Reconnaissance and Targeted Flora and Vegetation Survey

Lot 43, Plantation Road, Capel

Prepared for Ludlow Holdings Pty Ltd
May 2022

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Executive summary

Ecoedge Environmental Services was engaged by MBS Environmental on behalf of client Ludlow Holdings Pty Ltd (the landowner) to undertake a targeted and reconnaissance flora and vegetation survey over Lot 43 Plantation Road, in the Shire of Capel.

The survey was required to identify key flora and vegetation values of the property to assist in scoping potential development opportunities and inform environmental impact assessment of a potential future development proposal.

The survey area was approximately 27.2 ha in size and comprised approximately 22 ha of remnant vegetation.

The survey was undertaken on 9 and 24 September 2020 and subsequently on 27 August and 3 September 2021 in accordance with the Environmental Protection Authority (EPA) (2016) Technical Guidance, Flora and Vegetation Surveys for Environmental Impact Assessment.

A total of one-hundred and fifty species were found during the survey.

The Threatened orchid *Drakaea elastica* (193 plants) was found at 45 locations, predominantly in the eastern most part of the survey area. This population size makes it one of the largest known for *D. elastica*.

One Priority 1 taxon *Dillwynia* sp. Capel (P.A. Jurjevich 1771) (one plant), one Priority 3 taxon *Boronia tetragona* (one plant), and eighty-seven plants of the Priority 4 flora species, *Acacia semitrullata*, were also recorded. The Priority 4 taxon *Eucalyptus rudis* subsp. *cratyantha* was also recorded in vegetation unit E2.

Several "range end" or disjunct taxa: *Beaufortia squarrosa*, *Calytrix fraseri*, *Conospermum teretifolium*, *Drosera zonaria*, *Macarthuria apetala*, *Sporadanthus strictus,* and *Taxandria fragrans* were also recorded growing in the survey area.

Two Pest Plants **Asparagus asparagoides* (Bridal creeper) and **Zantedeschia aethiopica* (Arum-lily), were recorded in the survey area.

Five vegetation units, A, B, C D1, D2, E1 and E2, were described for the survey area, with two of these units, D and E, being described and mapped as sub-units.

The two sub-units, E1 and E2, are considered to represent occurrences of the "Southern *Corymbia calophylla* woodlands on heavy soils", a State-listed TEC.

While vegetation unit C does not correspond with any TEC or PEC, it comprises wetland vegetation of high conservation value because it contains several disjunct or "range end" taxa.

Vegetation types D1 and D2 are not occurrences of "Central *Banksia attenuata-Eucalyptus marginata* woodlands" (SWAFCT21a) or "Southern *Banksia attenuata* woodlands" (SWAFCT21b) or the associated "*Banksia Woodlands of the Swan Coastal Plain*" TEC/PEC

because there is either not enough Good quality vegetation (greater than 2ha) or complete absence of *Banksia attenuata* or *B. ilicifolia*.

Vegetation units B and C and sub-unit E2 are considered to represent wetland or riparian vegetation because of the presence of typical wetland species.

About one-third of the survey area is cleared, just over a third was classed as Degraded or Completely Degraded, and the remainder was Good to Excellent condition vegetation.

Two vegetation complexes are mapped to occur across the survey area: the Southern River complex and the Abba Complex, with the Southern River complex making up the bulk of the survey area. The vegetation units described for the survey are broadly representative of both described complexes. The Southern River Complex has less than 30% of its pre-European extent remaining. The Abba Complex has less than 10% remaining.

One of Beard's vegetation associations, Association 1000, is mapped across the survey area. This association is a reasonable match for survey area vegetation units. It has less than 30% of its pre-European extent remaining at all tiers of assessment.

Portions of the survey area are contiguous with vegetation linked to two formally mapped Regional ecological linkages that occur to the north of the survey area.

There are no environmentally sensitive areas within the survey area. The nearest is located approximately 830 m to the southwest of the survey area.

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Statement of limitations

Reliance on data

In the preparation of this report, Ecoedge 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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1 Introduction

Ecoedge Environmental Services (Ecoedge) was engaged by MBS Environmental (MBS) on behalf of Ludlow Holdings Pty Ltd (the landowner) in May 2021 to undertake a targeted and reconnaissance flora and vegetation survey over Lot 43 Plantation Road, Ludlow, within the Shire of Capel (survey area). The survey area is approximately 27.2 hectares (ha) in size and occurs within a rural setting approximately 5 kilometres (km) south-southwest of the Capel town centre **Figure 1** and **Figure 2**.

Ecoedge had previously surveyed the same area in the spring of 2020 for another client, but due to circumstances beyond Ecoedge's control, the results were not presented in a report. These 2020 results have been combined with outcomes of the late 2021 winter/early spring survey to produce a thorough assessment of the survey area.

The survey was required to identify key flora and vegetation values of the property to assist in scoping potential development opportunities and inform environmental impact assessment of a potential future development proposal.

This report compiles the findings of the surveys.

2 Scope and objectives

A desktop assessment was undertaken to identify relevant key features and constraints which were in or nearby the survey area, such as Threatened and Priority Flora, Threatened and Priority Ecological Communities (TEC and PECs), riparian vegetation, unusual soil/landscape systems, conservation estates, poorly represented vegetation associations and/or vegetation complexes and Environmentally Sensitive Areas (ESA's). The desktop assessment area encompassed a five-kilometre (km) buffer to the survey area (**Figure 2**).

The field survey was required to ground-truth the desktop assessment findings and delineate all significant flora and vegetation components within the survey area, including TECs and PECs and Threatened and Priority flora.

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 to meet requirements of other relevant State and Commonwealth guidelines for threatened species and communities, such as approved conservation advice for *Environmental Protection and Biodiversity Act 1999* (EPBC Act 1999) threatened species and communities.

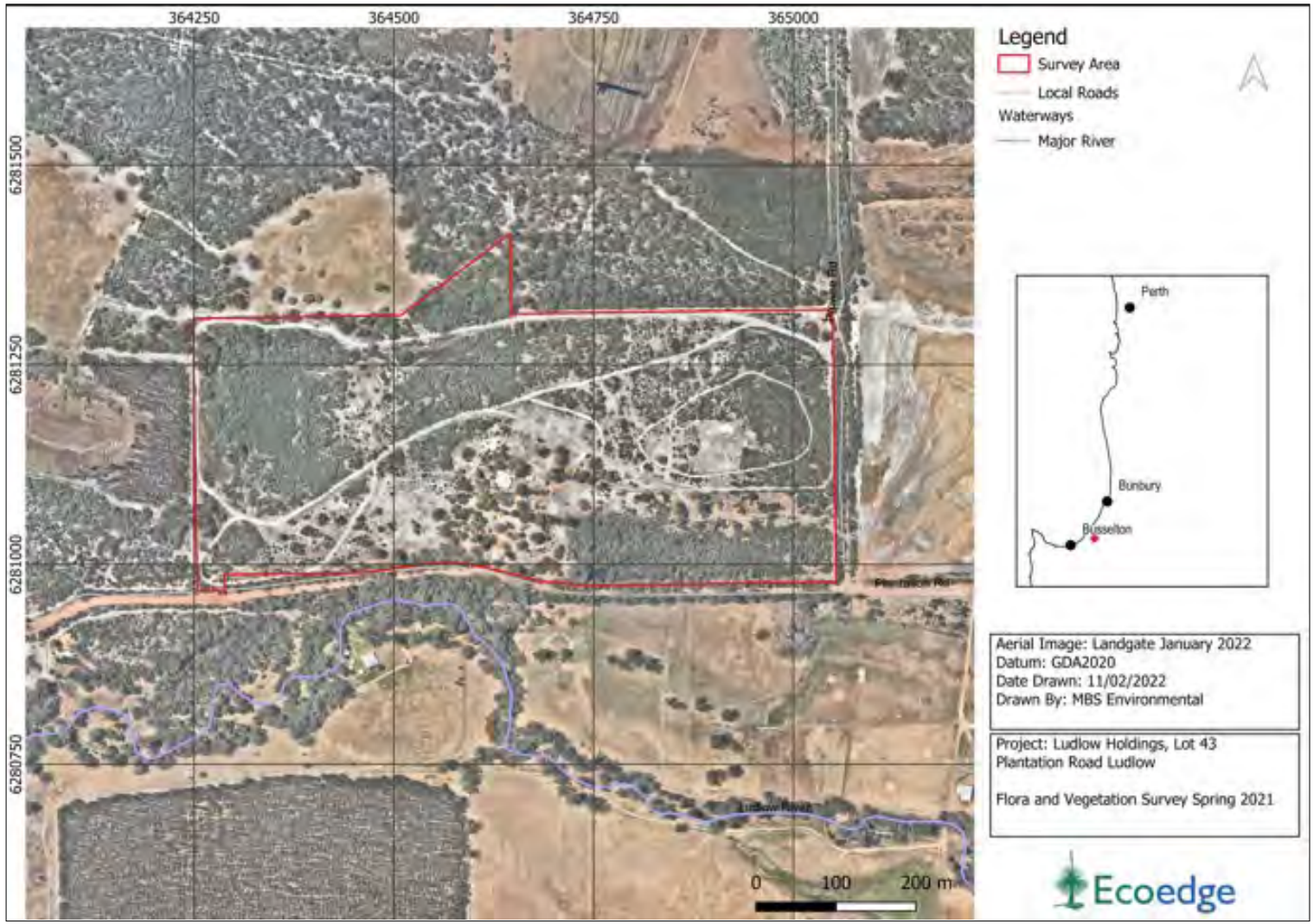

Figure 1. Aerial photograph showing the location of the survey area.

