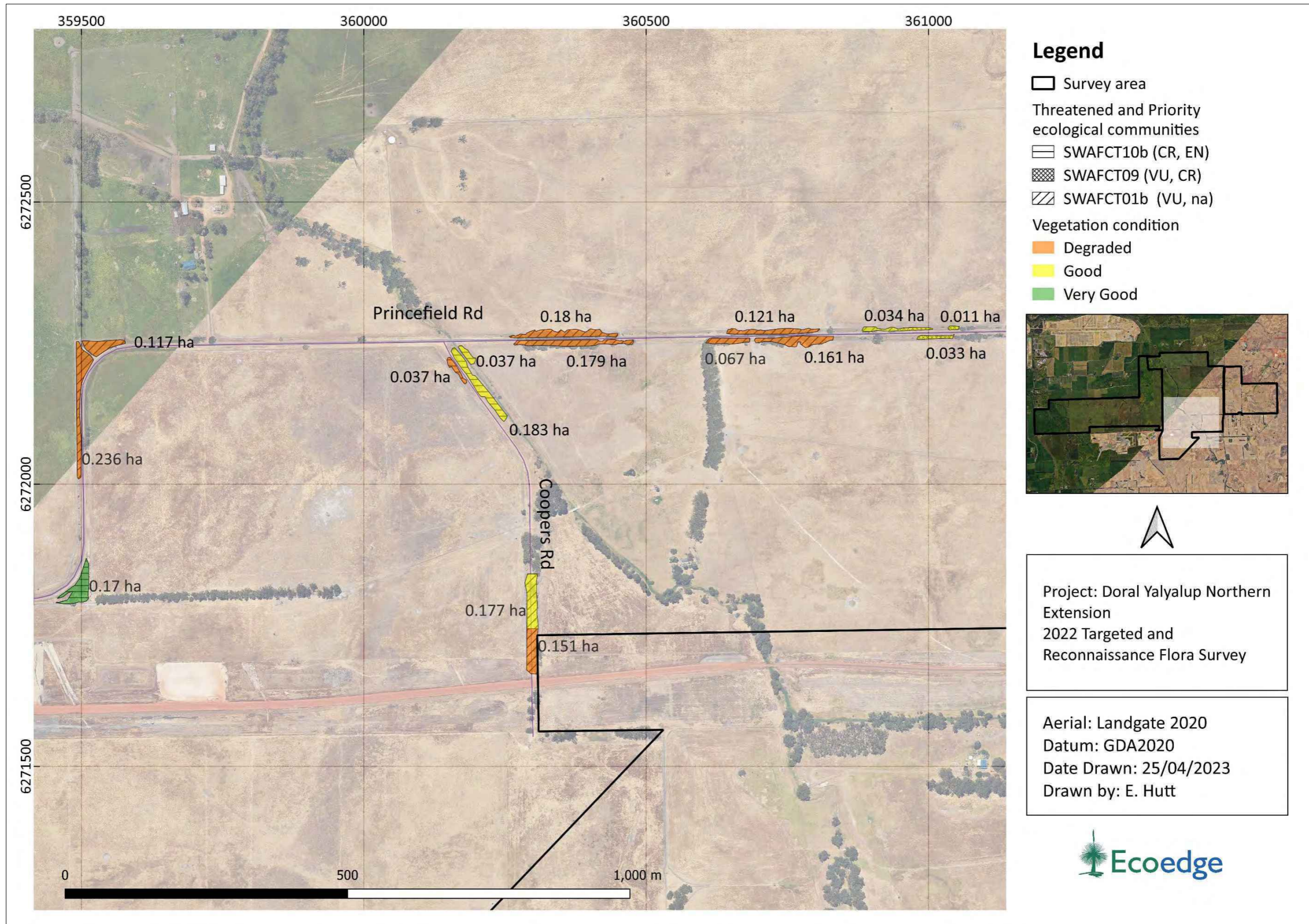


Figure 27. TECs recorded within the survey area.

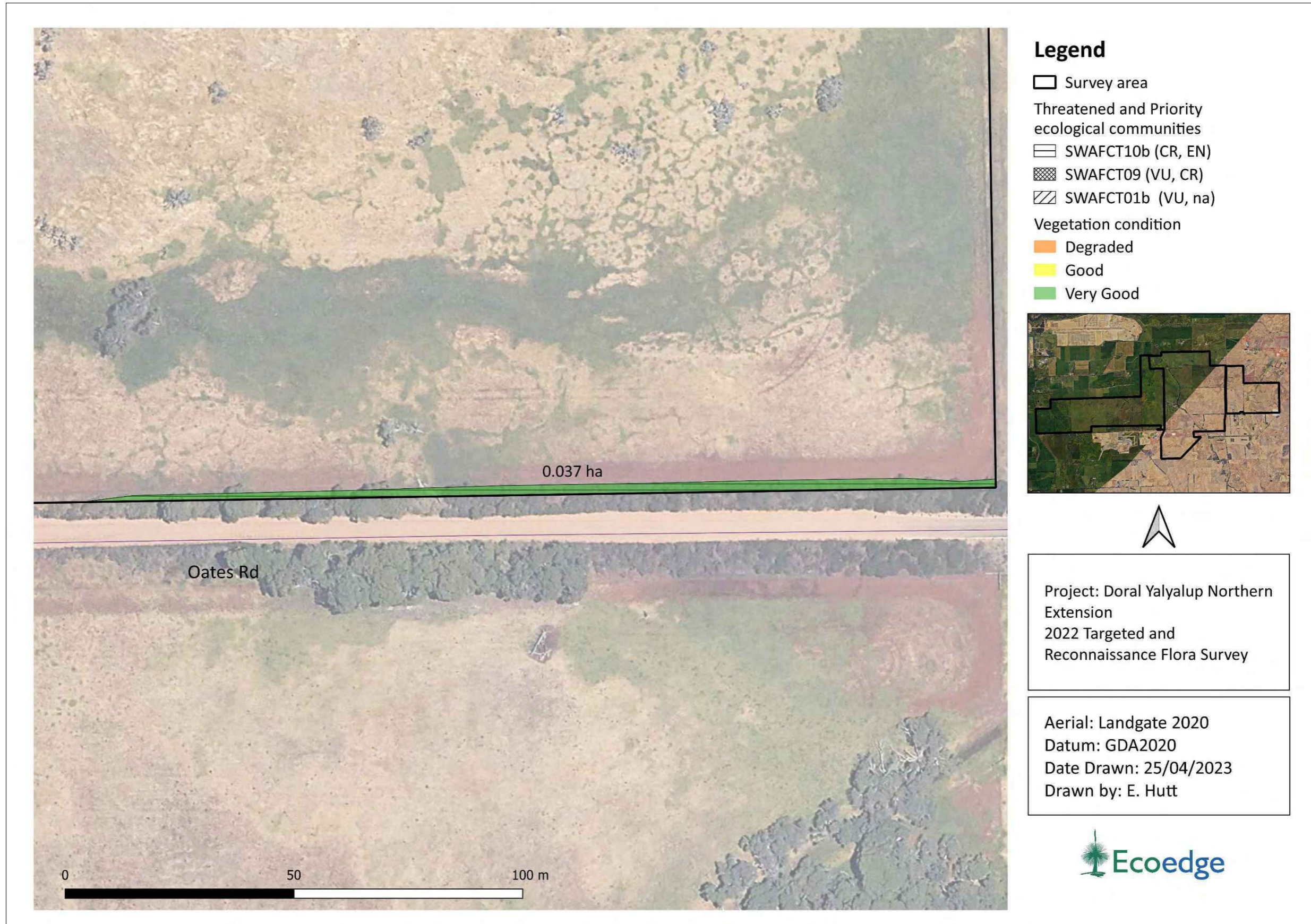


Figure 28. TECs found within the survey area.

6.7 Critical habitat SCP10b Southern Ironstone

There is critical habitat within SCP10b Southern Ironstone. The recovery plan⁷ for the Shrublands on southern SCP Ironstone TEC recognises that the habitat critical to the survival of the community comprises of:

- the area of occupancy of known occurrences
- similar habitat adjacent to important occurrences (i.e. within approximately 200m) i.e. poorly drained flats, depressions or winter wet flats with shallow red brown sands and loams over massive ironstone
- remnant vegetation that surrounds or links several occurrences
- the local catchment for the surface and groundwaters that maintain the winter-wet habitat of the community.

The recovery plan's position is that because the community is listed as Critically endangered all known occurrences of the community, and the catchments for the surface and groundwater that support this wetland habitat, are critical to the survival of the community (DEC 2005).

Table 20 shows how the survey area is considered in terms of the features recognised in the recovery plan as habitat critical to the survival of the community.

Table 20. Critical habitat features of the survey area vegetation.

Critical habitat features	Comment
Known occurrences	According to the criteria all areas of Vegetation Unit B1 and B2 including areas in Completely Degraded condition or Better Condition are regarded as critical habitat for the survival of the Shrublands on Southern SCP Ironstone community.
Similar habitat adjacent within 200 m to important occurrences	There was no similar habitat within 200 m of the mapped occurrences.
Remnant vegetation that surrounds or links occurrences	Given the highly cleared nature of the survey area there is no remnant vegetation of any real substance that surrounds the mapped occurrences of this ecological community, nor any parcels of vegetation within the survey area that clearly link occurrences of this TEC. There is however a narrow strip of roadside vegetation connected to the mapped occurrence of the community on Oates Road. This strip of vegetation extends east beyond the boundary of the survey area.

⁷ Note that neither the conservation advice for the Claypan TEC (TSSC 2012) nor the DBCA (2020) fact sheet for the Southern *Corymbia calophylla* woodlands TEC have provisions for critical habitat within them.

Local catchment for the surface and groundwaters that maintain the winter-wet habitat of the community.	The identification, or delineation of the local catchment that maintains the winter-wet habitat of the identified occurrences of the community within the survey area is beyond the scope of this flora and vegetation survey report. However, it may be reasonable to conclude that because most of the catchment for all occurrences of this TEC within the survey area have been cleared of native vegetation, that the peak impacts on hydrology associated with the clearing has already been experienced by the community.
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Table 21 provides a breakdown by area and condition of the critical habitat within the survey area. The total area of critical habitat is 3.814 ha. The location of the critical habitat areas is shown in **Figure 29** and **Figure 30**.

Table 21. Critical habitat occurrence by vegetation condition

FCT10b	Condition	Area (ha)	Comments
Critical habitat	Very Good	0.207	TEC occurrence of FCT10b
	Good	0.392	TEC occurrence of FCT10b
	Degraded	0.197	TEC occurrence of FCT10b
	Completely Degraded	3.018	Occurrence of the FCT10b
	Total critical habitat	3.814	

6.8 Riparian and wetland vegetation

Almost all of the survey area is classified as ‘Multiple Use’ palusplain wetland and all of the vegetation units have some species that are either fully or partially phreatophytic, or ground-water dependant, e.g., *Eucalyptus rudis*, *Melaleuca incana*, *M. preissiana*, *M. raphiophylla*, *Acacia saligna* and *Kunzea micrantha* (Canham et al. 2009). It is likely, therefore, that to a greater or lesser extent all vegetation units within the survey area are GDE’s.

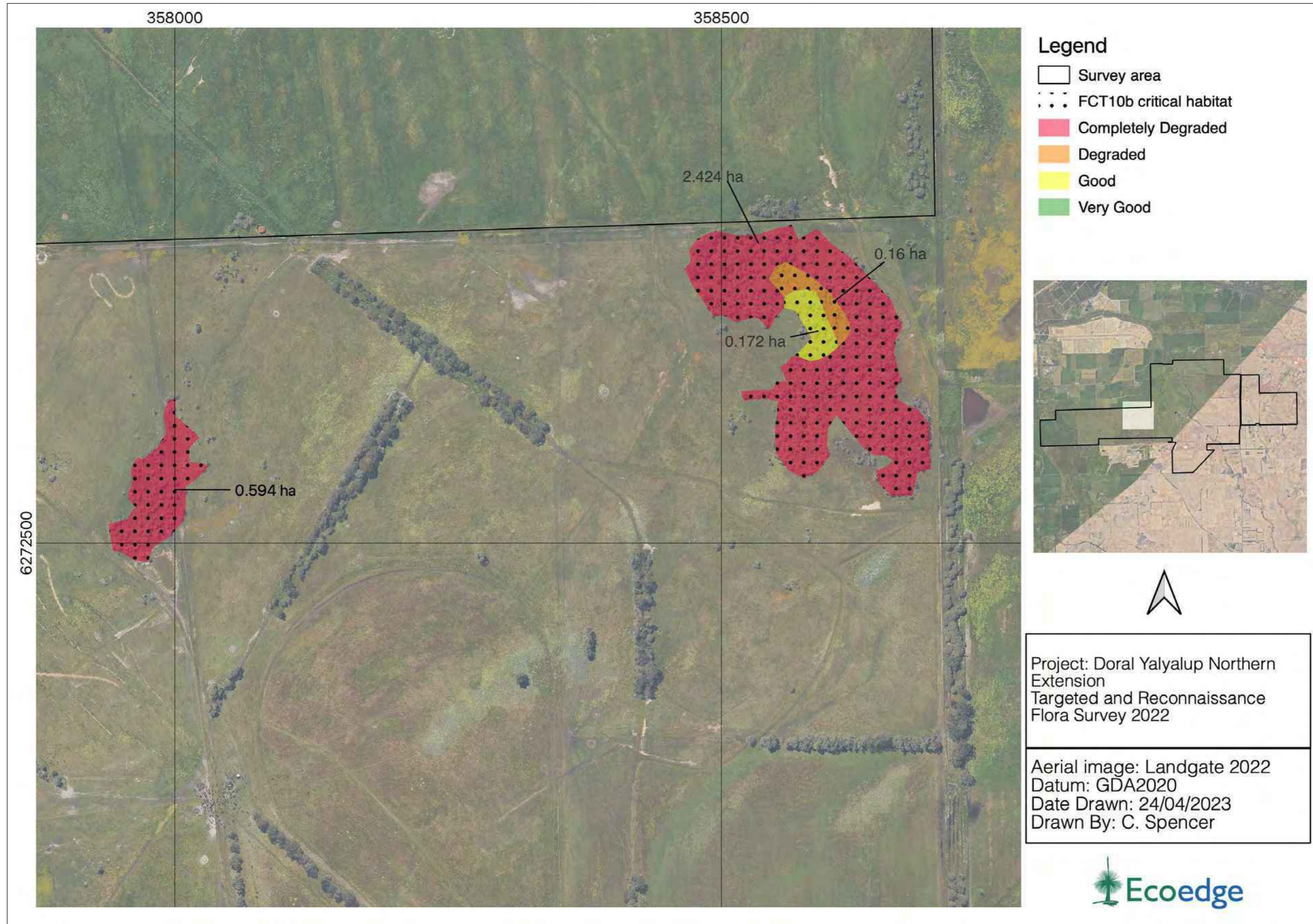


Figure 29. Critical habitat area for the Shrublands on the southern SCP Ironstones within the survey area.