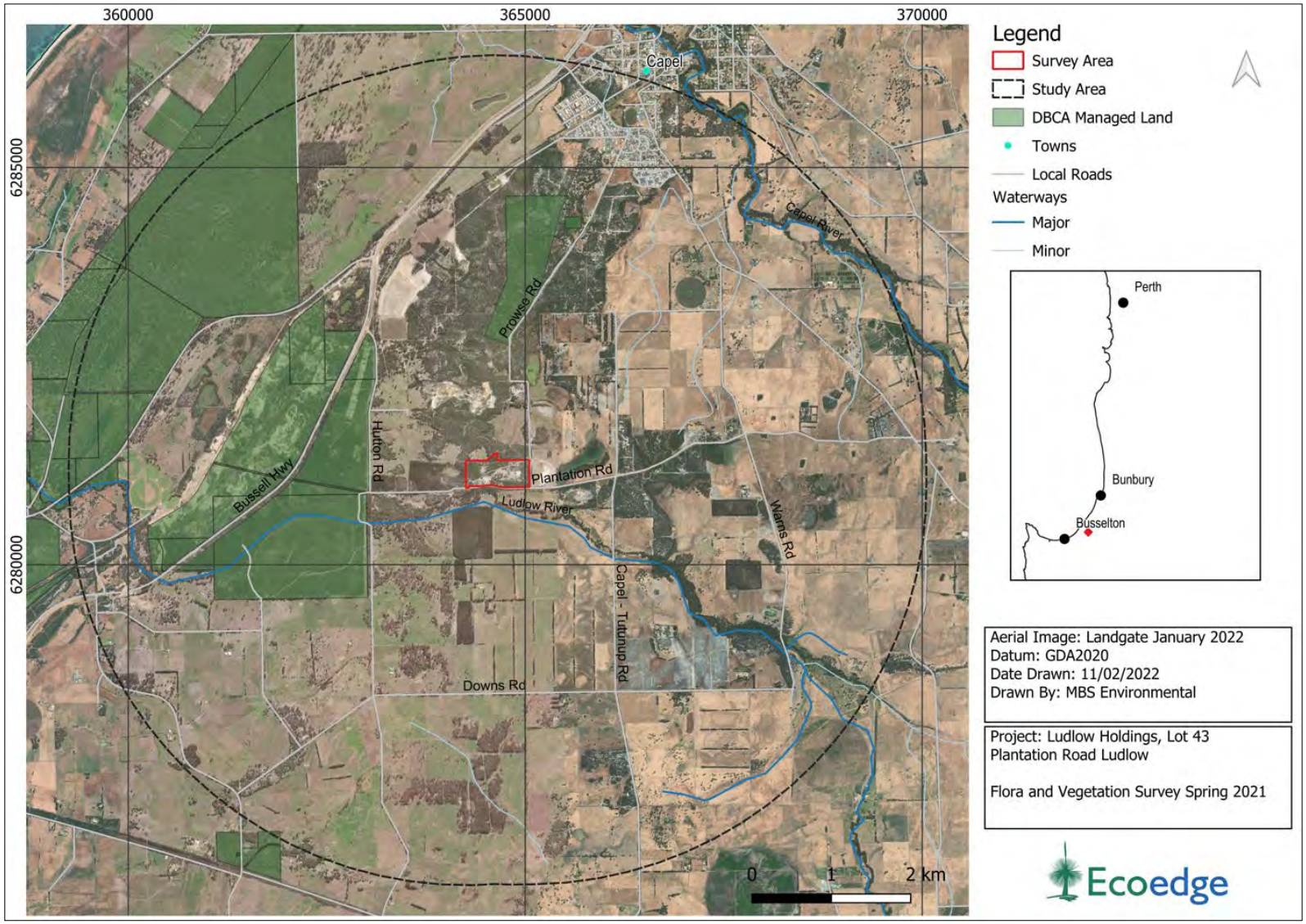

Figure 2. Aerial photograph showing the location of the survey and assessment area.

3 Methods

3.1 Desktop assessment

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

- Regional landscape and soil mapping – Busselton, Margaret River, Augusta: land capability study (Tille & Lantzke 1990) as digitally presented in the Soil Landscape Mapping – Best Available Data Set, DPIRD-027.
- Vegetation complex mapping of the South West Forest Region of Western Australia (Mattiske and Havel 1998) and the System 6 area (Heddle et al. 1980) as updated by Webb et al. (2016).
- Beard's Pre-European vegetation association mapping dataset (DPIRD-006) (Beard et al. 2013).
- WA Threatened and Priority Ecological Communities DBCA database extracts (DBCA 2021a) and TEC and PEC listings (DBCA 2018a, DBCA 2021b).
- Federal Protected Matters Search Tool results **(**DAWE 2020, DAWE 2022).
- Threatened and Priority flora Naturemap search results (DBCA 2020, DBCA 2021c)**.**
- Extract from the Department's Threatened Flora database and the Western Australian Herbarium database (DBCA 2020d).
- Environmentally sensitive areas distribution maps data set, DWER-046 (DWER 2020).
- Geomorphic Wetlands, Swan Coastal Plain data set, DBCA-019 (DBCA 2021e)
- Directory of Important Wetlands in Australia – Western Australia data set, DBCA-045 (DBCA 2018c).
- Surface Hydrology Lines (National) (Crossman & Li 2015).
- The flora and vegetation of the Busselton Plain (Swan Coastal Plain): a report for the Department of Environment and Conservation as part of the Swan Bioplan Project. Department of Environment and Conservation, Perth, Western Australia. (Webb et al. 2009).

3.1.1 Significant flora likelihood of occurrence

Prior to undertaking the survey, an assessment of the likelihood of occurrence of Threatened and Priority flora occurring within the survey area was undertaken. The rationale for determining this pre and post likelihood of occurrence is provided in **Appendix 1**.

3.2 Survey limitations

Limitations with regards to the assessment are addressed in **Table 1.**

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

Aspect	Constraint	Comment
Scope	Negligible	The survey scope was prepared in consultation with the client and was designed to comply with EPA requirements.
Proportion of flora identified	Slight	The survey was carried out in late August and early-mid September, which is within the prime season for flowering in the south-west of Western Australia.
Climatic and seasonal effects	Minimal	Rainfall in the period May-September was 95% of the mean for that period in 2020 and 117% of the mean till the end of August 2021. Observations on growth and flowering indicated that it was good.
Availability of contextual information	Negligible	Comprehensive regional surveys of remnant vegetation, as well as more localised surveys, have been carried out on the southern Swan Coastal Plain.
Completeness of the survey	Negligible	The whole search area was covered on foot. Flowering was good.
Skill and knowledge of the botanists	Negligible	The senior field botanist conducting the survey has had extensive experience in botanical surveys in south-west Australia over a period of 25 years.

3.3 Field survey

The survey was carried out by Debbie Brace (flora permit FT61000764), Russell Smith (flora permit FB61000473) and Colin Spencer (flora permit FB62000169) according to the requirements of EPA (2016) on 9th and 24th September 2020 and on 27 August and 3 September 2021. Flora species not identified in the field were either photographed or collected for later identification. The time of the survey was within the optimum time for field identification of most of the Threatened and Priority flora identified as potentially occurring within the survey area. Taxonomy and conservation status were checked against the latest WA Herbarium census download (DBCA 2022).

A targeted survey for the Threatened orchid *Drakaea elastica* was carried out on 27 August and on 3 September 2021, when its distinctive leaf was clearly visible (DEC 2009).

Plant communities were described using data collected at 193 relevés or vegetation condition waypoints as well as recent aerial photography.

The relevé and quadrat information was used to identify and describe vegetation units using the NVIS system (Level 5; NVIS 2017).

Data collection points (vegetation condition assessment points and relevés) and survey track files were collected while on site.

Vegetation condition was assessed using the method of the EPA (2016) (**Appendix 2**).

4 Results desktop assessment

4.1 Biogeographic region and location

The survey area is located within the Swan Coastal Plain Bioregion as defined in the Interim Biogeographic Regionalisation for Australia (IBRA) (Commonwealth of Australia 2016). It is characterised as a low lying coastal plain, mainly covered by Banksia or Tuart woodlands over sandy soils with paperbark prevalent in swampy areas (Thackway & Cresswell 1995).

The Swan Coastal Plain Bioregion is divided into two subregions, the Dandaragan Plateau (SWA01) and Perth (SWA02), of which the survey area is located within the Perth subregion. This subregion comprises colluvial and aeolian sands, alluvial river flats and coastal limestone. Native vegetation varies from heath and/or Tuart woodlands on limestone, Banksia and Jarrah woodlands on Quaternary marine dunes of various ages, and Marri on colluvial and alluvials. This subregion also includes a complex series of seasonal wetlands (Mitchell, Williams, and Desmond 2002).

4.2 Landform and soils

The survey area occurs near the boundary of the aeolian derived Bassendean System (212Bs) and predominantly alluvially derived Abba (213Ab) system of the southern Swan Coastal Plain, with most of the area comprising the Bassendean system.

The Abba system is a level to gently undulating, poorly drained plain 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 separated into landform-soil mapping units or "land units" based on landscape position and soil characteristics (Tille & Lantzke 1990). Five land units have been described for the survey area and are described in **Table 2** and **Figure 3**.

Table 2. Soil mapping units occurring within the survey area (Tille & Lantzke 1990, DPIRD-027).

System	Land units	Description
Bassendean system (212Bs)	212Bs__B1b	Very low relief dunes of undulating sand plain with deep bleached grey sandy A2 horizons and pale yellow B horizons.
	212Bs__B3	Closed depressions and poorly defined stream channels with moderately deep, poorly to very poorly drained bleached sands with an iron-organic pan or clay subsoil. Surfaces are dark grey sand or sandy loam.
	212BsW_SWAMP	Swamp
Abba system (213Ab)	213AbABw	Winter wet flats and slight depressions with sandy grey-brown duplex (Abba) and gradational (Busselton) soils.
	213AbABvw	Small narrow swampy depressions along drainage lines. Alluvial soils.

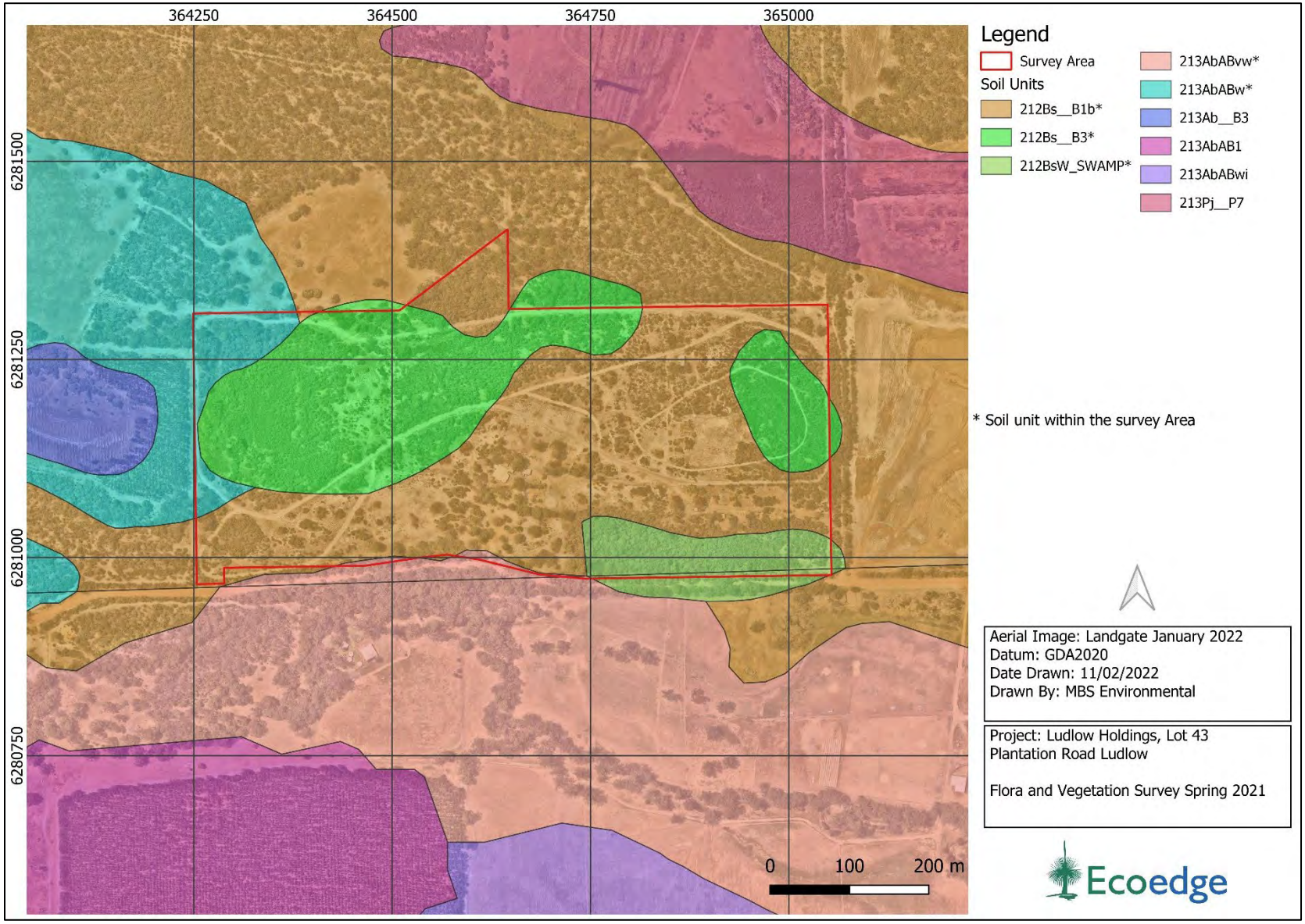

Figure 3. Land units mapped in and nearby the survey area (Tille & Lantzke 1990).

4.3 Vegetation description according to pre-European mapping datasets

4.3.1 Vegetation complexes

The comprehensive pre-1750 distribution of vegetation complexes[1] across the southwest of Western Australia is based on two main data sets, Heddle et al.'s 1980 1:250,000 scale vegetation complex mapping of the 'System 6' area comprising the greater Perth and Darling Range Region and Mattiske and Havel's 1998 1:50,000 scale mapping of forest vegetation covered by the Regional Forest Agreement 1999[2] (Webb et al. 2016). Both data sets were prepared in order to inform the adequacy of biodiversity conservation through state-managed reserves (EPA 1993, South West Regional Forest Agreement 1999). In 2016 these data sets were revised by DPaW (Webb et al. 2016) in order to fill data gaps and improve alignment and correlation between the data sets.

According to the vegetation complex mapping, as updated by Webb et al. in 2016, two vegetation complexes, the Southern River Complex and the Abba Complex, are mapped across the survey area. These are described in **Table 3** and shown in **Figure 4.** The Southern River Complex comprises the majority of the survey area.

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

Vegetation Complex	Description
Southern River Complex	Open woodland of *Corymbia calophylla* (Marri) - *Eucalyptus marginata* (Jarrah) - *Banksia* species with fringing woodland of *Eucalyptus rudis* (Flooded Gum) - *Melaleuca rhaphiophylla* (Swamp Paperbark) along creek beds.
Abba Complex	A mixture of open forest of *Corymbia calophylla* (Marri) - *Eucalyptus marginata* (Jarrah) - *Banksia* species and woodland of *Corymbia calophylla* (Marri) with minor occurrences of *Corymbia haematoxylon* (Mountain Marri). Woodland of *Eucalyptus rudis* (Flooded Gum) - *Melaleuca* species along creeks and on flood plains.

[1] Vegetation complex mapping is based on broadscale assessment of regional patterns of vegetation in relation to underlying landforms, soils and climatic trends.

[2] Mattiske and Havel's (1998) mapping also included an assessment of an area of the very southern portion of the Swan Coastal Plain landform (Webb etal. 2016).

4.3.2 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 Western Australia at a scale of 1:250,000. Beard's vegetation maps 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) [3].

The survey area comprised only one Beard vegetation association: Association 1000 'Mosaic: Medium forest; jarrah-marri / Low woodland; banksia / Low forest; tea tree (Melaleuca spp.)'.

[3] 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 more detail than do Beard's.

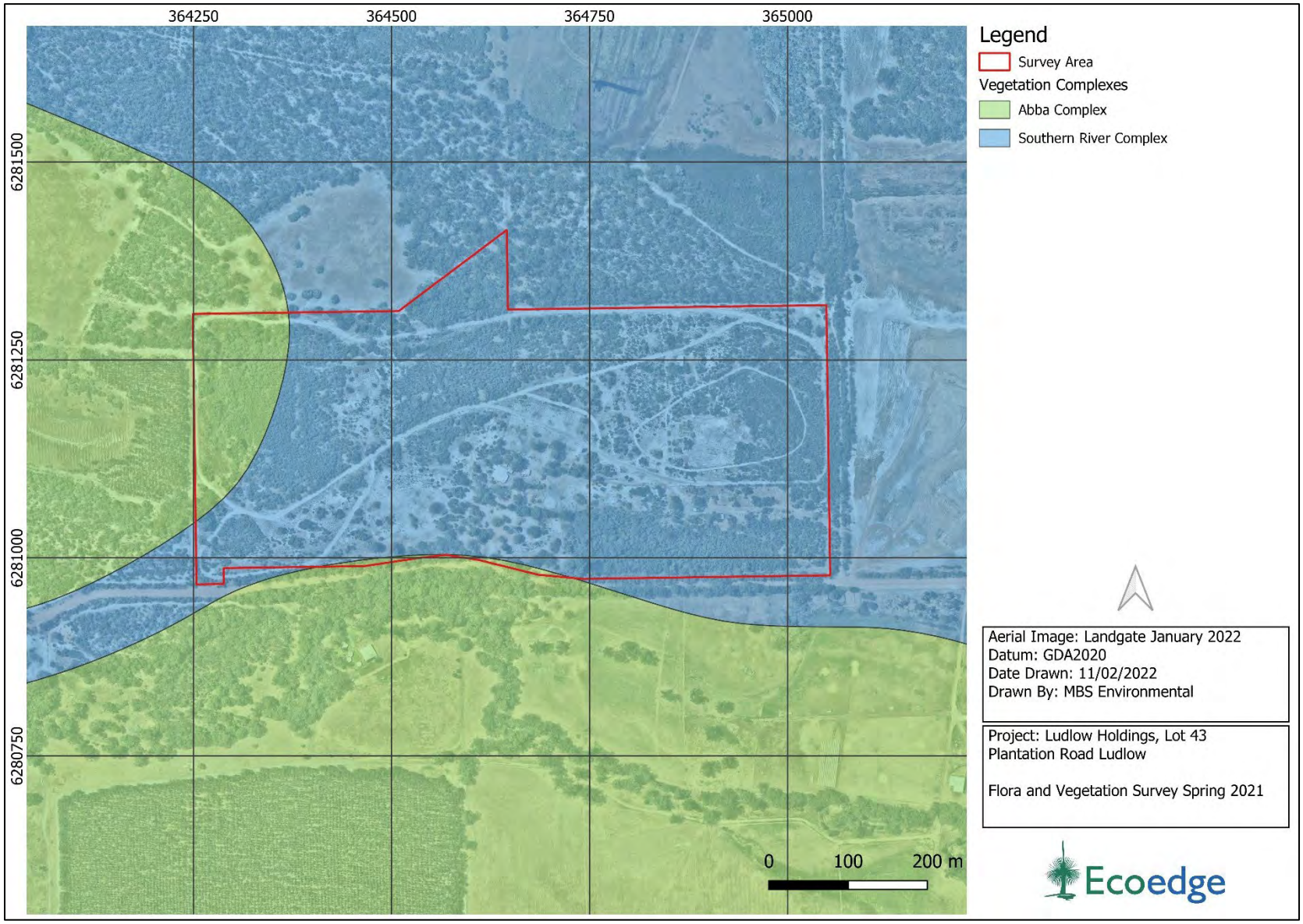

Figure 4. Vegetation complexes mapped in and nearby the survey area (Webb et al., 2016).