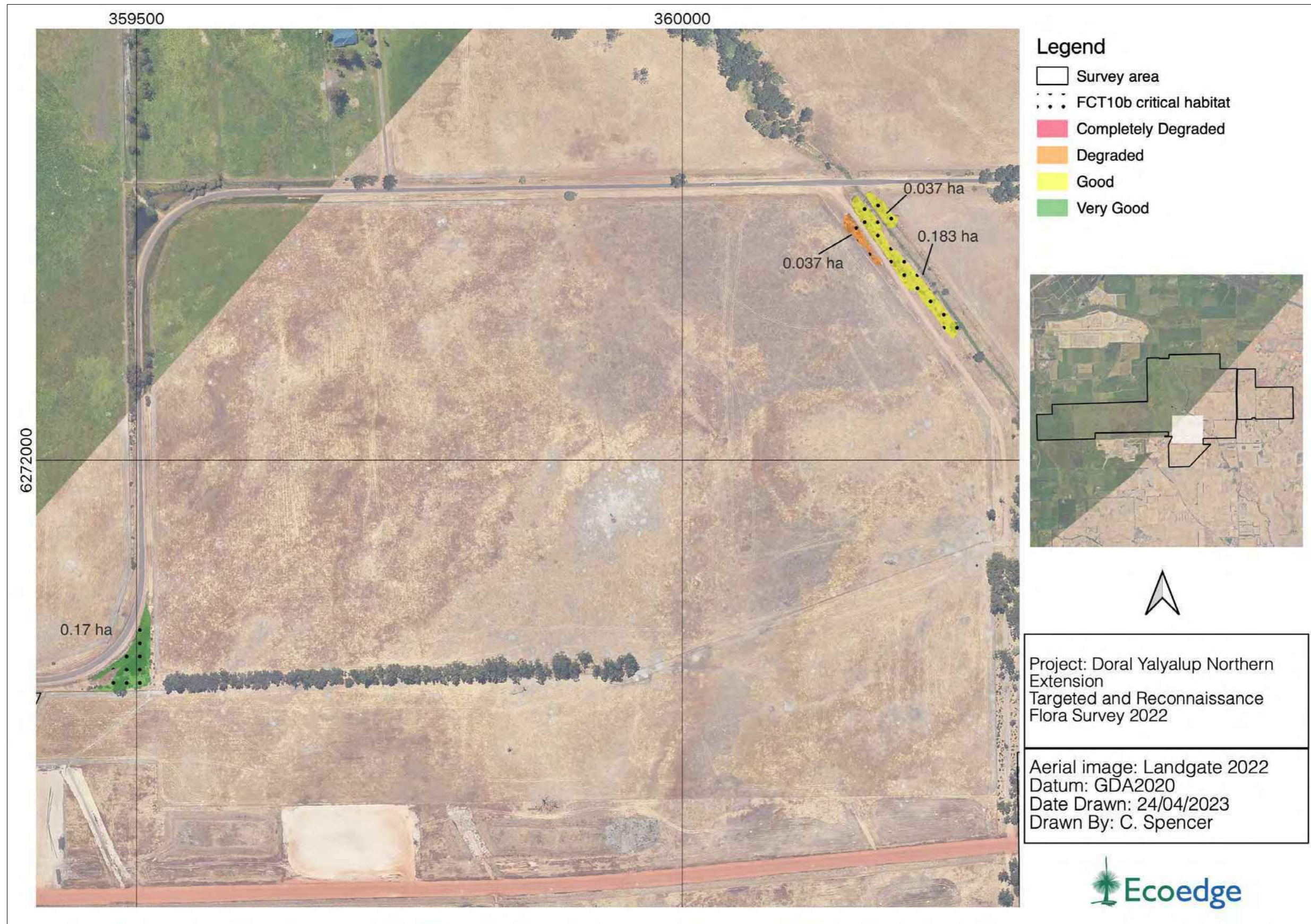


Figure 30. Critical habitat area for the Shrublands on the southern SCP Ironstones within the survey area.

7 Discussions and conclusions

7.1 Significance of the flora

A spring flora and vegetation survey of 33 ha of remnant vegetation within the survey area at Yalyalup resulted in the following primary findings:

Native flora richness is relatively low (72 taxa in total), with a high proportion of introduced species (38%).

7.1.1 Threatened and Priority flora

One species of Threatened Flora (*Verticordia plumosa* var. *vassensis* (T, EN) and four Priority flora (*Acacia flagelliformis* (P4), *Calothamnus quadrifidus* subsp. *teretifolius* (P4), *Grevillea brachystylis* subsp. *brachystylis* (P3), and *Loxocarya magna* (P3) were found within the survey area. These were found in the same location and same numbers as in a previous survey in 2019 (Ecoedge 2019b).

7.2 Post survey likelihood

Ninety-three significant taxa were identified as known, or potentially occurring within the survey area. Following the survey five species were recorded in the survey area and the balance (88) were regarded as unlikely to occur. Seven of these, including the fungi *Amanita kalamundae* had no suitable habitat within the survey area and the balance with potentially suitable habitat could have observed and identified had they occurred within the survey area. This included the six species which were outside of their optimum identification period, including the Threatened orchid *Drakaea elastica* and five species of predominantly summer flowering verticordias.

Drakaea elastica whilst best observed in late winter when its glossy basal leaf is easy to see (DEC 2008), can be observed and identified in spring when in flower. Within the survey area there were few good potential habitat areas of naturally clear open spaces in intact vegetation over grey sandy infertile soils adjacent to damplands that weren't invaded by weeds, and no evidence of the taxa or indicator species, such as *Drakaea glyptodon* or *Paracalaena nigrita* were found.

Whilst the summer flowering verticordias do need to be flowering to be positively identified, they can generally be identified out of season as being a *Verticordia* of 'some-kind'. No plants resembling a verticordia, aside from *Verticordia plumosa* var. *vassensis* were recorded in the survey area.

7.3 Significance of the vegetation

Six vegetation units comprising native vegetation (A1, B1, B2, C1, C2 and C3) were identified in the survey area with a total area of 33.2 ha. Most (93.7%) of which was in a 'Completely Degraded' condition because of many years of grazing by livestock. The relatively small percentage (6.3%) which remains is in Degraded or better condition and comprises of the three threatened ecological communities which will require an appropriate level of protection during any mining-associated works within the survey area.

Unit A1, which is dominated by *Corymbia calophylla* on heavier soils and *Eucalyptus marginata* on grey sandy loams appears to correspond to the State listed TEC SCP01b (Southern *Corymbia calophylla* woodlands on heavy soils) where its condition is in a Degraded or better condition.

Vegetation units B1 and B2 are situated on massive ironstone overlain by shallow soils and are regarded as occurrences of the Shrublands of southern SCP Ironstones SCP10b TEC where they are in Degraded or better condition.

According to criteria in the DEC (2005) recovery plan for this community, all areas of Vegetation units B1 and B2 are also regarded as habitat critical to the survival of the Shrublands of southern SCP Ironstones community, including areas in Completely Degraded Condition. The recovery plan also includes those parts of the local catchment for the surface and groundwaters that maintain the winter-wet habitat of the community. These local catchment areas may extend beyond the mapped occurrences of this community and include areas which are mapped as cleared in this report, however the delineation of these boundaries is beyond the scope of this flora and vegetation survey report. Critical habitat may be listed and recognised under provisions of the BC Act 2016.

Units C1, C2, and C3 occur on clay-loam soils, and are associated with drainage lines (e.g., the Sabina River) or low-lying areas or shallow depressions. Unit C1, dominated by *C. calophylla* or *Eucalyptus rudis*, occurs mainly along the Sabina River is similar to some occurrences of unit A1. As with unit A1 it is also inferred to represent an occurrence of the State listed TEC SCP01b (Southern *Corymbia calophylla* woodlands on heavy soils) when the vegetation is in Degraded or better condition.

Unit C2, comprised of small wetlands with *Melaleuca raphiophylla* or *M. preissiana* are probably Completely Degraded occurrences of what was unit C3 which is found only on the verge of Princefield Road. Unit C3, which is all in Good condition, is inferred to be an occurrence of the TEC 'SCP09 - Dense shrublands on clay flats' which is part of the Commonwealth-listed TEC 'Claypans of the Swan Coastal Plain'.

7.4 Wetland communities

Almost all of the survey area is classified as 'Multiple Use' palusplain wetland and all of the vegetation units have some species that are either fully or partially phreatophytic, or ground-water dependant and therefore is representative of wetland vegetation.

7.5 Regional ecological linkages

While the survey area is in close proximity to a network of regional ecological axis lines there are only few parcels of vegetation within the survey area with ecological linkage values. These parcels have low 3b and 3c linkage values due to the overall completely degraded condition of the vegetation and separation from other parcels of vegetation by expanses of pasture.

There is no statutory basis for the protection of this vegetation as an ecological linkage. However, the importance of ecological linkages, in general, has been recognised as an environmental policy consideration in EPA and Planning policy (EPA 2008 and references therein).

7.6 Environmentally sensitive areas

The survey area has three ESAs that are linked to Threatened flora locations. It is also intersected in the eastern portion by a larger ESA associated with the TEC 'Shrublands on Swan Coastal Plain Ironstones (Busselton area)' (SCP10b).

Of the three mapped ESAs associated with Threatened flora only one of the populations is current. This is associated with the population of *Verticordia plumosus* var. *vassensis* found within the southernmost ESA in the survey area in Very Good condition vegetation in unit B1 along Princefield Road. The Threatened flora (*Banksia nivea* subsp. *uliginosa*, *Verticordia plumosus* var. *vassensis* and *Chamelaucium roycei*) associated with the other two ESAs appears to have disappeared due to the ongoing degradation of the vegetation from competition from weeds and agricultural activities.

The only TEC occurrence protected under an existing ESA is that associated with the SCP10b occurrence in the east of the survey area along Oates Road. All other TEC occurrences mapped within the survey area as part of this report should also be recognised as ESAs.

Exemptions for the need to obtain a clearing permit under the Environmental Protection (Clearing of Native Vegetation) Regulation 2004 do not apply within the boundary of ESAs.

7.7 Vegetation complexes and vegetation association mapping

The remnant vegetation described and mapped within the survey area broadly conforms to the description of the Abba vegetation complex and the two Beard vegetation associations mapped for the area.

The Abba complex retains less than 10% of its pre-European extent both on the SCP and within the City of Busselton falling significantly below the desired Commonwealth 30% pre-European retention target.

Association 1136, which is dominant across the survey area has less than less than 10% of its pre-European extent across the SCP IBRA region, the Perth IBRA sub-region and within the City of Busselton. However, it exceeds the 30% retention target at a state level. Association 973 has less than less than 10% of its pre-European extent across the SCP IBRA region, the Perth IBRA sub-region and within the City of Busselton. However, it exceeds the 30% retention target at a state level.

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Appendix 1. Threatened and Priority flora Likelihood of occurrence assessment methodology.

Rating	Presurvey rationale	Post survey rationale
Recorded		Taxon was or has been recorded in the survey area.
Likely	Known to occur within one kilometre (km) of the survey area with suitable habitat known or predicted to occur within the survey area.	<p>The taxon is known to occur within one km of the survey area and very suitable habitat was present, but the taxon was not observed for one of the following reasons.</p> <ul style="list-style-type: none"> L1. The taxon was dormant at the time of survey and could therefore not be located. L2. The habitat was compromised, for example due to a recent fire. L3. The survey area is challenging to survey. The taxon is non- descript and difficult to find because, for example, it occurs in large areas of rocky granite outcrops, or within an expanse of open water.
Possible	Known to occur within a five-ten km of the survey area with suitable habitat known or predicted to occur within the survey area.	<p>The taxon is known from within a 1 to 10 km radius of the survey area, and suitable habitat for the species was present, but despite a thorough search being carried out, the species was not observed. The taxon may however be present for any of the following reasons.</p> <ul style="list-style-type: none"> P1. The taxon was dormant at the time of survey and could therefore not be located. P2. The habitat was compromised, for example, due to a recent fire. P3. The survey area is challenging to survey. The taxon is non- descript and difficult to find because, for example, it occurs in large areas of rocky granite outcrops, or within an expanse of open water.
Unlikely	Known or predicted to occur within ten km, but no suitable habitat is known or predicted to occur within the survey area.	<p>The taxon was not found and is unlikely to be present for one or more of the following reasons:</p> <ul style="list-style-type: none"> U1. A thorough search for the taxon was conducted and no suitable habitat was present given that the taxon is known to be generally restricted to a clearly defined habitat type. U2. Suitable or potential habitat was present and appropriately searched, but the taxon was not observed. U3. Suitable or potential habitat was present, but these areas were too degraded for the taxon to occur, for example, due to weed invasion and/or clearing.

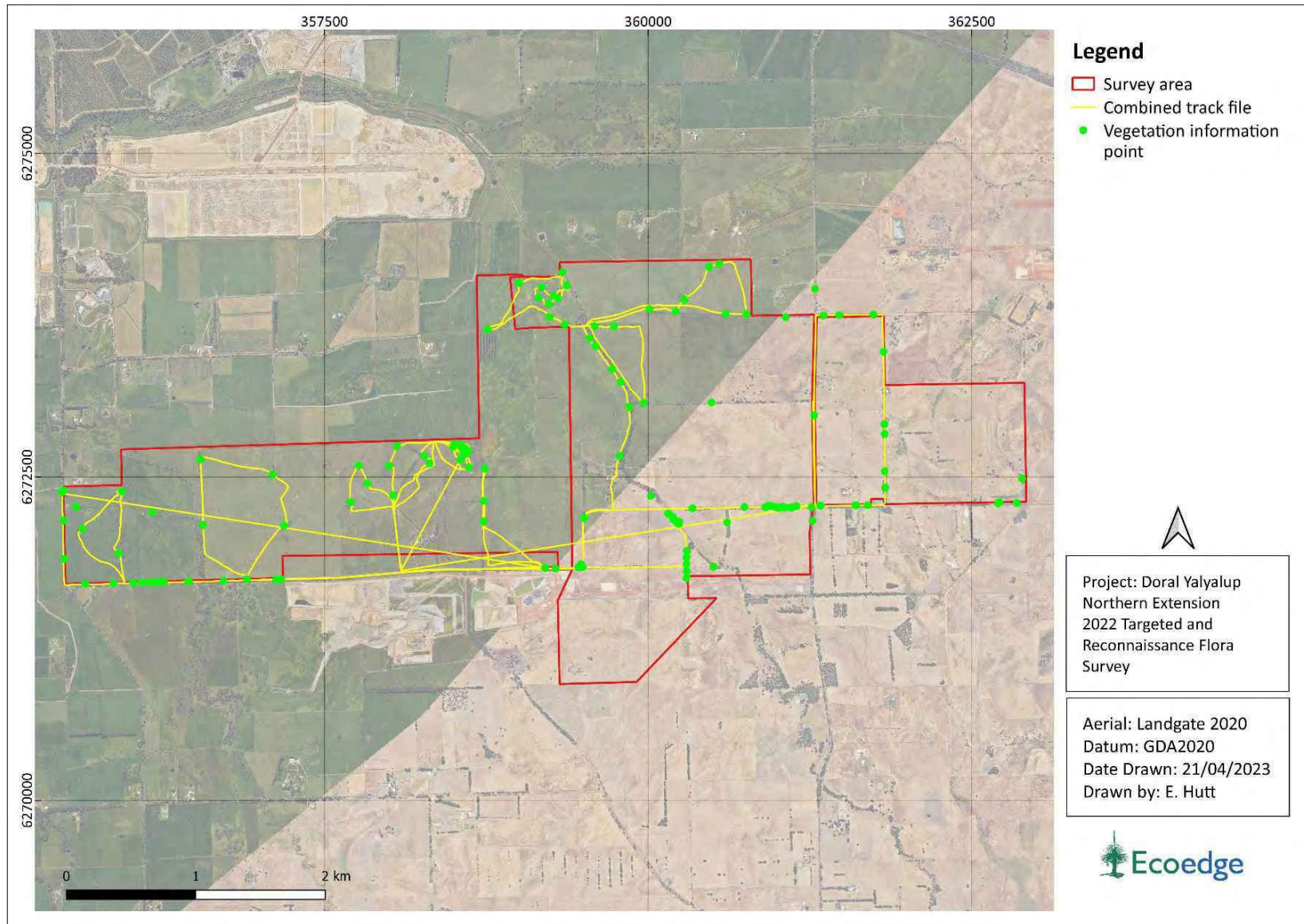
Example of application of pre and post-survey likelihood of occurrence

Taxon	Cons Status	Flowering	Description	Pre survey likelihood	Post Survey Likelihood
<i>Drakaea elastica</i>	T (EN)	Sep -Oct	Tuberous, perennial, herb, 0.12-0.3 m high. Fl. red, green, yellow. White or grey sand. Low-lying situations adjoining winter-wet swamps.	Likely	Unlikely (U3)

Appendix 2. Vegetation condition scale (EPA 2016).

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

Appendix 3. Location of sample sites and track logs within the survey area.



Appendix 4. Categories of threatened and priority ecological communities under the BC Act.

Conservation code	Category
(T) Threatened ecological community pursuant to Sect 27 of the <i>Biodiversity Conservation Act 2016</i> .	
T	<p>(T) CR – Critically endangered</p> <p>An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.</p>
	<p>(T) EN - Endangered</p> <p>An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.</p>
	<p>(T) VU - Vulnerable</p> <p>An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.</p>
(P) Priority species – possible threatened communities.	
p1	<p>Poorly known communities</p> <p>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. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.</p>

Conservation code	Category
P2	<p>Poorly known communities</p> <p>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. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.</p>
P3	<p>Poorly known communities</p> <ul style="list-style-type: none"> a) 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: b) communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat (within approximately 10 years), or; c) communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, inappropriate fire regimes, clearing, hydrological change etc. <p>Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.</p>
P4	<p>Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring.</p> <ul style="list-style-type: none"> a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.
P5	<p>Conservation dependent ecological communities</p> <p>Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.</p>

Appendix 5. Categories of Threatened ecological communities under the EPBC Act.