4.3.3 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 target 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".

Table 4 presents the statistics as they relate to the percentage remaining of pre-European extent vegetation and the percentage of current extent in DBCA managed land of the two vegetation complexes identified within the survey area. The Southern River Complex, which makes up the bulk of the survey area, has less than 30% of its pre-European extent remaining. The Abba Complex has less than 10% remaining.

Table 5 presents the same statistics for the Beard vegetation association mapped across the survey area: Association 1000. This association has less than 30% of its pre-European extent remaining at all scales.

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

Status of the commonwealth retention target	>30%	<30%	<10%

Table 4. Vegetation complexes mapped within the survey area with regard to the Commonwealth retention targets (Government of Western Australia 2019a).

Vegetation Complex	Pre-European (ha)	Current Extent (ha)	% Remaining	% remaining in DBCA reserves
Southern River Complex				
Swan Coastal Plain	58,781.48	10,832.18	18.43	1.60
Shire of Capel	7,876.12	1,794.33	22.78	N/A
Abba Complex				
Swan Coastal Plain	50,892.78	3,326.20	6.54	0.36
Shire of Capel	9,356.82	569.79	6.09	N/A

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

Table 5. Vegetation associations within the survey area with regard to the Commonwealth retention targets (Government of Western Australia 2019b).

Beard Vegetation Association	Pre-European (ha)	Current Extent (ha)	% Remaining	% remaining in DBCA Managed Land*
Association 1000 -				
State-wide	99,835.86	27,768.84	27.81	5.19
IBRA region: Swan Coastal Plain (SWA)	94,175.31	24,869.20	26.41	5.06
IBRA sub-region Perth (SWA02)	94,175.31	24,869.20	26.41	5.19
Shire of Capel	15,173.76	3,189.87	21.02	1.53

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

4.4 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 TEC. These TECs can be listed under one of three conservation categories: Critically Endangered (CR), Endangered (EN), or 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, that 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 DBCA (2018a, 2021b). The conservation categories for these Threatened and Priority ecological communities are defined in **Appendix 3**.

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 Agriculture, Water and the Environment) (DAWE 2020b). These are defined in **Appendix 4.**

The desktop assessment, which included a Protected Matters Search (DAWE 2020, DAWE 2022) and review of DBCA TEC and PEC database extracts (DBCA 2021a), found four EPBC Act, four BC Act listed TECs, and three State listed PECs within the 5 km assessment area.

The outcomes of these searches are presented in **Table 6.** The results of the DBCA records are shown in **Figure 5.**

Table 6. Threatened and Priority ecological communities occurring within assessment area (DAWE 2020, DAWE 2022, DBCA 2021a).

Community Name	Community Description	Status (WA)	Status (EPBC Act)
'Claypans of the Swan Coastal Plain' – a federally listed TEC consisting of four State-listed communities, three of which occur in the assessment area: 1. SCP07: Herb rich saline shrublands in claypans 2. SCP08: Herb rich shrublands in claypans 3. SCP10a: Shrublands on dry clay flats		1. VU 2. VU 3. EN	T (CR)
SCP10b Shrublands on southern Swan Coastal Plain Ironstones (Busselton area)		CR	T (EN)
Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain		P3	T (CR)
SCP1b Corymbia calophylla woodlands on heavy soils of the southern Swan Coastal Plain		VU	-
'Banksia Woodlands of the Swan Coastal Plain' – a federally listed TEC consisting of numerous State-listed communities, including SCP21b Southern *Banksia attenuata* woodlands mapped separately in **Figure 5.**		P3	T (EN)
Wooded wetlands which support colonial waterbird nesting areas		P2	-

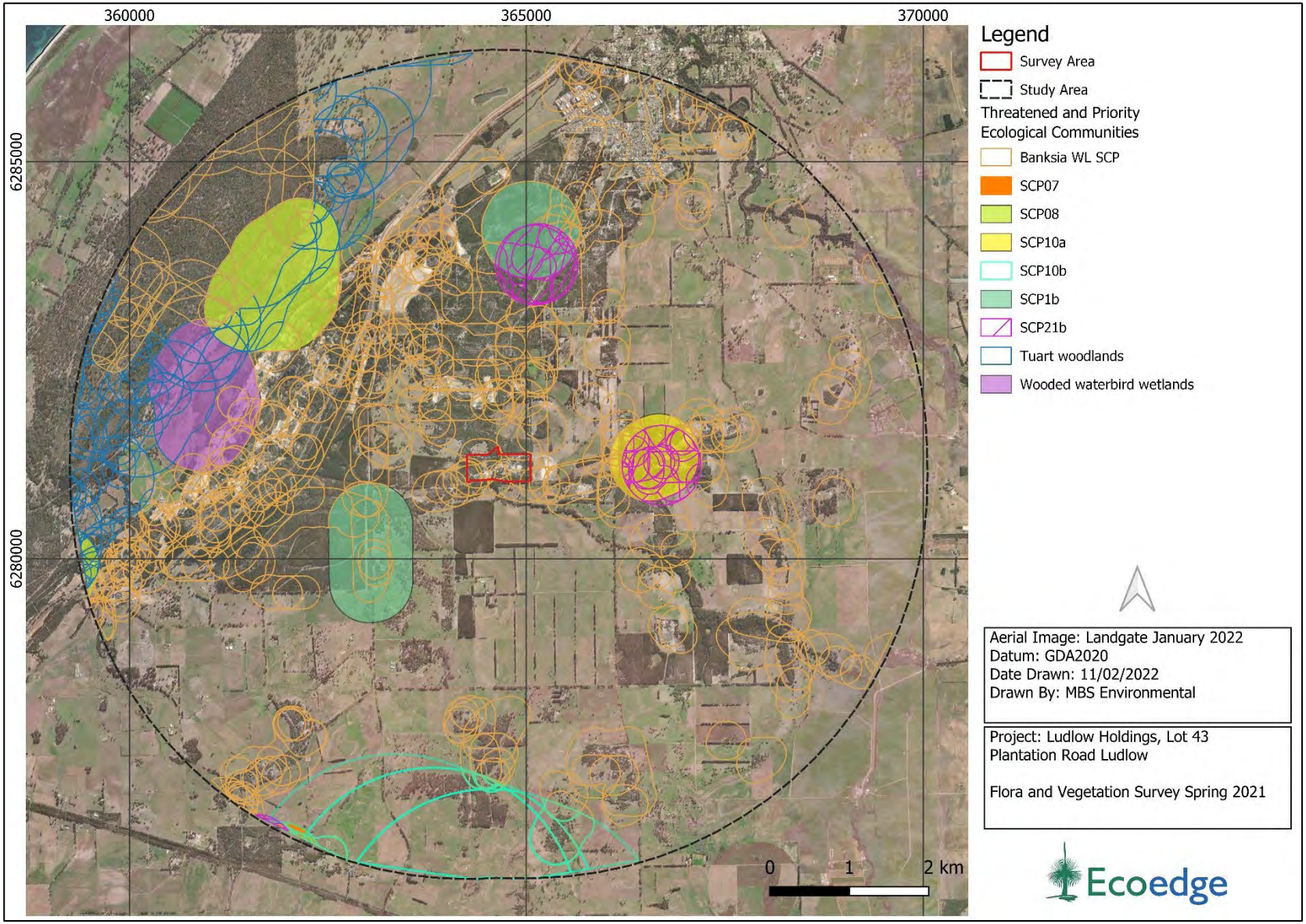

Figure 5. Threatened and Priority ecological communities within the assessment area (DBCA 2021a).

4.5 Threatened and Priority flora

Species of flora and fauna 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 toward population and species protection.

Threatened extant flora species are listed under Section 19 of the BC Act and 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) need further survey to determine their status, while 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 5 December 2018 (DBCA 2018b).

Categories of Threatened and Priority flora as defined by the BC Act are presented in **Appendix 5**

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 6** (DAWE 2020c).

Threatened or Priority flora occurring within 5 km of the survey area generated from a NatureMap search (DBCA 2020, DBCA 2021c) and a Protected Matters Search Tool query (DAWE 2020, DAWE 2022). DBCA and WA Herbarium Threatened and Priority flora data downloads (DBCA 2021d) are provided in **Appendix 7**.

Forty-one significant species were identified within this search area. Two species were considered Likely, thirty-two possible, and seven unlikely to occur within the survey area. The likely occurring species are listed in **Table 7.** There were no species recorded within the survey area according to the DBCA Threatened and Priority Flora data base download (DBCA 2021d). A summary breakdown of the likelihood of occurrence of all potential species according to conservation status is provided in **Table 8**, with the complete likelihood of occurrence assessment and post likelihood assessment provided in **Appendix 8**.

The locations of all Threatened and Priority Flora database flora are shown in **Figure 6 (**DBCA 2021d).

Table 7. Conservation significant flora likely to occur within the survey area.

Species	Conservation Status
Stylidium paludicola	P3
Verticordia attenuata	P3

Table 8. Likelihood of occurrence according to conservation status.

Likelihood of occurrence	Total number	Priority 1	Priority 2	Priority 3	Priority 4	Threatened
Likely	**2**	0	0	2	0	0
Possible	**32**	0	4	12	12	4
Unlikely	**7**	0	0	4	0	3
Total	**41**	**0**	**4**	**18**	**12**	**7**

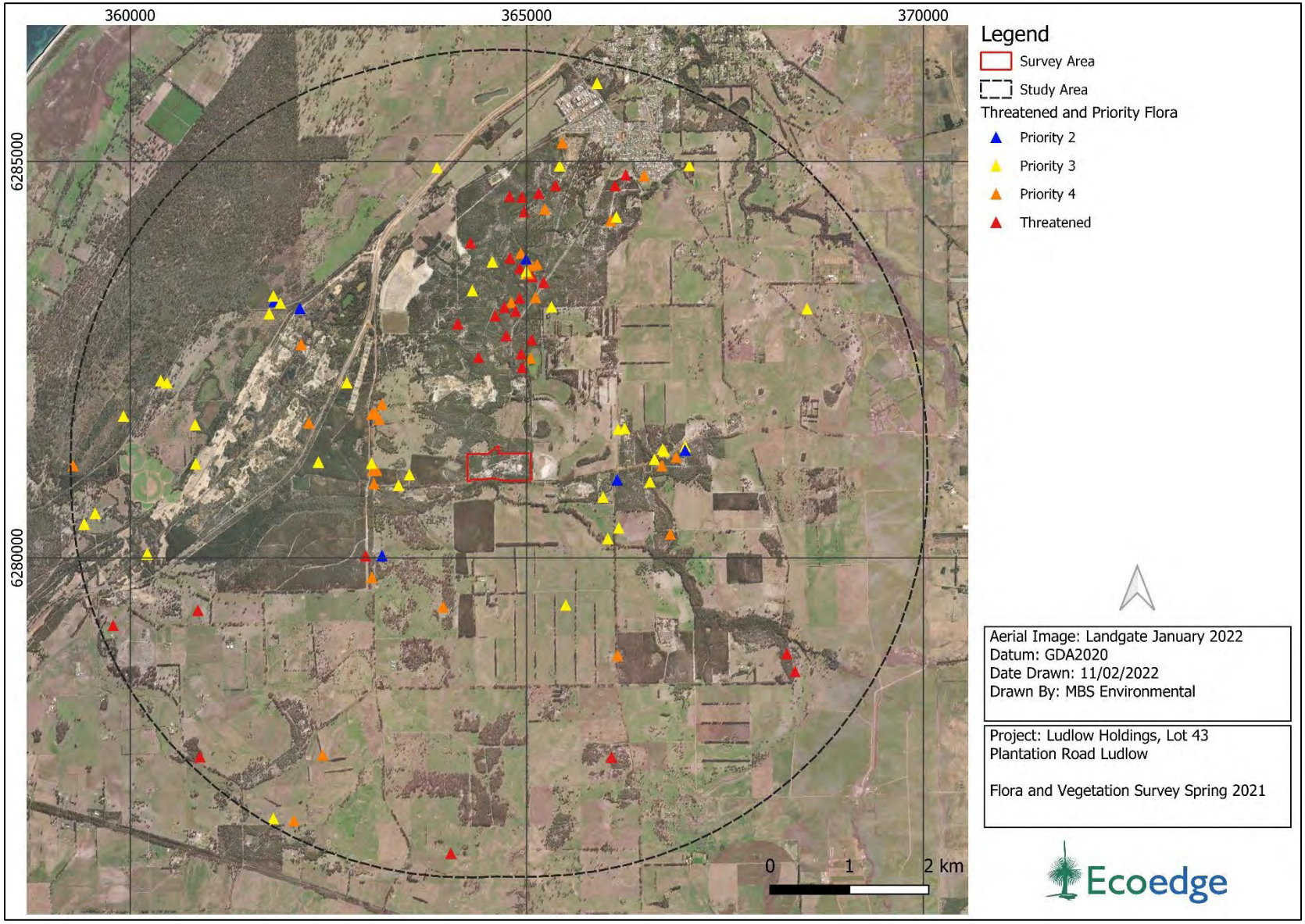

Figure 6. Threatened and Priority flora within the five km assessment area (DBCA 2021d)

4.6 Wetlands

Wetlands on the SCP 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 9.** The SCP 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 10.**

Table 9. 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 10. 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

The survey area intersects a mapped occurrence of an extensive Multiple Use palusplain wetland (Unique Feature ID 15809) that covers over 42,000 ha in the southern Swan Coastal Plain (DBCA 2021e) **Figure 7.** No Conservation category or Resource Enhancement category wetlands intersect the survey area. The nearest Conservation category wetland and Resource Enhancement wetlands are both located approximately 920 metres to the north of the survey area **Figure 8.**

4.7 Watercourses

There are no permanent or ephemeral rivers, creeks or drainage lines within the survey area. The closest watercourse is Ludlow River, that at its closest point, runs approximately 30 m south of the survey area, as shown in **Figure 7** and **Figure 8** (Crossman & Li 2015)**.**

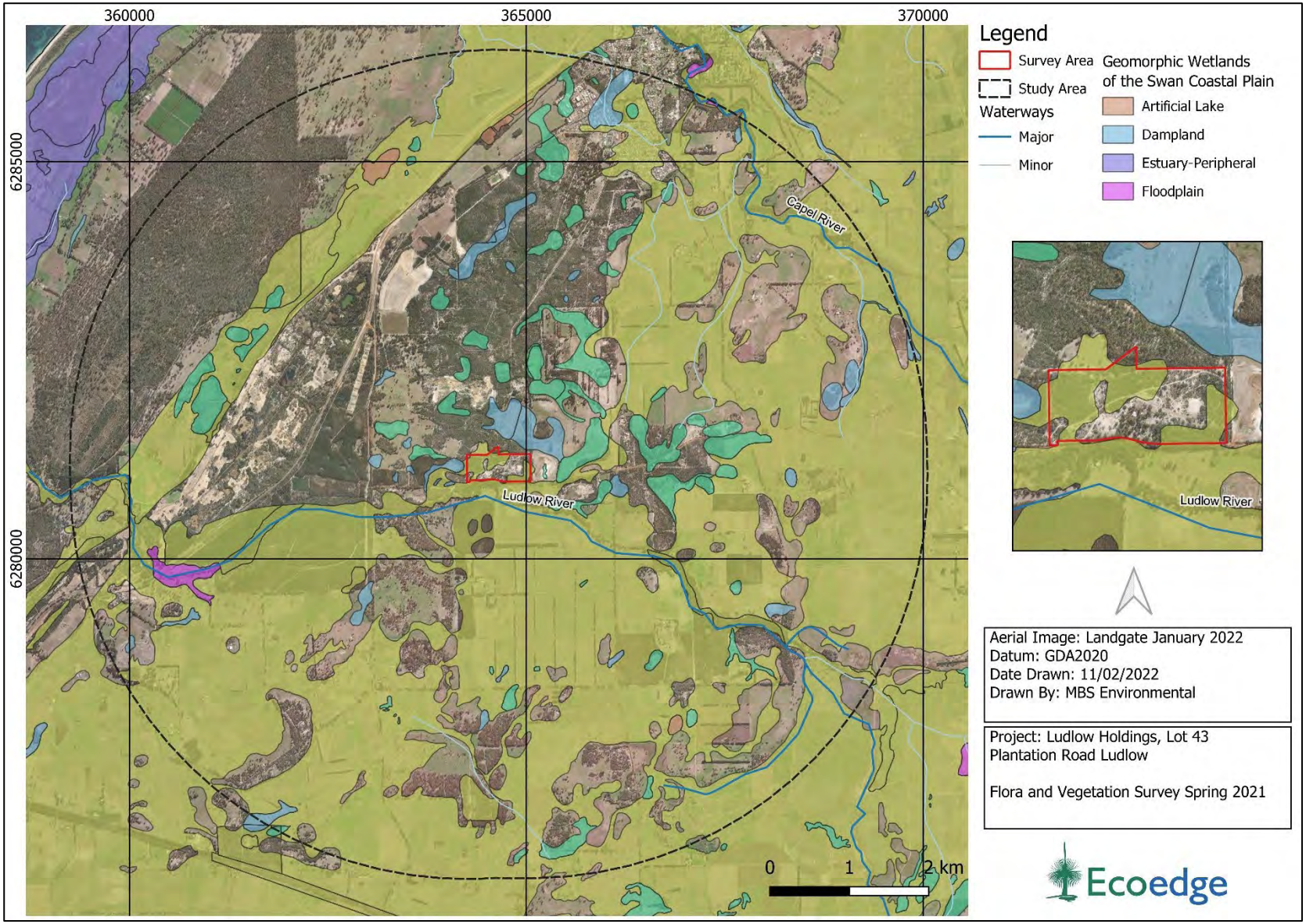

Figure 7. Geomorphic wetland type and waterways in proximity to the survey area (DBCA 2021e, Crossman & Li 2015).