Category	Definition
Critically endangered (CR)	If, at that time, an ecological community is facing an extremely high risk of extinction in the wild in the immediate future (indicative timeframe being the next 10 years).
Endangered (EN)	If, at that time, an ecological community 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)	If, at that time, 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 6. Naturemap excel data Protected Matters Search Tool

#	Species	Cons Status*
1	<i>Chamelaucium roycei</i>	T (VU)
2	<i>Banksia squarrosa</i> subsp. <i>argillacea</i>	T (VU)
3	<i>Daviesia elongata</i> subsp. <i>elongata</i>	T (VU)
4	<i>Diuris micrantha</i>	T (VU)
5	<i>Drakaea micrantha</i>	T (VU)
6	<i>Banksia nivea</i> subsp. <i>uliginosa</i>	T (EN)
7	<i>Drakaea elastica</i>	T (EN)
8	<i>Grevillea elongata</i>	T (EN)
9	<i>Petrophile latericola</i>	T (EN)
10	<i>Verticordia plumosa</i> var. <i>vassensis</i>	T (EN)
11	<i>Darwinia whicherensis</i>	T (EN)
12	<i>Gastrolobium papilio</i>	T (EN)
13	<i>Grevillea maccutcheonii</i>	T (EN)
14	<i>Lambertia echinata</i> subsp. <i>occidentalis</i>	T (EN)
15	<i>Verticordia densiflora</i> var. <i>pedunculata</i>	T (EN)
16	<i>Verticordia plumosa</i> var. <i>ananeotes</i>	T (EN)
17	<i>Caladenia busselliana</i>	T (EN)
18	<i>Caladenia hoffmanii</i>	T (EN)
19	<i>Caladenia huegelii</i>	T (EN)
20	<i>Brachyscias verecundus</i>	T (CR)
21	<i>Hemigenia ramosissima</i>	T (CR)
22	<i>Synaphea</i> sp. Fairbridge Farm (D. Papenfus 696)	T (CR)
23	<i>Morelotia australiensis</i>	T (VU)
24	<i>Calothamnus quadrifidus</i> subsp. <i>teretifolius</i>	P4
25	<i>Acacia flagelliformis</i>	P4
26	<i>Aponogeton hexatepalus</i>	P4
27	<i>Banksia meisneri</i> subsp. <i>ascendens</i>	P4
28	<i>Chamelaucium erythrochlorum</i>	P4
29	<i>Eucalyptus rudis</i> subsp. <i>cratyantha</i>	P4
30	<i>Franklandia triaristata</i>	P4

#	Species	Cons Status*
31	<i>Schoenus natans</i>	P4
32	<i>Stylidium longitubum</i>	P4
33	<i>Tripterococcus</i> sp. <i>Brachylobus</i> (A.S. George 14234)	P4
34	<i>Verticordia lehmannii</i>	P4
35	<i>Acacia semitrullata</i>	P4
36	<i>Caladenia speciosa</i>	P4
37	<i>Ornduffia submersa</i>	P4
38	<i>Pultenaea skinneri</i>	P4
39	<i>Stylidium striatum</i>	P4
40	<i>Verticordia lindleyi</i> subsp. <i>lindleyi</i>	P4
41	<i>Hakea oldfieldii</i>	P3
42	<i>Isopogon formosus</i> subsp. <i>dasylepis</i>	P3
43	<i>Angianthus drummondii</i>	P3
44	<i>Blennospora doliiformis</i>	P3
45	<i>Boronia anceps</i>	P3
46	<i>Caustis</i> sp. <i>Boyanup</i> (G.S. McCutcheon 1706)	P3
47	<i>Chordifex gracilior</i>	P3
48	<i>Eryngium</i> sp. <i>Subdecumbens</i> (G.J. Keighery 5390)	P3
49	<i>Grevillea brachystylis</i> subsp. <i>brachystylis</i>	P3
50	<i>Lepyrodia heleocharoides</i>	P3
51	<i>Loxocarya magna</i>	P3
52	<i>Meionectes tenuifolia</i>	P3
53	<i>Myriophyllum echinatum</i>	P3
54	<i>Schoenus benthamii</i>	P3
55	<i>Schoenus pennisetis</i>	P3
56	<i>Stylidium paludicola</i>	P3
57	<i>Synaphea hians</i>	P3
58	<i>Verticordia attenuata</i>	P3
59	* <i>Amanita kalamundae</i>	P3
60	<i>Boronia capitata</i> subsp. <i>gracilis</i>	P3
61	<i>Boronia tetragona</i>	P3
62	<i>Chamaescilla gibsonii</i>	P3

#	Species	Cons Status*
63	<i>Eryngium</i> sp. Ferox (G.J. Keighery 16034)	P3
64	<i>Grevillea bronwenae</i>	P3
65	<i>Grevillea manglesioides</i> subsp. <i>ferricola</i>	P3
66	<i>Jacksonia gracillima</i>	P3
67	<i>Lasiopetalum laxiflorum</i>	P3
68	<i>Lasiopetalum membranaceum</i>	P3
69	<i>Olearia strigosa</i>	P3
70	<i>Pithocarpa corymbulosa</i>	P3
71	<i>Synaphea diabolica</i>	P3
72	<i>Amperea micrantha</i>	P2
73	<i>Calytrix retrorsifolia</i>	P2
74	<i>Gratiola pedunculata</i>	P2
75	<i>Leucopogon</i> sp. Busselton (D. Cooper 243)	P2
76	<i>Stylidium squamellosum</i>	P2
77	<i>Synaphea petiolaris</i> subsp. <i>simplex</i>	P2
78	<i>Acacia benthamii</i>	P2
79	<i>Actinotus whicheranus</i>	P2
80	<i>Cardamine paucijuga</i>	P2
81	<i>Eucalyptus relict</i>	P2
82	<i>Gastrolobium whicherense</i>	P2
83	<i>Montia australasica</i>	P2
84	<i>Platytheca</i> sp. Sabina (G.J. & B.J. Keighery 295)	P2
85	<i>Schoenus loliaceus</i>	P2
86	<i>Thysanotus</i> sp. Badgingarra (E.A. Griffin 2511)	P2
87	<i>Andersonia ferricola</i>	P1
88	<i>Boronia humifusa</i>	P1
89	<i>Dillwynia</i> sp. Capel (P.A. Jurjevich 1771)	P1
90	<i>Gastrolobium</i> sp. Yoongarillup	P1
91	<i>Loxocarya striata</i> subsp. <i>implexa</i>	P1
92	<i>Stachystemon exilis</i>	P1
93	<i>Stylidium ferricola</i>	P1



Australian Government

**Department of Climate Change, Energy,
the Environment and Water**

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. Please see the caveat for interpretation of information provided here.

Report created: 31-Oct-2022

[Summary](#)

[Details](#)

[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment 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 (Ramsar)	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	36
Listed Migratory Species:	12

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 <https://www.dcceew.gov.au/parks-heritage/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 Lands:	2
Commonwealth Heritage Places:	None
Listed Marine Species:	15
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	4
Regional Forest Agreements:	1
Nationally Important Wetlands:	None
EPBC Act Referrals:	13
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Vasse-wonnerup system	Within 10km of Ramsar site	In feature area

Listed Threatened Ecological Communities [Resource Information]

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

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community likely to occur within area	In feature area
Clay Pans of the Swan Coastal Plain	Critically Endangered	Community likely to occur within area	In buffer area only
Shrublands on southern Swan Coastal Plain ironstones	Endangered	Community likely to occur within area	In buffer area only
Tuart (<i>Eucalyptus gomphocephala</i>) Woodlands and Forests of the Swan Coastal Plain ecological community	Critically Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.

Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area	In feature area
Zanda baudinii listed as Calyptorhynchus baudinii Baudin's Black-Cockatoo, Long-billed Black-cockatoo [87736]	Endangered	Breeding known to occur within area	In feature area
Zanda latirostris listed as Calyptorhynchus latirostris Carnaby's Black Cockatoo, Short-billed Black-cockatoo [87737]	Endangered	Species or species habitat known to occur within area	In feature area
FISH			
Nannatherina balstoni Balston's Pygmy Perch [66698]	Vulnerable	Species or species habitat may occur within area	In feature area
MAMMAL			
Dasyurus geoffroi Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pseudocheirus occidentalis Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Breeding known to occur within area	In feature area
OTHER			
Westralunio carteri Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
PLANT			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Banksia nivea subsp. uliginosa Swamp Honeypot [82766]	Endangered	Species or species habitat known to occur within area	In feature area
Banksia squarrosa subsp. argillacea Whicher Range Dryandra [82769]	Vulnerable	Species or species habitat known to occur within area	In feature area
Brachyscias verecundus Ironstone Brachyscias [81321]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Caladenia busselliana Bussell's Spider-orchid [24369]	Endangered	Species or species habitat likely to occur within area	In feature area
Caladenia hoffmanii Hoffman's Spider-orchid [56719]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat known to occur within area	In feature area
Chamelaucium sp. S coastal plain (R.D.Royce 4872) Royce's Waxflower [87814]	Vulnerable	Species or species habitat known to occur within area	In feature area
Darwinia whicherensis Abba Bell [83193]	Endangered	Species or species habitat known to occur within area	In feature area
Daviesia elongata subsp. elongata Long-leaved Daviesia [64883]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Drakaea elastica Glossy-leaved Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Gastrolobium papilio Butterfly-leaved Gastrolobium [78415]	Endangered	Species or species habitat known to occur within area	In feature area
Grevillea elongata Ironstone Grevillea [64578]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Grevillea maccutcheonii McCutcheon's Grevillea [64522]	Endangered	Species or species habitat known to occur within area	In feature area
Lambertia echinata subsp. occidentalis Western Prickly Honeysuckle [64528]	Endangered	Species or species habitat known to occur within area	In feature area
Petrophile latericola Laterite Petrophile [64532]	Endangered	Species or species habitat known to occur within area	In feature area
Synaphea sp. Fairbridge Farm (D. Papenfus 696) Selena's Synaphea [82881]	Critically Endangered	Species or species habitat may occur within area	In feature area
Tetraria australiensis Southern Tetraria [10137]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Verticordia densiflora var. pedunculata Long-stalked Featherflower [55689]	Endangered	Species or species habitat known to occur within area	In feature area
Verticordia plumosa var. vassensis Vasse Featherflower [55804]	Endangered	Species or species habitat known to occur within area	In feature area
SHARK			
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Marine Species			
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area
Migratory Terrestrial Species			
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pandion haliaetus Osprey [952]		Breeding known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area	In feature area

Other Matters Protected by the EPBC Act

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

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.

Commonwealth Land Name	State	Buffer Status
Unknown		
Commonwealth Land - [52117]	WA	In buffer area only
Commonwealth Land - [50269]	WA	In buffer area only

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

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pandion haliaetus Osprey [952]		Breeding known to occur within area	In buffer area only
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat may occur within area overfly marine area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

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

Protected Area Name	Reserve Type	State	Buffer Status
Ruabon Townsite	Nature Reserve	WA	In buffer area only
Unnamed WA14567	Nature Reserve	WA	In buffer area only
Unnamed WA46070	Nature Reserve	WA	In buffer area only
Whicher	National Park	WA	In buffer area only

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

Note that all areas with completed RFAs have been included.

RFA Name	State	Buffer Status
South West WA RFA	Western Australia	In buffer area only

EPBC Act Referrals [\[Resource Information \]](#)

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Bussell Highway Duplication Hutton to Sabina	2020/8800	Controlled Action	Post-Approval	In buffer area only
Titanium Minerals Deposit	2001/279	Controlled Action	Post-Approval	In buffer area only
Tutunup South Mineral Sands Project	2007/3441	Controlled Action	Post-Approval	In buffer area only
Wonnerup North Mineral Sands Project, Busselton, WA	2014/7205	Controlled Action	Post-Approval	In buffer area only
Wonnerup South Mineral Sands Project, Yalyalup, WA	2014/7135	Controlled Action	Post-Approval	In buffer area only
Wonnerup Titanium Mineral Mining Project	2010/5403	Controlled Action	Post-Approval	In buffer area only
Yalyalup Mineral Sands Project, WA	2017/8094	Controlled Action	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Yarragadee Water Supply Development	2005/2073	Controlled Action	Completed	In feature area
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Waterloo to Busselton 132kV Transmission Line	2002/816	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Referral decision				
Harvesting of Pinus Radiata Plantation	2010/5414	Referral Decision	Completed	In buffer area only

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and 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

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

Where little information is available for a 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 detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

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

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

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

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

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 7. Definitions of conservation codes for Threatened and Priority flora under the BC Act.

Conservation code	Category
(T) Threatened species pursuant to Sect 19 of the BC Act 2016.	
T	<p>(T) CR – Critically endangered</p> <p>Threatened species considered to be “<i>facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines</i>”.</p>
	<p>(T) EN - Endangered</p> <p>Threatened species considered to be “<i>facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines</i>”.</p>
	<p>(T) VU - Vulnerable</p> <p>Threatened species considered to be “<i>facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines</i>”.</p>
(P) Priority species – possible Threatened species.	
P1	<p>Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.</p>
P2	<p>Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.</p>

Conservation code	Category
P3	<p>Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.</p>
P4	<p>(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.</p> <p>(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.</p> <p>(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.</p>

Appendix 8. Categories of Threatened species under the EPBC Act.

Category	Definition
Extinct (Ex)	A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
Extinct in the Wild (ExW)	A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time (a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or (b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
Critically Endangered (CE)	A native species is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered (EN)	A native species is eligible to be included in the endangered category at a particular time if, at that time (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
Vulnerable (VU)	A native species is eligible to be included in the vulnerable category at a particular time if, at that time (a) it is not critically endangered or endangered; and (b) it is facing a high risk of extinction in the wild in the medium term future, as determined in accordance with the prescribed criteria.
Conservation Dependent (CD)	A native species is eligible to be included in the conservation dependent category at a particular time if, at that time, the species is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.

Appendix 9. Pre and post survey likelihood of occurrence table.

Pre and post survey likelihood of threatened and priority flora occurring within the survey area, based on a comparison of known (DBCA 2022d) and potential species (DCCEEW 2022a) within the 10 km radius study area.¹

#	SPECIES	CATEGORY	FLOWERING	DESCRIPTION AND HABITAT	Likelihood of occurrence	Post survey LoO
1	<i>Banksia squarrosa</i> subsp. <i>argillacea</i>	T (VU)	Jun-Nov	Erect, open, non-lignotuberous shrub, 1.2–4 m high. Fl. yellow, Jun–Nov. White/grey sand, gravelly clay or loam. Winter-wet flats, clay flats.	Likely	Unlikely (U2)
2	<i>Chamelaucium roycei</i>	T (VU)	Oct-Dec	Winter-wet areas, loams and ironstone.	Likely/recorded	Unlikely (U2)
3	<i>Daviesia elongata</i> subsp. <i>elongata</i>	T (VU)	Dec-Feb	Spreading shrub, 0.4–1 m high. Fl. yellow, orange, red. Sandy soils.	Possible	Unlikely (U2)
4	<i>Diuris micrantha</i>	T (VU)	Sep-Oct	Tuberous, perennial, herb, 0.3–0.6 m high. Fl. yellow, brown. Brown loamy clay. Winter-wet swamps, in shallow water.	Possible	Unlikely (U2)
5	<i>Drakaea micrantha</i>	T (VU)	Sep-Oct	Tuberous, perennial, dwarf hammer orchid, 0.15–0.3 m high. Fl. red, yellow. Small heart shaped leaf with green veins. White-grey infertile sand in <i>Eucalyptus marginata</i> , <i>Allocasuarina fraseriana</i> woodland or forest. Often under <i>Kunzea ericifolia</i> , <i>K. glabrescens</i> with <i>Paracaleana nigrita</i> and other <i>Drakaea</i> species.	Unlikely	Unlikely (U1)

¹ Note presurvey data downloads were conducted by Ecoedge (DBCA 2020c and DAWE 2020a) for a 10 km buffer. This data is included in the appendices.

#	SPECIES	CATEGORY	FLOWERING	DESCRIPTION AND HABITAT	Likelihood of occurrence	Post survey LoO
6	<i>Banksia nivea</i> subsp. <i>uliginosa</i>	T (EN)	July-Sep	Dense, erect, non-lignotuberous shrub, 0.2–1.5 m high. Fl. yellow, brown. Sandy clay, gravel.(red, sandy, shallow loams over ironstone in thick scrub, in winter wet southern and Scott ironstones.)	Likely/recorded	Unlikely (U2)
7	<i>Caladenia busselliana</i>	T (EN)	Sept-Oct	Tuberous, perennial, herb, 0.2–0.3 m high. Fl. green, yellow, cream. Sandy loam. Winter-wet swamps	Possible	Unlikely (U2)
8	<i>Caladenia hoffmanii</i>	T (EN)	Aug-Oct	Tuberous, perennial, herb, 0.13-0.3 m high. Fl. green & yellow & red. Clay, loam, laterite, granite. Rocky outcrops and hillsides, ridges, swamps and gullies.	Unlikely	Unlikely (U2)
9	<i>Caladenia huegelii</i>	T (EN)	Sep-Oct	Tuberous, perennial, herb, 0.25-0.6 m high. Fl. green, cream, red. Grey or brown sand, clay loam. (Jarrah banksia woodland usually associated with the Bassendean sand-dune system, rarely in the Spearwood system).	Unlikely	Unlikely (U1)
10	<i>Darwinia whicherensis</i>	T (EN)	Oct-Nov	Erect low shrub to 30 cm, flowers green, outer red. Winter-wet area of shrubland over shallow red clay over ironstone	Likely	Unlikely (U2)
11	<i>Drakaea elastica</i>	T (EN)	Oct-Nov	Tuberous, perennial, herb, 0.12-0.3 m high. Fl. red, green, yellow. White or grey sand. Low-lying situations adjoining winter-wet swamps.	Likely/recorded	Unlikely (U2)

#	SPECIES	CATEGORY	FLOWERING	DESCRIPTION AND HABITAT	Likelihood of occurrence	Post survey LoO
12	<i>Gastrolobium papilio</i>	T (EN)	Oct-Dec	Tangled, clumped shrub, to 1.5 m high. Fl. cream-red. Sandy clay over ironstone and laterite. Flat plains.	Likely	Unlikely (U2)
13	<i>Grevillea elongata</i>	T (EN)	May or Sep to Nov	Prostrate, vigorously suckering shrub, 0.05-0.3 m high. Fl. red/pink-red. White or yellow sand, laterite.	Likely	Unlikely (U2)
14	<i>Grevillea maccutcheonii</i>	T (EN)	Mar or May or Dec	Densely branched shrub, to 2 m high. Fl. green & red. Shallow soils over laterite, clay. Seasonally inundated sites.	Likely	Unlikely (U2)
15	<i>Lambertia echinata</i> subsp. <i>occidentalis</i>	T (EN)	Feb/May-Jun/Oct	Prickly, much-branched, non-lignotuberous shrub, to 3 m high. Fl. yellow. White sandy soils over laterite, orange/brown-red clay over ironstone.	Likely	Unlikely (U2)
16	<i>Petrophile latericola</i>	T (EN)	Nov	Multi-stemmed shrub, 0.4-1.5 m high. Fl. yellow. Red lateritic clay. Winter-wet flats.	Likely/recorded	Unlikely (U2)
17	<i>Verticordia densiflora</i> var. <i>pedunculata</i>	T (EN)	Dec-Jan	Erect to spreading shrub, 0.3-0.6 m high. Fl. pink/pink-white. Grey/yellow sand, sandy loam. Winter-wet low-lying areas.	Possible	Unlikely (U2)
18	<i>Verticordia plumosa</i> var. <i>aneantes</i>	T (EN)	Nov-Dec	Erect, sparsely branched shrub, 0.3-0.5 m high. Fl. pink-purple/white. Sandy loam. Seasonally inundated plains.	Possible	Unlikely (U2)
19	<i>Verticordia plumosa</i> var. <i>vassensis</i>	T (EN)	Sep-Feb	Shrub, 0.3–1 m high. Fl. pink. White/grey sand. Winter-wet flats.	Likely/recorded	Recorded

#	SPECIES	CATEGORY	FLOWERING	DESCRIPTION AND HABITAT	Likelihood of occurrence	Post survey LoO
20	<i>Brachyscias verecundus</i>	T (CR)	Nov to early December	Annual (or ephemeral), herb, 0.012-0.022 m high, entirely glabrous. Fl. white/cream. Recorded in winter-wet clay over ironstone in open to tall shrubland, other occurrence in moss sward in granite outcrop in Shannon River National Park has been officially disregarded, according the EPBC Act conservation advice (2006) for this species .	Possible	Unlikely (U2)
21	<i>Hemigenia ramosissima</i>	T (CR)	Nov-Dec or Jan	Slender shrub, to 0.5 m high. Fl. blue-purple. Lateritic soils, clay. Granite outcrops.	Unlikely	Unlikely (U2)
22	<i>Synaphea</i> sp. Fairbridge Farm (D. Papenfus 696)	T (CR)	Oct	Dense, clumped shrub, to 0.3 m high, to 0.4 m wide. Fl. Yellow. Sandy with lateritic pebbles. Near winter-wet flats, in low woodland with weedy grasses.	Possible	Unlikely (U2)
23	<i>Morelotia australiensis</i>	T (VU)	Nov-Dec	Rhizomatous, tufted perennial, grass-like or herb (sedge), to 1 m high. Fl. brown. Sandy soils associated with heavy soils on the Pinjarra Plain.	Possible	Unlikely (U2)
24	<i>Acacia flagelliformis</i>	P4	May-Sep	Rush-like, erect or sprawling shrub, 0.3-0.75(-1.6) m high. Fl. yellow. Sandy soils. Winter-wet areas.	Possible	Recorded
25	<i>Acacia semitrullata</i>	P4	May-Oct	Slender, erect, pungent shrub, (0.1-)0.2-0.7(-1.5) m high. Fl. cream, white. White/grey sand, sometimes over laterite, clay. Sandplains, swampy areas.	Unlikely	Unlikely (U2)

#	SPECIES	CATEGORY	FLOWERING	DESCRIPTION AND HABITAT	Likelihood of occurrence	Post survey LoO
26	<i>Aponogeton hexatepalus</i>	P4	Jul-Oct	Rhizomatous or cormous, aquatic perennial, herb, leaves floating. Fl. green, white. Mud. Freshwater: ponds, rivers, claypans.	Possible	Unlikely (U2)
27	<i>Banksia meisneri</i> subsp. <i>ascendens</i>	P4	Apr-Sep	Shrub, 0.5-2 m high, leaves ascending, 8-15 mm long. Fl. yellow-orange-brown. White or grey sand. Swampy flats.	Possible	Unlikely (U2)
28	<i>Caladenia speciosa</i>	P4	Sep-Oct	Tuberous, perennial, herb, 0.35-0.6 m high. Fl. white, pink. White, grey or black sand.	Unlikely	Unlikely (U2)
29	<i>Calothamnus quadrifidus</i> subsp. <i>teretifolius</i>	P4	Nov-Dec	Erect, compact, perennial shrub 1.7 m high x 1 m wide. Fl. Red. Seeds held. Fruit exposed. Occurs inland from Busselton in clay with ironstone, wet in winter, with tall shrubland.	Likely/recorded	Recorded
30	<i>Chamelaucium erythrochlorum</i>	P4	Jul-Oct	Non-lignotuberous shrub, to 2.5 m high. Fl. cream, yellow. Jarrah-marri forest. Loams, sandy clays. Riverbanks, lower slopes, below laterite breakaways.	Possible	Unlikely (U2)
31	<i>Eucalyptus rudis</i> subsp. <i>cratyantha</i>	P4	Jul-Sep	Tree, 5-20 m high, bark rough, box-type. Fl. white. Loam. Flats, hillsides.	Possible	Unlikely (U2)
32	<i>Franklandia triaristata</i>	P4	Aug-Oct	Erect, lignotuberous shrub, 0.2-1 m high. Fl. white, cream, yellow, brown, purple. White or grey sand.	Possible	Unlikely (U2)
33	<i>Ornduffia submersa</i>	P4	Sep-Oct	Tuberous emergent aquatic perennial dwarf shrub, height to 35 cm; flowers white; leaves floating on surface of	Possible	Unlikely (U2)

#	SPECIES	CATEGORY	FLOWERING	DESCRIPTION AND HABITAT	Likelihood of occurrence	Post survey LoO
				water. Clay-based ponds and swamps (semi-aquatic)		
34	<i>Pultenaea skinneri</i>	P4	Jul-Sep	Slender shrub, 1-2 m high. Fl. yellow, orange, red. Sandy or clayey soils. Winter-wet depressions.	Possible	Unlikely (U2)
35	<i>Schoenus natans</i>	P4	Oct	Aquatic annual, grass-like or herb (sedge), 0.3 m high. Fl. brown. Winter-wet depressions.	Possible	Unlikely (U2)
36	<i>Styloidium longitubum</i>	P4	Oct-Dec	Erect annual (ephemeral), herb, 0.05-0.12 m high. Fl. Pink. Sandy clay, clay. Seasonal wetlands.	Possible	Unlikely (U2)
37	<i>Styloidium striatum</i>	P4	Oct-Nov	Rosetted perennial, herb, 0.15-0.55 m high, Leaves erect, oblanceolate to spatulate, 1.5-4 cm long, 1.5-6 mm wide, apex acute to acuminate, margin entire, glabrous, striate. Scape sparingly glandular on inflorescence axis, glabrous below. Inflorescence racemose. Fl. yellow. Brown clay loam over laterite. Hillslopes. Jarrah/Marri forest, Wandoo woodland.	Unlikely	Unlikely (U2)
38	<i>Tripterococcus sp.</i> <i>Brachylobus (A.S. George 14234)</i>	P4	Nov-Dec or Feb	Perennial, herb, to 1 m high. Fl. yellow/yellow-green. Grey sand, red clay, laterite, often moist. Low-lying flats.	Possible	Unlikely (U2)
39	<i>Verticordia lehmannii</i>	P4	Jan/Apr-Aug/Dec	Slender shrub, 0.2–1 m high. Fl. pink. Sandy clay. Winter-wet flats.	Possible	Unlikely (U2)

#	SPECIES	CATEGORY	FLOWERING	DESCRIPTION AND HABITAT	Likelihood of occurrence	Post survey LoO
40	<i>Verticordia lindleyi</i> subsp. <i>lindleyi</i>	P4	May or Nov-Dec or Jan	Erect shrub, 0.2-0.75 m high. Fl. pink. Sand, sandy clay. Winter-wet depressions.	Possible	Unlikely (U2)
41	* <i>Amanita kalamundae</i>	P3	May to Jun	Macroscopic characters: Pileus 40-50 mm, pale buff to clay pink to pale vinaceous buff, margin appendiculate, non-sulcate, context white, smell of mustard. Universal veil on pileus: white or pale buff, breaking into large or small patches, fugacious. Jarrah forest near woody plants.	Unlikely	Unlikely (U1)
42	<i>Angianthus drummondii</i>	P3	Oct-Dec	Erect annual, herb, to 0.1 m high. Fl. yellow. Grey or brown clay soils, ironstone. Seasonally wet flats.	Possible	Unlikely (U2)
43	<i>Blennospora doliiformis</i>	P3	Oct-Nov	Erect annual, herb, to 0.15 m high. Fl. yellow. Grey or red clay soils over ironstone. Seasonally-wet flats.	Possible	Unlikely (U2)
44	<i>Boronia anceps</i>	P3	Sep-Dec or Jan	Perennial, herb, 0.3-0.6 m high, lacking lignotuber, stem flattened and ancipitous when young. Fl. pink/pink-purple. White sand, gravelly laterite. Seasonally swampy heaths.	Possible	Unlikely (U2)
45	<i>Boronia capitata</i> subsp. <i>gracilis</i>	P3	Jun-Nov	Slender shrub, 0.3-0.6(-3) m high, branches pilose. Fl. pink. White/grey or black sand. Winter-wet swamps,	Possible	Unlikely (U2)
46	<i>Boronia tetragona</i>	P3	Oct-Dec	Perennial, herb, 0.3–0.7 m high, leaves sessile, entire, with papillate margins, branches quadrangular, sepals ciliate. Fl. pink, red.	Possible	Unlikely (U2)

#	SPECIES	CATEGORY	FLOWERING	DESCRIPTION AND HABITAT	Likelihood of occurrence	Post survey LoO
				Black/white sand, laterite, brown sandy loam. Winter-wet flats, swamps, open woodland.		
47	<i>Caustis</i> sp. Boyanup (G.S. McCutcheon 1706)	P3	Dec-Jan	Rhizomatous, clumped perennial, grass-like or herb (sedge), 0.7–1 m high. White or grey sand.	Possible	Unlikely (U2)
48	<i>Chamaescilla gibsonii</i>	P3	Sep	Clumped tuberous, herb. Fl. blue. Clay to sandy clay. Winter-wet flats, shallow water-filled claypans.	Possible	Unlikely (U2)
49	<i>Chordifex gracilior</i>	P3	Sep-Dec	Rhizomatous, erect perennial, herb, 0.3-0.5 m high. Fl. brown. Peaty sand. Swamps.	Possible	Unlikely (U2)
50	<i>Eryngium</i> sp. Ferox (G.J. Keighery 16034)	P3	Nov	Erect, open tuberous, herb, 0.1–0.3 m high. Fl. green. Grey to brown loamy to sandy clay, brown cracking clay. Winter-wet flats, swamps, dried claypans, ridges.	Possible	Unlikely (U2)
51	<i>Eryngium</i> sp. Subdecumbens (G.J. Keighery 5390)	P3	Nov	Erect, open tuberous, herb, 0.1–0.3 m high. Fl. green. Grey to brown loamy to sandy clay, brown cracking clay. Winter-wet flats, swamps, dried claypans, ridges.	Possible	Unlikely (U2)
52	<i>Grevillea brachystylis</i> subsp. <i>brachystylis</i>	P3	Aug-Nov	Much-branched, prostrate or decumbent, non-lignotuberous shrub, 0.2-0.5 m high, to 3 m wide. Fl. red. Black sand, sandy clay. Swampy situations.	Possible	Recorded
53	<i>Grevillea bronwenae</i>	P3	Jun-Dec	Slender, erect shrub, 0.5–1.6 m high. Fl. red. Grey sand over laterite, lateritic loam. Hillslopes.	Unlikely	Unlikely (U2)

#	SPECIES	CATEGORY	FLOWERING	DESCRIPTION AND HABITAT	Likelihood of occurrence	Post survey LoO
54	<i>Grevillea manglesioides</i> subsp. <i>ferricola</i>	P3	Oct	Erect or spreading shrub, 1.5 m high. Fl. red/green/red&green. Red sandy clay over ironstone. Winter wet flats.	Possible	Unlikely (U2)
55	<i>Hakea oldfieldii</i>	P3	Aug-Oct	Open, straggling shrub, up to 2.5 m high. Fl. white, cream, yellow. Red clay or sand over laterite. Seasonally wet flats.	Likely/recorded	Unlikely (U2)
56	<i>Isopogon formosus</i> subsp. <i>dasylepis</i>	P3	Jun-Dec	Low, bushy or slender, upright, non-lignotuberous shrub, 0.2–2 m high. Fl. pink, purple, red. Sand, sandy clay, gravelly sandy soils over laterite. Often swampy areas.	Likely	Unlikely (U2)
57	<i>Jacksonia gracillima</i>	P3	Oct-Nov	Decumbent shrub - 20 cm high and 50 cm wide. Flowers standard orange-yellow; eye yellow with red halo; wings/keel red. Seasonally damp shrublands and woodlands, on sandy loams or clay loams	Possible	Unlikely (U2)
58	<i>Lasiopetalum laxiflorum</i>	P3	Sep-Oct	Jarrah forest, lateritic soils. 2-3 ft high. Mauve flowers. Brown on underside of leaf.	Unlikely	Unlikely (U2)
59	<i>Lasiopetalum membranaceum</i>	P3	Sep-Dec	Multi-stemmed shrub, 0.2-1 m high. Fl. pink, blue, purple. Sand over limestone.	Unlikely	Unlikely (U1)
60	<i>Lepyrodia heleocharoides</i>	P3	Dec	Rhizomatous, slender, tufted perennial, herb (sedge-like), 0.15–0.25 m high. Moist peaty sand. Dry or seasonally inundated heath or woodland, swamps.	Possible	Unlikely (U2)