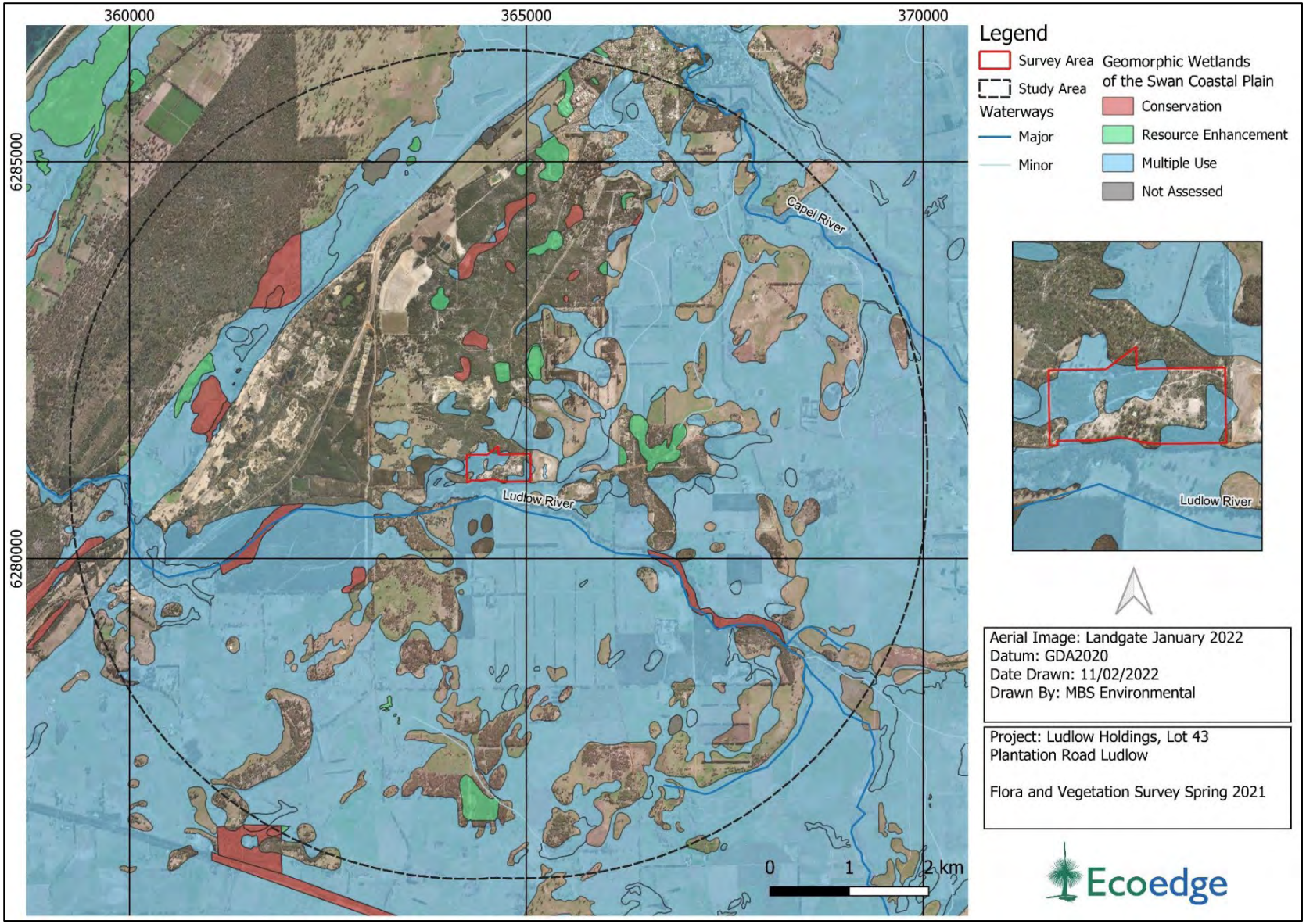

Figure 8. Status of geomorphic wetlands in proximity to the survey area (DBCA 2021e, Crossman & Li 2015).

4.8 Regional ecological linkages

Regional ecological linkages "link protected patches of regional significance by retaining the best (condition) patches available as steppingstones 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 Western Australia in an area spanning between just north of Mandurah to Walpole in the south-east.

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 11**).

Table 11. Linkage proximity values rating assigned to patches of remnant vegetation within a landscape (from 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

Two regional ecological axis lines mapped by Molloy et al. (2009) meet to the north of the survey area **Figure 9.** These are the Capel - Boyanup Ecological Linkage and Wonnerup / Ludlow River / Gibson Forest Ecological Linkage. Parts of vegetation within the survey area have been mapped with the highest tier 1a, 1b and 1c proximity values due to their proximity to these linkages. The majority of the survey area has not been assigned a proximity value due to the extent of previous vegetation clearing and other disturbances.

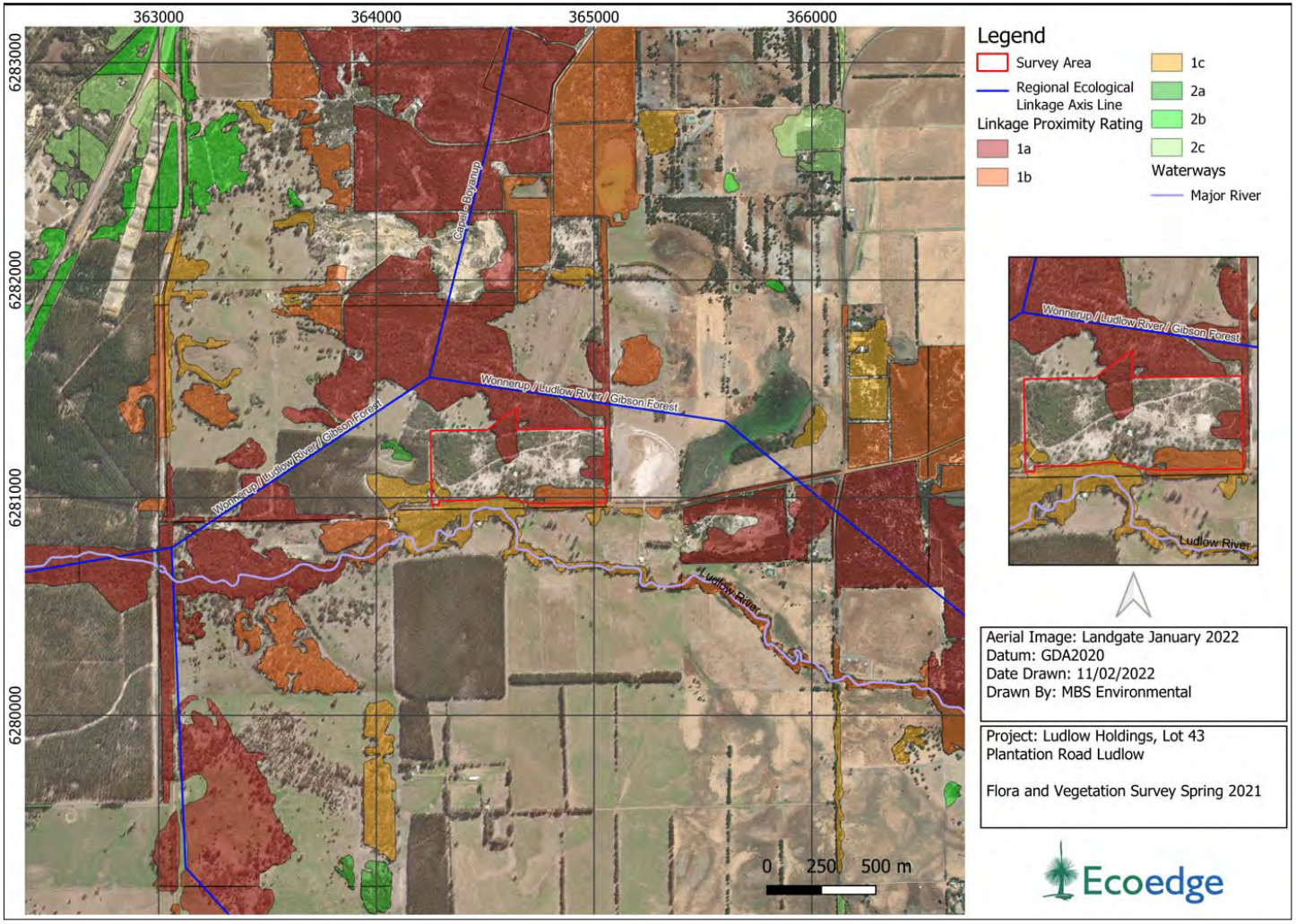

Figure 9. The survey area in relation to regional ecological linkages (Molloy et al. 2009).

4.9 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.

The survey area does not intersect a mapped ESA (DWER 2020), as shown in **Figure 10.** The nearest ESA is located approximately 830 m to the southwest of the survey area.