#	SPECIES	CATEGORY	FLOWERING	DESCRIPTION AND HABITAT	Likelihood of occurrence	Post survey LoO
61	<i>Loxocarya magna</i>	P3	Sep-Nov	Rhizomatous, perennial, herb (sedge-like), 0.5-1.5 m high. Sand, loam, clay, ironstone. Seasonally inundated or damp habitats.	Likely/recorded	Recorded
62	<i>Meionectes tenuifolia</i>	P3	Nov	Suckering spreading decumbent shrub with cream-green flowers - red style. Height to ca 25 cm. Broadly distributed across the Swan Coastal Plain, northern and southern Jarrah forests associated with ephemeral wetlands.	Possible	Unlikely (U2)
63	<i>Myriophyllum echinatum</i>	P3	Nov	Erect annual, herb, 0.02-0.03 m high. Fl. red. Clay. Winter-wet flats.	Possible	Unlikely (U2)
64	<i>Olearia strigosa</i>	P3	Dec or Jan-May	Erect shrub, 0.5-1.5 m high. Fl. blue-purple, Dec or Jan to May. Sandy loam. Open forest.	Unlikely	Unlikely (U2)
65	<i>Pithocarpa corymbulosa</i>	P3	Jan-Apr	Erect to scrambling perennial, herb, 0.5-1 m high. Fl. white. Gravelly or sandy loam. Amongst granite outcrops.	Unlikely	Unlikely (U1)
66	<i>Schoenus benthamii</i>	P3	Oct-Nov	Tufted perennial, grass-like or herb (sedge), 0.15-0.45 m high. Fl. brown. White, grey sand, sandy clay. Winter-wet flats, swamps.	Possible	Unlikely (U2)
67	<i>Schoenus pennisetis</i>	P3	Aug-Sep	Tufted annual, grass-like or herb (sedge), 0.05-0.15 m high. Fl. purple-black. Grey or peaty sand, sandy clay. Swamps, winter-wet depressions.	Possible	Unlikely (U2)

#	SPECIES	CATEGORY	FLOWERING	DESCRIPTION AND HABITAT	Likelihood of occurrence	Post survey LoO
68	<i>Stylidium paludicola</i>	P3	Oct-Dec	Reed-like perennial, herb, 0.35-1 m high, Leaves tufted, linear or subulate or narrowly oblanceolate, 0.5-4 cm long, 0.5-1.5 mm wide, apex acute, margin entire, glabrous. Scape mostly glabrous, inflorescence axis glandular. Inflorescence racemose. Fl. pink. Peaty sand over clay. Winter wet habitats. Marri and Melaleuca woodland, Melaleuca shrubland.	Likely	Unlikely (U2)
69	<i>Synaphea diabolica</i>	P3	Aug - Nov	Clumped, sprawling shrub (subshrub), 0.2-0.6 m high. Dry, yellow-brown laterite soil with laterite gravel. In undulating areas.	Unlikely	Unlikely (U2)
70	<i>Synaphea hians</i>	P3	Jul-Nov	Prostrate or decumbent shrub, 0.15-0.6 m high, to 1 m wide. Fl. Yellow. Sandy soils. Rises.	Possible	Unlikely (U2)
71	<i>Verticordia attenuata</i>	P3	Dec-May	Shrub, 0.4–1 m high. Fl. pink. White or grey sand. Winter-wet depressions	Possible	Unlikely (U2)
72	<i>Acacia benthamii</i>	P2	Aug-Sep	Shrub, ca 1 m high. Fl. Yellow. Sand. Typically on limestone breakaways also recorded in Open shrubland; Melaleuca raphiophylla, Pericalymma ellipticum, Xanthorrhoea preissii, Hakea ceratophylla, Calothamnus lateralis, Hibbertia stellaris.	Unlikely	Unlikely (U2)
73	<i>Actinotus whicheranus</i>	P2	Dec or Jan-Mar	Erect, slender perennial, herb, with flowering branches to 0.4 m high. Fl. white. White sand pockets over laterite.	Unlikely	Unlikely (U2)

#	SPECIES	CATEGORY	FLOWERING	DESCRIPTION AND HABITAT	Likelihood of occurrence	Post survey LoO
74	<i>Amperea micrantha</i>	P2	Oct-Nov	Low, spreading, bushy perennial, herb, 0.1-0.3 m high. Fl. brown, Oct to Nov. Sandy soils, lateritic soils.	Likely	Unlikely (U2)
75	<i>Calytrix retrorsifolia</i>	P2	October (- Jan)	Slender, spreading, open shrub, 0.2-2 m high, Fl. 5-merous, white (pale yellow in bud). Shallow red clays and/or yellow sands over massive ironstones.	Likely	Unlikely (U2)
76	<i>Cardamine paucijuga</i>	P2	Sep-Oct	Slender erect annual, herb, to 0.4 m high. Fl. white. In moist to dry habitats.	Possible	Unlikely (U2)
77	<i>Eucalyptus relict</i>	P2	Jan-Feb	Mallee or tree, to 7 m high, bark rough all the way to branchlets, thick, grey; leaves lanceolate-falcate, dark olive-green, glossy above, dull and paler below. Fl. cream. Grey clay-loam. Undulating upper slopes, along creeklines.	Unlikely	Unlikely (U1)
78	<i>Gastrolobium whicherense</i>	P2	Oct	Slender, open shrub, to 1.6 m high. Fl. orange/yellow/red. Red-grey sandy clay over quartzite. Steep westerly slopes.	Unlikely	Unlikely (U2)
79	<i>Gratiola pedunculata</i>	P2	Sep-Nov	Erect to decumbent perennial herb 13–50 cm high. Damp areas.	Possible	Unlikely (U2)
80	<i>Leucopogon</i> sp. Busselton (D. Cooper 243)	P2	Aug-Sep	Slender, erect shrub to 70 cm; flowers white. Pericalymma ellipticum wet shrubland, Marri-Jarrah woodland.	Possible	Unlikely (U2)
81	<i>Montia australasica</i>	P2	Oct-Jan	Terrestrial or aquatic perennial herb, rooting from leaf nodes, terrestrial plants densely tufted and carpeting,	Possible	Unlikely (U2)

#	SPECIES	CATEGORY	FLOWERING	DESCRIPTION AND HABITAT	Likelihood of occurrence	Post survey LoO
				aquatics loose and open, 0.03-0.05 m high Fl. White to pale pink,		
82	<i>Platytheca</i> sp. Sabina (G.J. & B.J. Keighery 295)	P2	Aug-Nov	Erect open shrub to 70 cm high x 50 cm wide. Petals blue-purple.	Unlikely	Unlikely (U2)
83	<i>Schoenus loliaceus</i>	P2	Aug-Nov	Annual, grass-like or herb (sedge), 0.03–0.06 m high. Sandy soils. Winter-wet depressions.	Possible	Unlikely (U2)
84	<i>Stylidium squamellosum</i>	P2	Oct-Nov	Caespitose perennial, herb, 0.12-0.35 m high, leaves tufted, linear to narrowly oblanceolate, 1-5 cm long, 0.8-2.5 mm wide, apex subacute, margin entire, glandular. Scape glandular throughout. Inflorescence racemose. Fl. yellow. Brown to red-brown clay loam. Winter-wet habitats and depressions, open woodland, shrubland.	Possible	Unlikely (U2)
85	<i>Synaphea petiolaris</i> subsp. <i>simplex</i>	P2	Sep-Oct	Tufted shrub, 0.1–0.6 m high. Fl. yellow. Sandy soils. Flats, winter-wet areas.	Possible	Unlikely (U2)
86	<i>Thysanotus</i> sp. <i>Badgingarra</i> (E.A. Griffin 2511)	P2	Dec	Perennial, herb (with tuberous roots), ca 0.35 m high. Fl. blue. Grey sand with lateritic gravel.	Unlikely	Unlikely (U2)
87	<i>Andersonia ferricola</i>	P1	Oct	Shrub, 0.2-0.5 m high. Fl. purple. White sand or red-brown loam over ironstone. Seasonally wet flats.	Likely	Unlikely (U2)
88	<i>Boronia humifusa</i>	P1	Jun/Sep	Low-growing, wiry perennial, herb, 0.1–0.2 m high. Fl. pink, red. Gravelly	Possible	Unlikely (U2)

#	SPECIES	CATEGORY	FLOWERING	DESCRIPTION AND HABITAT	Likelihood of occurrence	Post survey LoO
				clay loam over laterite. Jarrah-marri open forest.		
89	<i>Dillwynia</i> sp. Capel (P.A. Jurjevich 1771)	P1	Sep-Oct	Erect, open, spreading shrub, to 2 m high. Fl. yellow, orange, red, pink. Littered grey loamy sand, rocky soils. Valleys,	Possible	Unlikely (U2)
90	<i>Gastrolobium</i> sp. Yoongarillup (S. Dilkes s.n. 1/9/1969)	P1	Aug-Oct	Erect, perennial shrub; 0.5 m high, 1.0 m wide; flowers yellow/orange. Jarrah-Marri forest, white sand, gravel	Possible	Unlikely (U2)
91	<i>Loxocarya striata</i> subsp. <i>implexa</i>	P1	Jul-Dec	Winter-wet flats.	Possible	Unlikely (U2)
92	<i>Stachystemon exilis</i>	P1	Sep - Nov	Monoeicious shrub/herb to 0.2 m high. Fl. Green yellow. Open, low-lying Banksia woodland in which <i>B. ilicifolia</i> is a significant component of the upper canopy. Other associated species are <i>Melaleuca preissiana</i> , <i>M. thymoides</i> , <i>Adenanthos meisneri</i> and <i>Hypocalymma angustifolium</i> .	Unlikely	Unlikely (U1)
93	<i>Stylidium ferricola</i>	P1		Caespitose perennial, herb, 0.09-0.15 m high. Shallow red-brown clay loam over ironstone. Seasonally wet poorly-drained slopes.	Possible	Unlikely (U2)

*Note: The BC Act Conservation Status is shown, EPBC Act status, where relevant, is in brackets.

**

Possible – Suitable habitat within the survey area.

Unlikely – No suitable habitat existing within the survey area.

Unknown – Data deficient.

Observed - Taxon was positively identified on site during the survey.

Moderate - The taxon was not observed but suitable habitat was observed. The survey was conducted outside the recorded flowering season and it is difficult to distinguish or see in the absence of flowers.

Low – The taxon was not observed but suitable habitat was observed. The survey was conducted just outside the main flowering season or the taxon can be cryptic and difficult to find.

Very Low - The taxon was not observed but suitable habitat was observed. The survey was conducted within the main flowering season or the taxon can easily be identified even in the absence of flowers.

Appendix 10. List of vascular flora found within the survey area.

#	FAMILY_NAME	SPECIES NAME	NATURALISED	PLANTED	CONSV_CODE
1	Araceae	<i>Zantedeschia aethiopica</i>	*		
2	Asparagaceae	<i>Asparagus asparagoides</i>	*		
3	Asparagaceae	<i>Chamaescilla corymbosa</i>			
4	Asparagaceae	<i>Lomandra micrantha</i>			
5	Asteraceae	<i>Arctotheca calendula</i>	*		
6	Asteraceae	<i>Brachyscome iberidifolia</i>			
7	Asteraceae	<i>Cotula australis</i>			
8	Asteraceae	<i>Cotula coronopifolia</i>	*		
9	Asteraceae	<i>Cotula turbinata</i>	*		
10	Asteraceae	<i>Hypochaeris glabra</i>	*		
11	Chenopodiaceae	<i>Tecticornia indica</i>			
12	Cyperaceae	<i>Lepidosperma pubisquameum</i>			
13	Dasyopogonaceae	<i>Kingia australis</i>			
14	Dennstaedtiaceae	<i>Pteridium esculentum</i>			
15	Fabaceae	<i>Acacia extensa</i>			
16	Fabaceae	<i>Acacia flagelliformis</i>			4
17	Fabaceae	<i>Acacia pulchella</i>			
18	Fabaceae	<i>Acacia saligna</i>			
19	Fabaceae	<i>Acacia stenoptera</i>			
20	Fabaceae	<i>Aotus gracillima</i>			
21	Fabaceae	<i>Lotus subbiflorus</i>	*		
22	Fabaceae	<i>Trifolium campestre</i>	*		
23	Fabaceae	<i>Trifolium dubium</i>	*		
24	Fabaceae	<i>Trifolium hirtum</i>	*		
25	Fabaceae	<i>Viminaria juncea</i>			
26	Goodeniaceae	<i>Dampiera linearis</i>			
27	Hemerocallidaceae	<i>Caesia micrantha</i>			
28	Iridaceae	<i>Freesia alba</i> × <i>leichtlinii</i>	*		
29	Iridaceae	<i>Romulea rosea</i>	*		
30	Iridaceae	<i>Watsonia meriana</i>	*		
31	Juncaceae	<i>Juncus pallidus</i>			
32	Lauraceae	<i>Cassythia racemosa</i>			
33	Loranthaceae	<i>Nuytsia floribunda</i>			
34	Myrtaceae	<i>Agonis flexuosa</i>			
35	Myrtaceae	<i>Astartea scoparia</i>			
36	Myrtaceae	<i>Calothamnus quadrifidus</i> subsp. <i>teretifolius</i>			4
37	Myrtaceae	<i>Corymbia calophylla</i>			
38	Myrtaceae	<i>Eucalyptus camaldulensis</i>		+	
39	Myrtaceae	<i>Eucalyptus citriodora</i>		+	
40	Myrtaceae	<i>Eucalyptus globulus</i>	*	+	
41	Myrtaceae	<i>Eucalyptus grandis</i>		+	
42	Myrtaceae	<i>Eucalyptus marginata</i>			
43	Myrtaceae	<i>Eucalyptus patens</i>			

#	FAMILY_NAME	SPECIES_NAME	NATURALISED	PLANTED	CONSV_CODE
44	Myrtaceae	<i>Eucalyptus rudis</i>			
45	Myrtaceae	<i>Kunzea glabrescens</i>			
46	Myrtaceae	<i>Kunzea micrantha</i> subsp. <i>micrantha</i>			
47	Myrtaceae	<i>Melaleuca osullivani</i>			
48	Myrtaceae	<i>Melaleuca preissiana</i>			
49	Myrtaceae	<i>Melaleuca raphiophylla</i>			
50	Myrtaceae	<i>Melaleuca viminea</i>			
51	Myrtaceae	<i>Verticordia plumosa</i> var. <i>vassensis</i>			T
52	Poaceae	<i>Avena fatua</i>	*		
53	Poaceae	<i>Bromus diandrus</i>	*		
54	Poaceae	<i>Cynodon dactylon</i>	*		
55	Poaceae	<i>Eragrostis curvula</i>	*		
56	Poaceae	<i>Hordeum leporinum</i>	*		
57	Poaceae	<i>Lolium perenne</i>	*		
58	Poaceae	<i>Vulpia bromoides</i>	*		
59	Polygonaceae	<i>Rumex pulcher</i>	*		
60	Proteaceae	<i>Adenanthos meisneri</i>			
61	Proteaceae	<i>Banksia littoralis</i>			
62	Proteaceae	<i>Grevillea brachystylis</i> subsp. <i>brachystylis</i>			3
63	Proteaceae	<i>Hakea ceratophylla</i>			
64	Proteaceae	<i>Hakea marginata</i>			
65	Proteaceae	<i>Hakea oleifolia</i>			
66	Proteaceae	<i>Hakea prostrata</i>			
67	Proteaceae	<i>Hakea varia</i>			
68	Proteaceae	<i>Persoonia longifolia</i>			
69	Restionaceae	<i>Leptocarpus coangustatus</i>			
70	Restionaceae	<i>Leptocarpus roycei</i>			
71	Restionaceae	<i>Loxocarya magna</i>			3
72	Xanthorrhoeaceae	<i>Xanthorrhoea preissii</i>			

Appendix 11. DBCA Threatened flora reporting forms.



Threatened and Priority Flora Report Form

Version 1.3 August 2017

Please complete as much of the form as possible, with emphasis on those sections bordered in black. For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DBCA website at <http://dpaw.wa.gov.au> under Standard Report Forms

TAXON: <u>Acacia flagelliformis</u>		TPFL Pop. No.: _____	
OBSERVATION DATE: <u>7/10/2022</u>		CONSERVATION STATUS: <u>P4</u> <input type="checkbox"/> New population <input type="checkbox"/>	
OBSERVER/S: <u>Russell Smithr</u>		PHONE: <u>0447809124</u>	
ROLE: <u>botanist</u>		ORGANISATION: <u>Ecoedge</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): Yalyalup
175 m to 350 m along princefield Road from Hithergreen Road

Reserve No.: _____

DBC DISTRICT: _____		LGA: <u>Busselton</u>		Land manager present: <input type="checkbox"/>	
DATUM:		COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:	
GDA94 / MGA94 <input checked="" type="checkbox"/>		DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM's <input checked="" type="checkbox"/>		GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	
AGD84 / AMG84 <input type="checkbox"/>		Lat / Northing: <u>6272272</u>		No. satellites: _____ Map used: _____	
WGS84 <input type="checkbox"/>		Long / Easting: <u>361012</u>		Boundary polygon captured: <input type="checkbox"/> Map scale: _____	
Unknown <input type="checkbox"/>		ZONE: <u>50</u>			
LAND TENURE:					
Nature reserve <input type="checkbox"/>		Timber reserve <input type="checkbox"/>		Private property <input type="checkbox"/>	
National park <input type="checkbox"/>		State forest <input type="checkbox"/>		Pastoral lease <input type="checkbox"/>	
Conservation park <input type="checkbox"/>		Water reserve <input type="checkbox"/>		UCL <input type="checkbox"/> SLK/Pole _____ to _____	
				Rail reserve <input type="checkbox"/> Shire road reserve <input checked="" type="checkbox"/>	
				MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>	
				Specify other: _____	

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/>		Area observed (m²): <u>1000</u>	
EFFORT: Time spent surveying (minutes): <u>60</u>		No. of minutes spent / 100 m²: _____	
POP'N COUNT ACCURACY: Actual <input checked="" type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input type="checkbox"/>		Count method: _____	
<small>(Refer to field manual for list)</small>			
WHAT COUNTED:		Plants <input type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>	
TOTAL POP'N STRUCTURE:			
		Mature: Juveniles: Seedlings: Totals:	
Alive		<u>13</u> <u></u> <u></u> <u>13</u>	
Dead		<u></u> <u></u> <u></u> <u></u>	
QUADRATS PRESENT:		No. _____ Size _____ Data attached <input type="checkbox"/> Total area of quadrats (m ²): _____	
Summary Quad. Totals: Alive		<u></u> <u></u> <u></u> <u></u>	
REPRODUCTIVE STATE:		Clonal <input type="checkbox"/> Vegetative <input type="checkbox"/> Flowerbud <input type="checkbox"/> Flower <input checked="" type="checkbox"/>	
		Immature fruit <input type="checkbox"/> Fruit <input type="checkbox"/> Dehisced fruit <input type="checkbox"/> Percentage in flower: <u>100%</u>	

CONDITION OF PLANTS: Healthy Moderate Poor Senescent

COMMENT: _____

THREATS - type, agent and supporting information:	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
Eg clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)			
•	_____	_____	_____
•	_____	_____	_____
•	_____	_____	_____



Threatened and Priority Flora Report Form

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input checked="" type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input checked="" type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input checked="" type="checkbox"/>	
Flat <input checked="" type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
CONDITION OF SOIL:	Dry <input type="checkbox"/>	Moist <input type="checkbox"/>	Waterlogged <input type="checkbox"/>	Inundated <input type="checkbox"/>	

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
 2. Open shrubland (Hibbertia sp., Acacia spp.);
 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Melaleuca preissiana

2. Hakea ceratophylla, Xanthorrhoea preissii

3.

4.

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 Australian Soil and Land Survey Field Handbook guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine Excellent Very good Good Degraded Completely degraded

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High Medium Low No signs of fire

FENCING: Not required Present Replace / repair Required Length req'd: _____

ROADSIDE MARKERS: Not required Present Replace / reposition Required Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

DRF PERMIT/ LICENCE No: Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licencing requirements see the Threatened Flora and Wildlife Licensing pages on DBCA's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

SPECIMEN: Collectors No: _____ WA Herb. Regional Herb. District Herb. Other: _____

ATTACHED: Map Mudmap Photo GIS data Field notes Other: _____

COPY SENT TO: Regional Office District Office Other: _____

Submitter of Record: Russell Smith Role: _botanist Signed: _____ Date: 24/04/2023

Please return completed form to **Species And Communities Branch DBCA**,
 Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983 OR email to: flora.data@dbca.wa.gov.au

RECORDS: Please forward to **Flora Administrative Officer**, Species and Communities Branch.
 Record entered by: _____ Sheet No.: _____ Record Entered in Database



Threatened and Priority Flora Report Form

Please complete as much of the form as possible, with emphasis on those sections bordered in black. For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DBCA website at <http://dpaw.wa.gov.au> under *Standard Report Forms*

TAXON: <u>Calothamnus quadrifidus subsp. teretifolius</u>		TPFL Pop. No.: _____
OBSERVATION DATE: <u>10/10/2022</u>	CONSERVATION STATUS: <u>P4</u>	New population <input type="checkbox"/>
OBSERVER/S: <u>Russell Smith</u>	PHONE : _____	<u>0447809124</u>
ROLE: <u>Botanist</u>	ORGANISATION: <u>Ecoedge</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): Yalyalup
100 m south of Princefield Road along Coopers Road

Reserve No.: _____

DBC DISTRICT: <u>Busselton</u>	LGA: <u>Busselton</u>	Land manager present: <input type="checkbox"/>
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>6272166</u>	No. satellites: _____ Map used: _____
WGS84 <input type="checkbox"/>	Long / Easting: <u>360218</u>	Boundary polygon captured: <input type="checkbox"/> Map scale: _____
Unknown <input type="checkbox"/>	ZONE: <u>50</u>	
LAND TENURE:		
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/> SLK/Pole _____ to _____
		Rail reserve <input type="checkbox"/> Shire road reserve <input type="checkbox"/>
		MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
		Specify other: <u>Drainage</u>

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/>	Area observed (m ²): <u>200</u>												
EFFORT: Time spent surveying (minutes): <u>20</u>	No. of minutes spent / 100 m ² : _____												
POP'N COUNT ACCURACY: Actual <input checked="" type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input type="checkbox"/>	Count method: _____												
(Refer to field manual for list)													
WHAT COUNTED: Plants <input type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>													
TOTAL POP'N STRUCTURE:													
Alive	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Mature:</th> <th>Juveniles:</th> <th>Seedlings:</th> <th>Totals:</th> </tr> <tr> <td style="text-align: center;">12</td> <td></td> <td></td> <td style="text-align: center;">12</td> </tr> <tr> <td>Dead</td> <td></td> <td></td> <td></td> </tr> </table>	Mature:	Juveniles:	Seedlings:	Totals:	12			12	Dead			
Mature:	Juveniles:	Seedlings:	Totals:										
12			12										
Dead													
	Area of pop (m ²): <u>150</u>												
	Note: Pls record count as numbers (not percentages) for database.												
QUADRATS PRESENT: No. _____ Size _____ Data attached <input type="checkbox"/>	Total area of quadrats (m ²): _____												
Summary Quad. Totals: Alive													
REPRODUCTIVE STATE: Clonal <input type="checkbox"/> Vegetative <input checked="" type="checkbox"/> Flowerbud <input checked="" type="checkbox"/> Flower <input checked="" type="checkbox"/>													
Immature fruit <input type="checkbox"/> Fruit <input type="checkbox"/> Dehisced fruit <input type="checkbox"/>	Percentage in flower: <u>100%</u>												

CONDITION OF PLANTS: Healthy Moderate Poor Senescent

COMMENT: t

THREATS - type, agent and supporting information:	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
Eg clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)	_____	_____	_____
•	_____	_____	_____
•	_____	_____	_____
•	_____	_____	_____



Threatened and Priority Flora Report Form

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input checked="" type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input checked="" type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input checked="" type="checkbox"/>	10-30% <input checked="" type="checkbox"/>	Clay loam <input checked="" type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input checked="" type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
CONDITION OF SOIL:	Dry <input type="checkbox"/>	Moist <input type="checkbox"/>	Waterlogged <input type="checkbox"/>	Inundated <input type="checkbox"/>	

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
 2. Open shrubland (Hibbertia sp., Acacia spp.);
 3. Isolated clumps of sedges (Mesomelaena tetragona)

- Tall shrubland of *Acacia saligna*, *Calothamnus quadrifidus* subsp. *teretifolius* over weeds
- _____
- _____
- _____

ASSOCIATED SPECIES:

Loxocarya magna

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine Excellent Very good Good Degraded Completely degraded

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High Medium Low No signs of fire

FENCING: Not required Present Replace / repair Required Length req'd: _____

ROADSIDE MARKERS: Not required Present Replace / reposition Required Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

DRF PERMIT/ LICENCE No: Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licencing requirements see the Threatened Flora and Wildlife Licensing pages on DBCA's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

SPECIMEN: Collectors No: _____ WA Herb. Regional Herb. District Herb. Other: _____

ATTACHED: Map Mudmap Photo GIS data Field notes Other: _____

COPY SENT TO: Regional Office District Office Other: _____

Submitter of Record: Russell Smith _____ Role: botanist Signed: _____ Date: 24/04/2023

Please return completed form to **Species And Communities Branch DBCA**,
 Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983 OR email to: flora.data@dbca.wa.gov.au

RECORDS: Please forward to **Flora Administrative Officer**, Species and Communities Branch.
 Record entered by: _____ Sheet No.: _____ Record Entered in Database



Threatened and Priority Flora Report Form

Version 1.3 August 2017

Please complete as much of the form as possible, with emphasis on those sections bordered in black. For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DBCA website at <http://dpaw.wa.gov.au> under Standard Report Forms

TAXON: <u>Grevillea brachystylis subsp. brachystylis</u>		TPFL Pop. No.: _____
OBSERVATION DATE: <u>7/10/2022</u>	CONSERVATION STATUS: <u>P3</u>	New population <input type="checkbox"/>
OBSERVER/S: <u>Russell Smith</u>	PHONE :	<u>0447809124</u>
ROLE: <u>botanist</u>	ORGANISATION: <u>Ecoedge</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): Yalyalup

175 m along princefield Road from Hithergreen Road

Reserve No.: _____

DBC DISTRICT: _____	LGA: <u>Busselton</u>	Land manager present: <input type="checkbox"/>
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>6272263</u>	No. satellites: _____ Map used: _____
WGS84 <input type="checkbox"/>	Long / Easting: <u>361112</u>	Boundary polygon captured: <input type="checkbox"/> Map scale: _____
Unknown <input type="checkbox"/>	ZONE: <u>50</u>	
LAND TENURE:		
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/> SLK/Pole _____ to _____
		Rail reserve <input type="checkbox"/> Shire road reserve <input checked="" type="checkbox"/>
		MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
		Specify other: _____

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/>	Area observed (m ²): <u>1000</u>												
EFFORT: Time spent surveying (minutes): <u>60</u>	No. of minutes spent / 100 m ² : _____												
POP'N COUNT ACCURACY: Actual <input checked="" type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input type="checkbox"/>	Count method: _____												
(Refer to field manual for list)													
WHAT COUNTED: Plants <input type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>													
TOTAL POP'N STRUCTURE:													
	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Mature:</th> <th>Juveniles:</th> <th>Seedlings:</th> <th>Totals:</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">2</td> <td></td> <td></td> <td style="text-align: center;">2</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Mature:	Juveniles:	Seedlings:	Totals:	2			2				
Mature:	Juveniles:	Seedlings:	Totals:										
2			2										
Alive	Area of pop (m ²): _____												
Dead	Note: Pls record count as numbers (not percentages) for database.												
QUADRATS PRESENT: No. _____ Size _____ Data attached <input type="checkbox"/>	Total area of quadrats (m ²): _____												
Summary Quad. Totals: Alive													
REPRODUCTIVE STATE: Clonal <input type="checkbox"/> Vegetative <input type="checkbox"/> Flowerbud <input type="checkbox"/> Flower <input checked="" type="checkbox"/>	Percentage in flower: <u>100%</u>												
Immature fruit <input type="checkbox"/> Fruit <input type="checkbox"/> Dehisced fruit <input type="checkbox"/>													

CONDITION OF PLANTS: Healthy Moderate Poor Senescent

COMMENT: _____

THREATS - type, agent and supporting information:	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
Eg clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)			
•	_____	_____	_____
•	_____	_____	_____
•	_____	_____	_____



Threatened and Priority Flora Report Form

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input checked="" type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input checked="" type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input checked="" type="checkbox"/>	
Flat <input checked="" type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
CONDITION OF SOIL:	Dry <input type="checkbox"/>	Moist <input type="checkbox"/>	Waterlogged <input type="checkbox"/>	Inundated <input type="checkbox"/>	

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.);
3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Melaleuca preissiana

2. Hakea ceratophylla, Xanthorrhoea preissii

3.

4.

ASSOCIATED SPECIES:

Loxocarya magna

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 Australian Soil and Land Survey Field Handbook guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine Excellent Very good Good Degraded Completely degraded

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High Medium Low No signs of fire

FENCING: Not required Present Replace / repair Required Length req'd: _____

ROADSIDE MARKERS: Not required Present Replace / reposition Required Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

DRF PERMIT/ LICENCE No: Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licencing requirements see the Threatened Flora and Wildlife Licensing pages on DBCA's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

SPECIMEN: Collectors No: _____ WA Herb. Regional Herb. District Herb. Other: _____

ATTACHED: Map Mudmap Photo GIS data Field notes Other: _____

COPY SENT TO: Regional Office District Office Other: _____

Submitter of Record: Russell Smith Role: _botanist Signed: _____ Date: 24/04/2023

Please return completed form to **Species And Communities Branch DBCA**,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983 OR email to: flora.data@dbca.wa.gov.au

RECORDS: Please forward to **Flora Administrative Officer**, Species and Communities Branch.
Record entered by: _____ Sheet No.: _____ Record Entered in Database



Threatened and Priority Flora Report Form

Please complete as much of the form as possible, with emphasis on those sections bordered in black. For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DBCA website at <http://dpaw.wa.gov.au/> under Standard Report Forms

TAXON: <u>Loxocarya magna</u>	TPFL Pop. No.: _____
OBSERVATION DATE: <u>10/10/2022</u>	CONSERVATION STATUS: <u>P3</u> New population <input type="checkbox"/>
OBSERVER/S: <u>Russell Smith</u>	PHONE: <u>0447809124</u>
ROLE: <u>Botanist</u>	ORGANISATION: <u>Ecoedge</u>

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): Yalyalup
70 m south of Princefield Road along Coopers Road

Reserve No.: _____

DBC DISTRICT: Busselton **LGA:** Busselton Land manager present:

DATUM: GDA94 / MGA94 AGD84 / AMG84 WGS84 Unknown

COORDINATES: (If UTM coords provided, Zone is also required)
 DecDegrees DegMinSec UTM **Lat / Northing:** 6272192
Long / Easting: 360185 **ZONE:** 50

METHOD USED: GPS Differential GPS Map
 No. satellites: _____ Map used: _____
 Boundary polygon captured: Map scale: _____

LAND TENURE:

<input type="checkbox"/> Nature reserve	<input type="checkbox"/> Timber reserve	<input type="checkbox"/> Private property	<input type="checkbox"/> Rail reserve	<input type="checkbox"/> Shire road reserve
<input type="checkbox"/> National park	<input type="checkbox"/> State forest	<input type="checkbox"/> Pastoral lease	<input type="checkbox"/> MRWA road reserve	<input type="checkbox"/> Other Crown reserve
<input type="checkbox"/> Conservation park	<input type="checkbox"/> Water reserve	<input type="checkbox"/> UCL	SLK/Pole _____ to _____	Specify other: <u>Drainage</u>

AREA ASSESSMENT: Edge survey Partial survey Full survey Area observed (m²): 200

EFFORT: Time spent surveying (minutes): 20 No. of minutes spent / 100 m²: _____

POP'N COUNT ACCURACY: Actual Extrapolation Estimate Count method: _____
 (Refer to field manual for list)

WHAT COUNTED: Plants Clumps Clonal stems

TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:	Area of pop (m ²): <u>1</u> Note: Pls record count as numbers (not percentages) for database.
Alive	<u>1</u>			<u>1</u>	
Dead					

QUADRATS PRESENT: No. _____ Size _____ Data attached Total area of quadrats (m²): _____

Summary Quad. Totals: Alive _____

REPRODUCTIVE STATE: Clonal Vegetative Flowerbud Flower
 Immature fruit Fruit Dehisced fruit Percentage in flower: 0%

CONDITION OF PLANTS: Healthy Moderate Poor Senescent

COMMENT: t

THREATS - type, agent and supporting information:	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
Eg clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)			
•	_____	_____	_____
•	_____	_____	_____
•	_____	_____	_____



Threatened and Priority Flora Report Form

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input checked="" type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input checked="" type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input checked="" type="checkbox"/>	10-30% <input checked="" type="checkbox"/>	Clay loam <input checked="" type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input checked="" type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
CONDITION OF SOIL:	Dry <input type="checkbox"/>	Moist <input type="checkbox"/>	Waterlogged <input type="checkbox"/>	Inundated <input type="checkbox"/>	