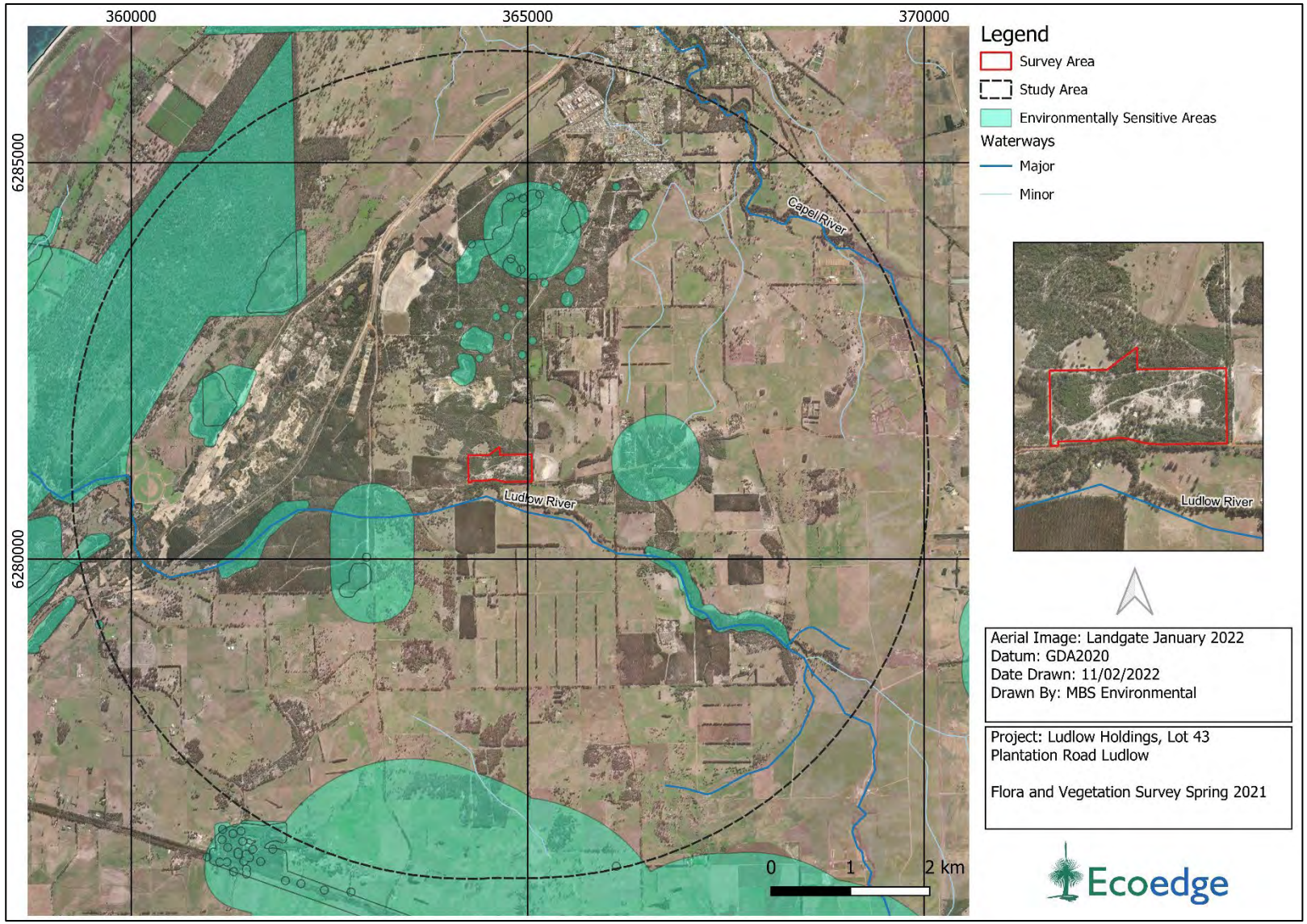

Figure 10. ESAs within assessment area (DWER 2020).

5 Field survey results

A map showing the location of data collection points (vegetation condition assessment points and relevés) and survey track files is provided in **Appendix 9.**

5.1 Flora

One hundred and fifty vascular flora taxa were identified within the survey area, of which twelve (≈ 7.8%) were introduced taxa. The most common families were Myrtaceae (17 taxa), Fabaceae (15 taxa, incl. 1 non-native) and Orchidaceae (17 taxa).

The vascular flora recorded during the field survey is included in **Appendix 10.**

5.2 Post likelihood of occurrence

Thirty-eight of the forty-two Threatened or Priority taxa potentially occurring in the survey area were assigned a post-survey residual likelihood of "Unlikely" because for the bulk of them, even though potentially suitable habitat was present, they were not seen despite being thoroughly searched for at an appropriate time of year. The balance (4) of potentially occurring flora were recorded in the survey area.

A summary of the post-survey likelihood of occurrence according to conservation status is provided in **Table 12.**

Table 12. Vascular flora post-survey likelihood of occurrence according to conservation status.

Likelihood of occurrence	Total No.	Priority 1	Priority 2	Priority 3	Priority 4[4]	Threatened
Recorded	**4**	1	0	1	1	1
Unlikely	**38**	0	4	18	12	4
Possible	**0**	0	0	0	0	0
Total	**42**		**4**	**19**	**13**	**5**

5.3 Threatened, Priority and other conservation significant flora

The Threatened orchid *Drakaea elastica* (193 plants) was found at 45 locations, predominantly in the easternmost part of the survey area. Most plants were still in the leaf stage, though some had sent up their flowering stalks. Typical habitat for *D. elastica* in the survey area were thickets of *Kunzea glabrescens* over a leaf litter on grey sand.

[4] The Priority 4 taxon *Eucalyptus rudis* subsp. *cratyantha* was also recorded in vegetation unit E2.

One plant of the Priority 1 taxon *Dillwynia* sp. Capel (PA Jurjevich 1771) (P1) was found within vegetation unit D1, in the northeast quadrant of the survey area, this was not included in the pre-survey likelihood table.

A single *Boronia tetragona* (P3) plant was found growing on grey sand with *Kunzea glabrescens* in the central, northern part of the survey area.

Eighty-seven plants of the P4 flora species, *Acacia semitrullata,* were recorded scattered through the eastern part of the survey area, mainly in *Kunzea glabrescens* tall shrubland.

Several "range end" or disjunct taxa: *Beaufortia squarrosa*, *Calytrix fraseri*, *Conospermum teretifolium*, *Drosera zonaria*, *Macarthuria apetala*, *Sporadanthus strictus* and *Taxandria fragrans*[5], were also recorded growing in the survey area. *Calytrix fraseri*, *C. teretifolium*, *D. zonaria* and *M. apetala* were found in *Kunzea glabrescens* tall shrubland, whereas the other species were in wetland dominated by *Corymbia calophylla*, *Eucalyptus rudis* and *Melaleuca preissiana* in the southern part of the survey area.

The significance of the populations of this flora is discussed in **sub-section 6.1** below.

Photographs of this flora are shown in **Figure 11,** with their locations within the survey area shown in **Figure 12**. The occurrences of the Threatened *Drakaea elastica* are also shown by itself in **Figure 13**.

Copies of the completed Threatened and Priority Flora Report form for the confirmed occurrences of these species are provided in **Appendix 11.**

5.4 Pest plants

Two of the introduced species, **Asparagus asparagoides* (Bridal creeper) and **Zantedeschia aethiopica* (Arum-lily), are listed as Declared Pest Plants, but with no management requirements as no management category has been assigned to them under the *Biosecurity and Agriculture Management Act 2007* (BAM Act). *A. asparagoides* was found in two locations and *Z. aethiopica* at one location (**Figure 14**).

[5] See photo on report cover.

Drakaea elastica [6]

Boronia tetragona

Drosera zonaria

Beaufortia squarrosa

Macarthuria apetala

Conospermum teretifolium

Sporadanthus strictus

Dillwynia sp. Capel (PA Jurjevich 1771)

Figure 11. Photographs of some of the significant taxa found within the survey area.

[6] The photo of *D. elastica* shows its bright green leaf next to *Drakaea glyptodon* grey leaf.

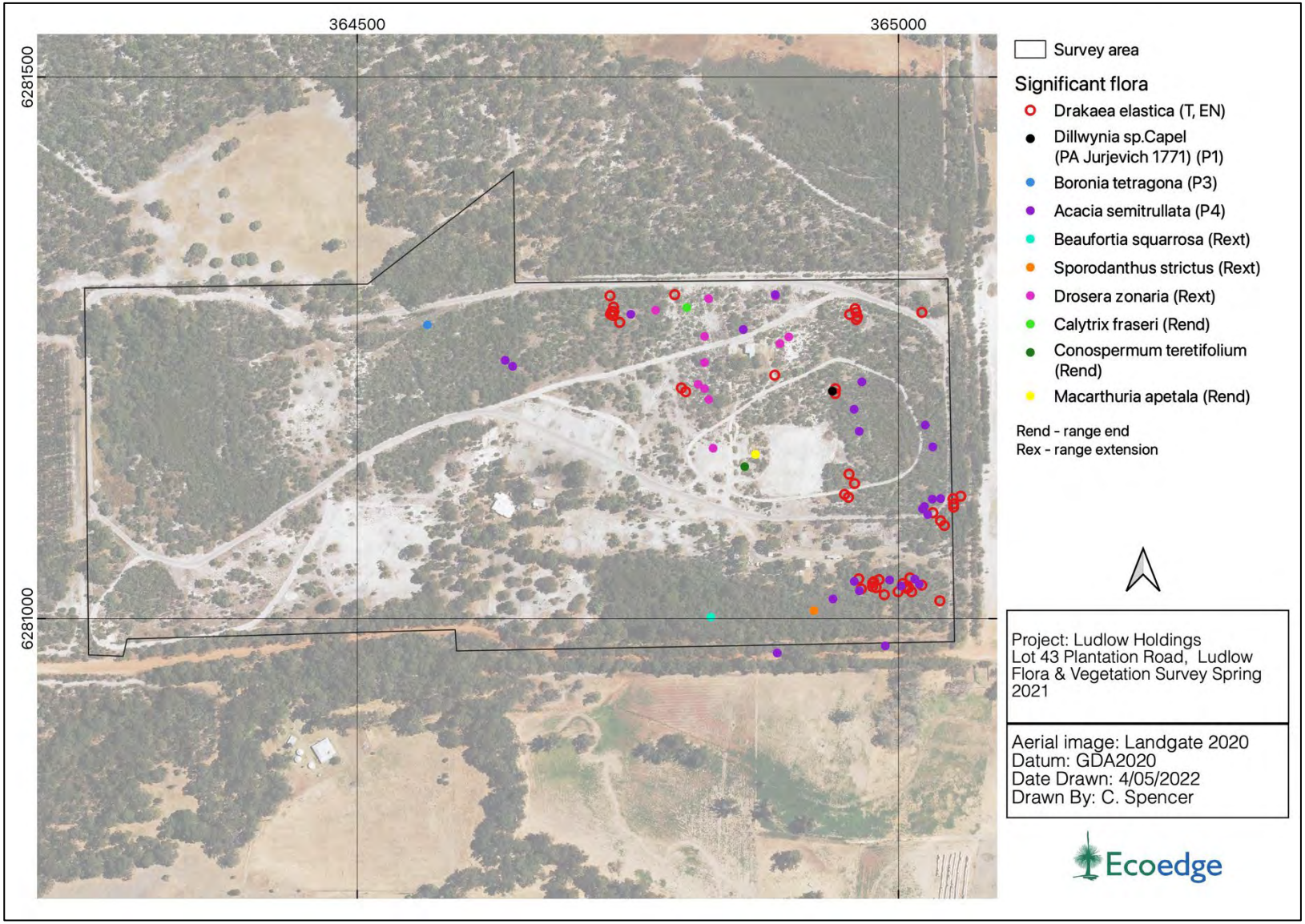

Figure 12. Significant flora within the survey area.