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
 2. Open shrubland (Hibbertia sp., Acacia spp.);
 3. Isolated clumps of sedges (Mesomelaena tetragona)

- Tall shrubland of *Acacia saligna*, *Calothamnus quadrifidus* subsp. *teretifolius* over weeds
- _____
- _____
- _____

ASSOCIATED SPECIES:

Loxocarya magna

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine Excellent Very good Good Degraded Completely degraded

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High Medium Low No signs of fire

FENCING: Not required Present Replace / repair Required Length req'd: _____

ROADSIDE MARKERS: Not required Present Replace / reposition Required Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

DRF PERMIT/ LICENCE No: Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licencing requirements see the Threatened Flora and Wildlife Licensing pages on DBCA's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

SPECIMEN: Collectors No: _____ WA Herb. Regional Herb. District Herb. Other: _____

ATTACHED: Map Mudmap Photo GIS data Field notes Other: _____

COPY SENT TO: Regional Office District Office Other: _____

Submitter of Record: Russell Smith _____ Role: botanist Signed: _____ Date: 24/04/2023

Please return completed form to **Species And Communities Branch DBCA**,
 Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983 OR email to: flora.data@dbca.wa.gov.au

RECORDS: Please forward to **Flora Administrative Officer**, Species and Communities Branch.
 Record entered by: _____ Sheet No.: _____ Record Entered in Database



Threatened and Priority Flora Report Form

Please complete as much of the form as possible, with emphasis on those sections bordered in black. For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DBCA website at <http://dpaw.wa.gov.au> under Standard Report Forms

TAXON: <u>Verticordia plumosa var. vassensis</u>		TPFL Pop. No.: _____
OBSERVATION DATE: <u>24/02/2022</u>	CONSERVATION STATUS: <u>TF</u>	New population <input type="checkbox"/>
OBSERVER/S: <u>Russell Smith</u>	PHONE : _____	<u>0447809124</u>
ROLE: <u>botanists</u>	ORGANISATION: <u>Ecoedge</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): Yalyalup
Princefield Road, 2.23 km west of Hithergreen Road (on right-angled bend in road)

Reserve No.: _____

DBC DISTRICT: _____	LGA: _____	Land manager present: <input type="checkbox"/>
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM's <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>6271808</u>	No. satellites: _____ Map used: _____
WGS84 <input type="checkbox"/>	Long / Easting: <u>359500</u>	Boundary polygon captured: <input type="checkbox"/> Map scale: _____
Unknown <input type="checkbox"/>	ZONE: <u>50</u>	
LAND TENURE:		
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/> SLK/Pole _____ to _____
		Rail reserve <input type="checkbox"/> Shire road reserve <input checked="" type="checkbox"/>
		MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
		Specify other: _____

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input checked="" type="checkbox"/> Full survey <input type="checkbox"/>	Area observed (m ²): _____												
EFFORT: Time spent surveying (minutes): _____	No. of minutes spent / 100 m ² : _____												
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/>	Count method: _____												
(Refer to field manual for list)													
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>													
TOTAL POP'N STRUCTURE:													
	Area of pop (m ²): <u>50</u> _____												
Alive	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Mature:</th> <th>Juveniles:</th> <th>Seedlings:</th> <th>Totals:</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">26</td> <td></td> <td></td> <td style="text-align: center;">26</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Mature:	Juveniles:	Seedlings:	Totals:	26			26				
Mature:		Juveniles:	Seedlings:	Totals:									
26			26										
Dead													
Note: Pls record count as numbers (not percentages) for database.													
QUADRATS PRESENT: No. _____ Size _____ Data attached <input type="checkbox"/>	Total area of quadrats (m ²): _____												
Summary Quad. Totals: Alive													
REPRODUCTIVE STATE: Clonal <input type="checkbox"/> Vegetative <input type="checkbox"/> Flowerbud <input type="checkbox"/> Flower <input checked="" type="checkbox"/>													
Immature fruit <input type="checkbox"/> Fruit <input type="checkbox"/> Dehisced fruit <input type="checkbox"/>	Percentage in flower: <u>100%</u>												

CONDITION OF PLANTS: Healthy Moderate Poor Senescent

COMMENT: _____

THREATS - type, agent and supporting information:	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
Eg clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)			
•	_____	_____	_____
•	_____	_____	_____
•	_____	_____	_____

Please return completed form to **Species And Communities Branch DBCA**,
 Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983 OR email to: flora.data@dbca.wa.gov.au

RECORDS: Please forward to **Flora Administrative Officer**, Species and Communities Branch.
 Record entered by: _____ Sheet No.: _____ Record Entered in Database



Threatened and Priority Flora Report Form

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input checked="" type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input checked="" type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input checked="" type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input checked="" type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
CONDITION OF SOIL:	Dry <input type="checkbox"/>	Moist <input checked="" type="checkbox"/>	Waterlogged <input type="checkbox"/>	Inundated <input type="checkbox"/>	

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
 2. Open shrubland (Hibbertia sp., Acacia spp.);
 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. shrubland of Verticordia plumosa var. vassensis

2. _____

3. _____

4. _____

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 Australian Soil and Land Survey Field Handbook guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine Excellent Very good Good Degraded Completely degraded

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High Medium Low No signs of fire

FENCING: Not required Present Replace / repair Required Length req'd: _____

ROADSIDE MARKERS: Not required Present Replace / reposition Required Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

DRF PERMIT/ LICENCE No: Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licencing requirements see the Threatened Flora and Wildlife Licensing pages on DBCA's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

SPECIMEN: Collectors No: _____ WA Herb. Regional Herb. District Herb. Other: _____

ATTACHED: Map Mudmap Photo GIS data Field notes Other: _____

COPY SENT TO: Regional Office District Office Other: _____

Submitter of Record: Russell Smith Role: botanist Signed: _____ Date: 23/11/2019

Please return completed form to **Species And Communities Branch DBCA**,
 Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983 OR email to: flora.data@dbca.wa.gov.au

RECORDS: Please forward to **Flora Administrative Officer**, Species and Communities Branch.
 Record entered by: _____ Sheet No.: _____ Record Entered in Database

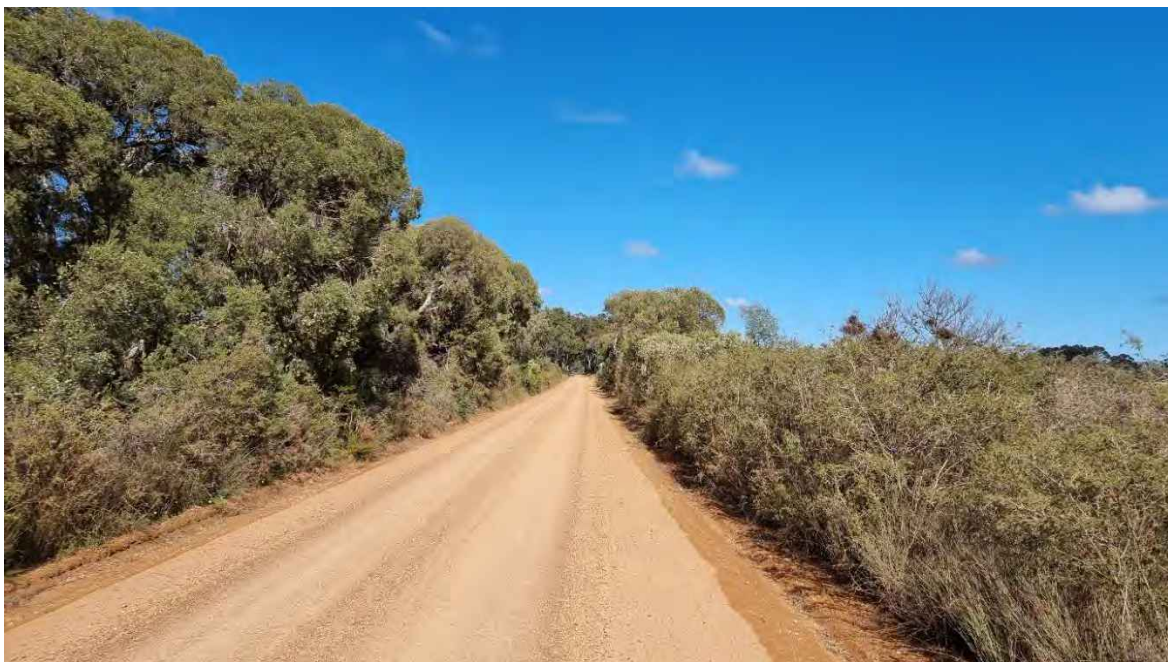
Appendix 12. Photographs and descriptions of each vegetation units within the survey area.

1. Vegetation Unit A1



Woodland/open forest of *Corymbia calophylla* and *Eucalyptus marginata*, with scattered *Agonis flexuosa*, *B. grandis*, *Melaleuca preissiana*, *Nuytsia floribunda*, *Persoonia longifolia* or *Xylomelum occidentale* over *Xanthorrhoea preissii* over weeds on grey-brown or grey loamy sand or sand (on farmland usually only *C. calophylla* and *E. marginata* are present).

2. Vegetation unit B1



Tall shrubland of *Acacia saligna*, *Calothamnus quadrifidus* subsp. *teretifolius*, *Melaleuca incana* and *Kunzea micrantha* (with scattered emergent *Eucalyptus rudis*) over scattered native herbs including *Drosera glanduligera* and *Sowerbaea laxiflora*, the sedge *Loxocarya magna*, and weeds on shallow red sandy clay on massive ironstone.

3. Vegetation Unit B2



Open woodland of *Melaleuca preissiana* over weeds (rarely with *Hyalosperma cotula*) on seasonally wet brown clay-loam over massive laterite.

4. Vegetation Unit C1



Open forest of *Eucalyptus rudis* and/or *Corymbia calophylla* over scattered *Agonis flexuosa* and *Melaleuca preissiana* or *M. raphiophylla* over (*Xanthorrhoea preissii*) over weeds on grey-brown clayey loams in drainage lines and on damp flats.

5. Vegetation Unit C2



Open woodland of *Melaleuca preissiana* or *M. raphiophylla* over weeds on seasonally wet brown clay-loam.

6. Vegetation Unit C3



Tall Open Shrubland that may include *Acacia saligna*, *Jacksonia furcellata*, *Kingia australis*, *Melaleuca osullivanii*, *M. preissiana*, *M. viminea* and *Xanthorrhoea preissii* on seasonally wet grey-brown sandy clay loam.

7. Vegetation Unit PL.



Amenity plantings of *Eucalyptus* spp. or *Melaleuca* spp.

Appendix 13. DBCA TEC PEC reporting forms.



Threatened and Priority Ecological Community (TEC/PEC) Occurrence Report Form

COMMUNITY: 'SWAFCT10b - Shrublands on southern Swan Coastal Plain Ironstones (Busselton area)'		OBSERVATION DATE: 8/11/2022
New occurrence <input type="checkbox"/>	Site ID: _____	CONS STATUS: TEC
OBSERVER/S: Russell Smith		PHONE: 0447809124
ROLE: botanists	ORGANISATION: Ecoedge	
EMAIL: russell@ecoedge.com.au		

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
1570m east of Hithergreen Road along Oates Road, Yalyallup

Reserve No: _____

DISTRICT: _____ **LGA:** Busselton **Land manager present:**

DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input checked="" type="checkbox"/> DegMinSec <input type="checkbox"/> UTM's <input type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: 115.520	No. satellites: _____ Map used: _____
WGS84 <input type="checkbox"/>	Long / Easting: -33.680	Boundary polygon captured: <input type="checkbox"/> Map used: _____
Unknown <input type="checkbox"/>	Zone: 50	

LAND TENURE:

Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>	SLK/Pole _____ to _____	Specify other: _____

AREA ASSESSMENT: Edge survey Partial survey Full survey Area observed (m²): 370

EFFORT: Time spent surveying (minutes): 370 No. of minutes spent / 100 m²: _____

THREATS - type, and supporting information: e.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents.	Cause/Agent: e.g. weed type, grazing species, recreation type	Area affected	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			

*Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme

*Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)

CONDITION OF OCCURRENCE: (Bush Forever Scale) (estimate % of area in each)

Pristine <input type="checkbox"/> _____%	Very Good <input type="checkbox"/> _____%	Degraded <input type="checkbox"/> _____%
Excellent <input type="checkbox"/> _____%	Good <input type="checkbox"/> _____%	Completely Degraded <input type="checkbox"/> _____%

Please return form to:

communities.data@dpaw.wa.gov.au

or Species and Communities Branch, Department of Parks and Wildlife, Locked Bag 104, Bentley Delivery Centre WA 6983

Record entered by: _____ Date entered: _____ Database no: _____



Threatened and Priority Ecological Community (TEC/PEC) Occurrence Report Form

RECOMMENDED MANAGEMENT ACTIONS: e.g. roadside markers, weed control, etc.

ACTIONS IMPLEMENTED (include date):

HABITAT INFORMATION: (Check more than one box for combinations or where necessary)

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/> Hill <input type="checkbox"/> Ridge <input type="checkbox"/> Outcrop <input type="checkbox"/> Slope <input type="checkbox"/> Flat <input checked="" type="checkbox"/> Open depression <input type="checkbox"/> Drainage line <input type="checkbox"/> Closed depression <input type="checkbox"/> Wetland <input type="checkbox"/>	Granite <input type="checkbox"/> Dolerite <input type="checkbox"/> Laterite <input checked="" type="checkbox"/> Ironstone <input type="checkbox"/> Limestone <input type="checkbox"/> Quartz <input type="checkbox"/> Specify other:	(on soil surface; e.g. gravel, quartz fields) 0-10% <input checked="" type="checkbox"/> 10-30% <input type="checkbox"/> 30-50% <input type="checkbox"/> 50-100% <input type="checkbox"/>	Sand <input type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Clay loam <input checked="" type="checkbox"/> Light clay <input type="checkbox"/> Peat <input type="checkbox"/> Specify other:	Red <input type="checkbox"/> Brown <input checked="" type="checkbox"/> Yellow <input type="checkbox"/> White <input type="checkbox"/> Grey <input checked="" type="checkbox"/> Black <input type="checkbox"/> Specify other:	Well drained <input type="checkbox"/> Seasonally inundated <input checked="" type="checkbox"/> Permanently inundated <input type="checkbox"/> Tidal <input type="checkbox"/> Specify other:

Specific Landform Element: (Refer to field manual for additional values)

CONDITION OF SOIL:
 Dry Moist Waterlogged Inundated Cracked Saline Other: _____

VEGETATION CLASSIFICATION:

1.	Medium shrubland
2.	
3.	
4.	

FIRE HISTORY:

Last Fire: Season/Month: Year: **Fire Intensity:** High Medium Low No evidence of fire

Actual Occurrence Landuse:

Please return form to:

communities.data@dpaw.wa.gov.au

or Species and Communities Branch, Department of Parks and Wildlife, Locked Bag 104, Bentley Delivery Centre WA 6983

Record entered by: _____ Date entered: _____ Database no: _____



Threatened and Priority Ecological Community (TEC/PEC) Occurrence Report Form

COMMUNITY: 'SWAFCT10b - Shrublands on southern Swan Coastal Plain Ironstones (Busselton area)'		OBSERVATION DATE: 10/10/2022
New occurrence <input type="checkbox"/>	Site ID: _____	CONS STATUS: TEC
OBSERVER/S: Russell Smith		PHONE: 0447809124
ROLE: botanist	ORGANISATION: Ecoedge	
EMAIL: russell@ecoedge.com.au		

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
 Adjacent to the drain along Coopers Road (unmade) 1130 m along Princefield Road from Hithergreen Road

Reserve No: _____

DISTRICT: _____ **LGA:** _____ **Land manager present:**

DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input checked="" type="checkbox"/> DegMinSec <input checked="" type="checkbox"/> UTM's <input type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: 115.49172	No. satellites: _____ Map used: _____
WGS84 <input type="checkbox"/>	Long / Easting: -33.68104	Boundary polygon captured: <input checked="" type="checkbox"/> Map used: _____
Unknown <input type="checkbox"/>	Zone: 50	

LAND TENURE:

Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input checked="" type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>	SLK/Pole _____ to _____	Specify other: _____

AREA ASSESSMENT: Edge survey Partial survey Full survey Area observed (m²): 1700

EFFORT: Time spent surveying (minutes): 20 No. of minutes spent / 100 m²: _____

THREATS - type, and supporting information: e.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents.	Cause/Agent: e.g. weed type, grazing species, recreation type	Area affected	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			

*Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme

*Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)

CONDITION OF OCCURRENCE: (Bush Forever Scale) (estimate % of area in each)

Pristine <input type="checkbox"/> _____%	Very Good <input type="checkbox"/> 100%	Degraded <input type="checkbox"/> _____%
Excellent <input type="checkbox"/> _____%	Good <input type="checkbox"/> _____%	Completely Degraded <input type="checkbox"/> _____%

Please return form to:

communities.data@dpaw.wa.gov.au

or Species and Communities Branch, Department of Parks and Wildlife, Locked Bag 104, Bentley Delivery Centre WA 6983

Record entered by: _____ Date entered: _____ Database no: _____



Threatened and Priority Ecological Community (TEC/PEC) Occurrence Report Form

RECOMMENDED MANAGEMENT ACTIONS: e.g. roadside markers, weed control, etc.

ACTIONS IMPLEMENTED (include date):

HABITAT INFORMATION: (Check more than one box for combinations or where necessary)

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/> Hill <input type="checkbox"/> Ridge <input type="checkbox"/> Outcrop <input type="checkbox"/> Slope <input type="checkbox"/> Flat <input checked="" type="checkbox"/> Open depression <input type="checkbox"/> Drainage line <input checked="" type="checkbox"/> Closed depression <input type="checkbox"/> Wetland <input type="checkbox"/>	Granite <input type="checkbox"/> Dolerite <input type="checkbox"/> Laterite <input checked="" type="checkbox"/> Ironstone <input type="checkbox"/> Limestone <input type="checkbox"/> Quartz <input type="checkbox"/> Specify other:	(on soil surface; e.g. gravel, quartz fields) 0-10% <input checked="" type="checkbox"/> 10-30% <input type="checkbox"/> 30-50% <input type="checkbox"/> 50-100% <input type="checkbox"/>	Sand <input type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Clay loam <input checked="" type="checkbox"/> Light clay <input type="checkbox"/> Peat <input type="checkbox"/> Specify other:	Red <input type="checkbox"/> Brown <input checked="" type="checkbox"/> Yellow <input type="checkbox"/> White <input type="checkbox"/> Grey <input checked="" type="checkbox"/> Black <input type="checkbox"/> Specify other:	Well drained <input type="checkbox"/> Seasonally inundated <input checked="" type="checkbox"/> Permanently inundated <input type="checkbox"/> Tidal <input type="checkbox"/> Specify other:

Specific Landform Element: (Refer to field manual for additional values)

CONDITION OF SOIL:
 Dry Moist Waterlogged Inundated Cracked Saline Other:

VEGETATION CLASSIFICATION:

1.	Tall/medium shrubland
2.	
3.	
4.	

FIRE HISTORY:

Last Fire: Season/Month: Year: **Fire Intensity:** High Medium Low No evidence of fire

Actual Occurrence Landuse:

Please return form to:

communities.data@dpaw.wa.gov.au

or Species and Communities Branch, Department of Parks and Wildlife, Locked Bag 104, Bentley Delivery Centre WA 6983

Record entered by: _____ Date entered: _____ Database no: _____



Threatened and Priority Ecological Community (TEC/PEC) Occurrence Report Form

COMMUNITY: 'SWAFCT10b - Shrublands on southern Swan Coastal Plain Ironstones (Busselton area)'		OBSERVATION DATE: 10/10/2022
New occurrence <input type="checkbox"/>	Site ID: _____	CONS STATUS: TEC
OBSERVER/S: Russell Smith		PHONE: 0447809124
ROLE: botanists	ORGANISATION: Ecoedge	
EMAIL: russell@ecoedge.com.au		

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
 Lot 104, Princefield Road, Yalyallup

Reserve No: _____

DISTRICT: _____ **LGA:** Busselton **Land manager present:**

DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input checked="" type="checkbox"/> DegMinSec <input type="checkbox"/> UTM's <input type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: 115.47	No. satellites: _____ Map used: _____
WGS84 <input type="checkbox"/>	Long / Easting: -33.67	Boundary polygon captured: <input checked="" type="checkbox"/> Map used: _____
Unknown <input type="checkbox"/>	Zone: 50	

LAND TENURE:

Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input checked="" type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>	SLK/Pole _____ to _____	Specify other: _____

AREA ASSESSMENT: Edge survey Partial survey Full survey Area observed (m²): 3300

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m²: _____

THREATS - type, and supporting information: <small>e.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents.</small>	Cause/Agent: <small>e.g. weed type, grazing species, recreation type</small>	Area affected	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
• General degradation	Livestock grazing	100%	M	E	M
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			

*Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme

*Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)

CONDITION OF OCCURRENCE: (Bush Forever Scale) (estimate % of area in each)

Pristine <input type="checkbox"/> _____%	Very Good <input type="checkbox"/> _____%	Degraded <input checked="" type="checkbox"/> 50%
Excellent <input type="checkbox"/> _____%	Good <input checked="" type="checkbox"/> 50%	Completely Degraded <input type="checkbox"/> _____%

Please return form to:

communities.data@dpaw.wa.gov.au

or Species and Communities Branch, Department of Parks and Wildlife, Locked Bag 104, Bentley Delivery Centre WA 6983

Record entered by: _____ Date entered: _____ Database no: _____



Threatened and Priority Ecological Community (TEC/PEC) Occurrence Report Form

RECOMMENDED MANAGEMENT ACTIONS: e.g. roadside markers, weed control, etc.

Fencing off from livestock

ACTIONS IMPLEMENTED (include date):

HABITAT INFORMATION: (Check more than one box for combinations or where necessary)

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/> Hill <input type="checkbox"/> Ridge <input type="checkbox"/> Outcrop <input type="checkbox"/> Slope <input type="checkbox"/> Flat <input checked="" type="checkbox"/> Open depression <input type="checkbox"/> Drainage line <input type="checkbox"/> Closed depression <input type="checkbox"/> Wetland <input type="checkbox"/>	Granite <input type="checkbox"/> Dolerite <input type="checkbox"/> Laterite <input type="checkbox"/> Ironstone <input checked="" type="checkbox"/> Limestone <input type="checkbox"/> Quartz <input type="checkbox"/> Specify other:	(on soil surface; e.g. gravel, quartz fields) 0-10% <input type="checkbox"/> 10-30% <input checked="" type="checkbox"/> 30-50% <input type="checkbox"/> 50-100% <input type="checkbox"/>	Sand <input type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Clay loam <input type="checkbox"/> Light clay <input checked="" type="checkbox"/> Peat <input type="checkbox"/> Specify other:	Red <input type="checkbox"/> Brown <input checked="" type="checkbox"/> Yellow <input type="checkbox"/> White <input type="checkbox"/> Grey <input checked="" type="checkbox"/> Black <input type="checkbox"/> Specify other:	Well drained <input type="checkbox"/> Seasonally inundated <input checked="" type="checkbox"/> Permanently inundated <input type="checkbox"/> Tidal <input type="checkbox"/> Specify other:

Specific Landform Element: (Refer to field manual for additional values)

CONDITION OF SOIL:

Dry Moist Waterlogged Inundated Cracked Saline Other:

VEGETATION CLASSIFICATION:

1. Low woodland
2. Forbland
- 3.
- 4.

FIRE HISTORY:

Last Fire: Season/Month: Year: **Fire Intensity:** High Medium Low No evidence of fire

Actual Occurrence Landuse:

Please return form to:

communities.data@dpaw.wa.gov.au

or Species and Communities Branch, Department of Parks and Wildlife, Locked Bag 104, Bentley Delivery Centre WA 6983

Record entered by: _____ Date entered: _____ Database no: _____



Threatened and Priority Ecological Community (TEC/PEC) Occurrence Report Form

COMMUNITY: 'SWAFCT10b - Shrublands on southern Swan Coastal Plain Ironstones (Busselton area)'		OBSERVATION DATE: 10/10/2022
New occurrence <input type="checkbox"/>	Site ID: _____	CONS STATUS: TEC
OBSERVER/S: Russell Smith		PHONE: 0447809124
ROLE: botanist	ORGANISATION: Ecoedge	
EMAIL: russell@ecoedge.com.au		

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
 930m east of McGibbon Track along Princefield Road

Reserve No: _____

DISTRICT: _____ **LGA:** _____ **Land manager present:**

DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM's <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: 6271808	No. satellites: _____ Map used: _____
WGS84 <input type="checkbox"/>	Long / Easting: 359500	Boundary polygon captured: <input type="checkbox"/> Map used: _____
Unknown <input type="checkbox"/>	Zone: 50	

LAND TENURE:

Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input checked="" type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>	SLK/Pole _____ to _____	Specify other: _____

AREA ASSESSMENT: Edge survey Partial survey Full survey Area observed (m²): 1700

EFFORT: Time spent surveying (minutes): 20 No. of minutes spent / 100 m²: _____

THREATS - type, and supporting information: e.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents.	Cause/Agent: e.g. weed type, grazing species, recreation type	Area affected	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			

*Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme

*Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)

CONDITION OF OCCURRENCE: (Bush Forever Scale) (estimate % of area in each)

Pristine <input type="checkbox"/> _____%	Very Good <input type="checkbox"/> 100%	Degraded <input type="checkbox"/> _____%
Excellent <input type="checkbox"/> _____%	Good <input type="checkbox"/> _____%	Completely Degraded <input type="checkbox"/> _____%

Please return form to:

communities.data@dpaw.wa.gov.au

or Species and Communities Branch, Department of Parks and Wildlife, Locked Bag 104, Bentley Delivery Centre WA 6983

Record entered by: _____ Date entered: _____ Database no: _____



Threatened and Priority Ecological Community (TEC/PEC) Occurrence Report Form

RECOMMENDED MANAGEMENT ACTIONS: e.g. roadside markers, weed control, etc.

ACTIONS IMPLEMENTED (include date):

HABITAT INFORMATION: (Check more than one box for combinations or where necessary)

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/> Hill <input type="checkbox"/> Ridge <input type="checkbox"/> Outcrop <input type="checkbox"/> Slope <input type="checkbox"/> Flat <input type="checkbox"/> Open depression <input type="checkbox"/> Drainage line <input type="checkbox"/> Closed depression <input type="checkbox"/> Wetland <input type="checkbox"/>	Granite <input type="checkbox"/> Dolerite <input type="checkbox"/> Laterite <input type="checkbox"/> Ironstone <input type="checkbox"/> Limestone <input type="checkbox"/> Quartz <input type="checkbox"/> Specify other:	(on soil surface; e.g. gravel, quartz fields) 0-10% <input type="checkbox"/> 10-30% <input type="checkbox"/> 30-50% <input type="checkbox"/> 50-100% <input type="checkbox"/>	Sand <input type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Clay loam <input type="checkbox"/> Light clay <input type="checkbox"/> Peat <input type="checkbox"/> Specify other:	Red <input type="checkbox"/> Brown <input type="checkbox"/> Yellow <input type="checkbox"/> White <input type="checkbox"/> Grey <input type="checkbox"/> Black <input type="checkbox"/> Specify other:	Well drained <input type="checkbox"/> Seasonally inundated <input type="checkbox"/> Permanently inundated <input type="checkbox"/> Tidal <input type="checkbox"/> Specify other:

Specific Landform Element: (Refer to field manual for additional values)

--

CONDITION OF SOIL:

Dry Moist Waterlogged Inundated Cracked Saline Other: _____

VEGETATION CLASSIFICATION:

1.	Tall/medium shrubland
2.	
3.	
4.	

FIRE HISTORY:

Last Fire: Season/Month: Year: **Fire Intensity:** High Medium Low No evidence of fire

Actual Occurrence Landuse:

--

Please return form to:

communities.data@dpaw.wa.gov.au

or Species and Communities Branch, Department of Parks and Wildlife, Locked Bag 104, Bentley Delivery Centre WA 6983

Record entered by: _____ Date entered: _____ Database no: _____



Threatened and Priority Ecological Community (TEC/PEC) Occurrence Report Form

COMMUNITY: 'SWAFCT01b – Southern <i>Corymbia calophylla</i> woodlands on heavy soils' (TEC).		OBSERVATION DATE: 10/10/2022
New occurrence <input type="checkbox"/>	Site ID: _____	CONS STATUS: TEC (State listed)
OBSERVER/S: Russell Smith & Colin Spencer		PHONE: 0447809124
ROLE: botanists	ORGANISATION: Ecoedge	
EMAIL: russell@ecoedge.com.au		

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
Scattered along Princefield Road, from 300m to 1800 m west of Hithergreen Road

Reserve No: _____

DISTRICT: _____		LGA: Busselton	Land manager present: <input type="checkbox"/>
DATUM: GDA94 / MGA94 <input checked="" type="checkbox"/> AGD84 / AMG84 <input type="checkbox"/> WGS84 <input type="checkbox"/> Unknown <input type="checkbox"/>	COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:
	DecDegrees <input type="checkbox"/>	DegMinSec <input checked="" type="checkbox"/>	UTMs <input type="checkbox"/>
	Lat / Northing: 115.493		No. satellites: _____
	Long / Easting: -33.680		Map used: _____
Zone: 50		Boundary polygon captured: <input checked="" type="checkbox"/>	Map used: _____

LAND TENURE:

Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input checked="" type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>	SLK/Pole _____ to _____	Specify other: _____

AREA ASSESSMENT: Edge survey Partial survey Full survey Area observed (m²): 13,000

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m²: _____

THREATS - type, and supporting information: e.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents.	Cause/Agent: e.g. weed type, grazing species, recreation type	Area affected	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			

*Rate current and potential threat impact: **N=Nil, L=Low, M=Medium, H=High, E=Extreme**

*Estimate time to potential impact: **S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)**

CONDITION OF OCCURRENCE: (Bush Forever Scale) (estimate % of area in each)

Pristine <input type="checkbox"/> _____%	Very Good <input type="checkbox"/> _____%	Degraded <input checked="" type="checkbox"/> 80%
Excellent <input type="checkbox"/> _____%	Good <input checked="" type="checkbox"/> 20%	Completely Degraded <input type="checkbox"/> _____%

Please return form to:

communities.data@dpaw.wa.gov.au

or Species and Communities Branch, Department of Parks and Wildlife, Locked Bag 104, Bentley Delivery Centre WA 6983

Record entered by: _____ Date entered: _____ Database no: _____



Threatened and Priority Ecological Community (TEC/PEC) Occurrence Report Form

RECOMMENDED MANAGEMENT ACTIONS: e.g. roadside markers, weed control, etc.

ACTIONS IMPLEMENTED (include date):

HABITAT INFORMATION: (Check more than one box for combinations or where necessary)

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/> Hill <input type="checkbox"/> Ridge <input type="checkbox"/> Outcrop <input type="checkbox"/> Slope <input type="checkbox"/> Flat <input checked="" type="checkbox"/> Open depression <input type="checkbox"/> Drainage line <input type="checkbox"/> Closed depression <input type="checkbox"/> Wetland <input type="checkbox"/>	Granite <input type="checkbox"/> Dolerite <input type="checkbox"/> Laterite <input checked="" type="checkbox"/> Ironstone <input type="checkbox"/> Limestone <input type="checkbox"/> Quartz <input type="checkbox"/> Specify other:	(on soil surface; e.g. gravel, quartz fields) 0-10% <input type="checkbox"/> 10-30% <input type="checkbox"/> 30-50% <input type="checkbox"/> 50-100% <input type="checkbox"/>	Sand <input type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input checked="" type="checkbox"/> Clay loam <input checked="" type="checkbox"/> Light clay <input type="checkbox"/> Peat <input type="checkbox"/> Specify other:	Red <input type="checkbox"/> Brown <input checked="" type="checkbox"/> Yellow <input type="checkbox"/> White <input type="checkbox"/> Grey <input checked="" type="checkbox"/> Black <input type="checkbox"/> Specify other:	Well drained <input checked="" type="checkbox"/> Seasonally inundated <input type="checkbox"/> Permanently inundated <input type="checkbox"/> Tidal <input type="checkbox"/> Specify other:

Specific Landform Element: (Refer to field manual for additional values)

CONDITION OF SOIL:
 Dry Moist Waterlogged Inundated Cracked Saline Other:

VEGETATION CLASSIFICATION:

	1. Medium open forest
	2. Medium shrubland
	3.
	4.

FIRE HISTORY:

Last Fire: Season/Month: Year: **Fire Intensity:** High Medium Low No evidence of fire

Actual Occurrence Landuse:

Please return form to:

communities.data@dpaw.wa.gov.au

or Species and Communities Branch, Department of Parks and Wildlife, Locked Bag 104, Bentley Delivery Centre WA 6983

Record entered by: _____ Date entered: _____ Database no: _____