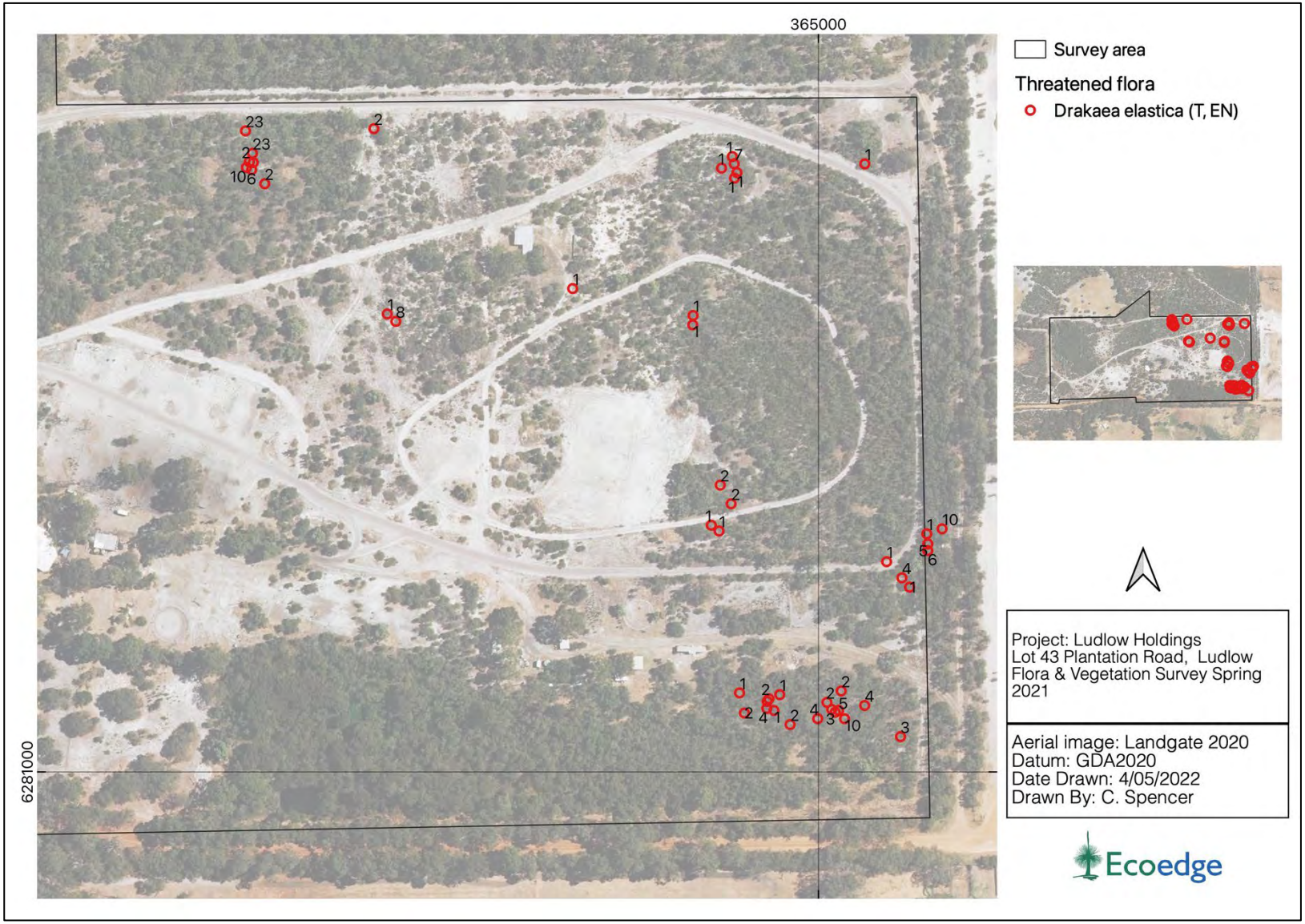

Figure 13. Location of Threatened flora (*Drakaea elastica*) within the survey area.

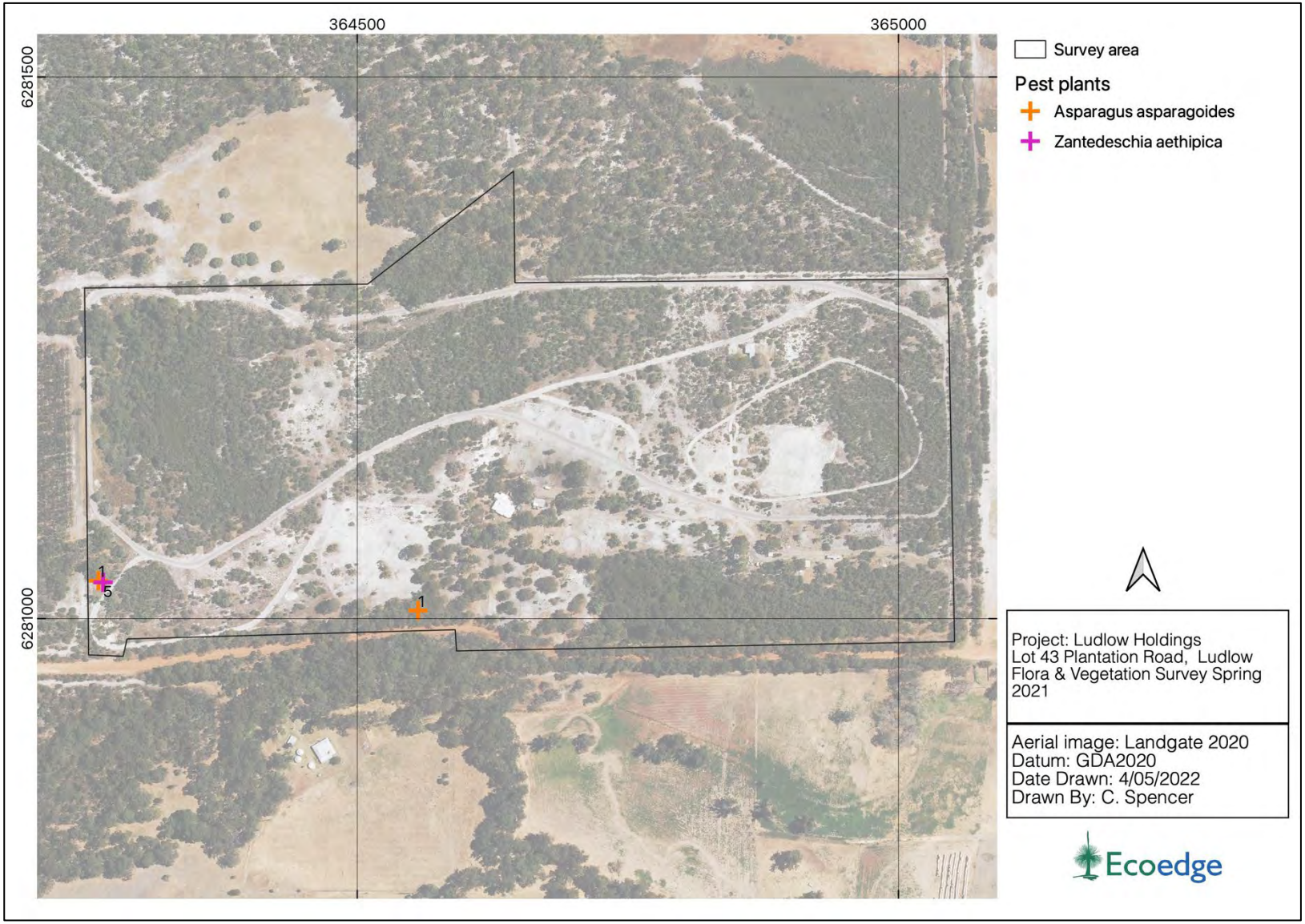

Figure 14. Declared pest plants within the survey area.

5.5 Vegetation Units

Five vegetation units were described for the survey area, with two of these units being described and mapped as sub-units. Vegetation unit D (comprised of sub-units D1 and D2) represents Banksia woodlands (in the case of D2, what was previously Banksia-dominated woodland) on sand. Unit E is comprised of *Corymbia calophylla*-dominated woodlands on loamy soils (sub-units E1 and E2).

These vegetation units and sub-units are described in **Table 13** and mapped in **Figure 15**. Photographs with accompanying descriptions are also provided in **Appendix 12**.

Aerial photography taken in 2004 shows that about 75% of the survey area had been cleared at that time. Since then, a large proportion of the cleared area has revegetated naturally to the extent that only 32% of the survey area has been mapped as cleared. The vegetation units dating from before the clearing are units A and C, sub-units E1 and E2 and a small portion of D1 and D2. Apart from the historical clearing, infestation by *Phytophthora cinnamomi* root-rot disease has caused major changes, particularly in vegetation unit D2, which is, in fact, a degraded form of D1 where all of the *Banksia attenuata* and *B. ilicifolia* have been removed by the disease.

Table 13. Description of vegetation units within the survey area.

Unit/Sub-unit	Description
A	Medium open forest of *Corymbia calophylla* over very open low woodland of *Xylomelum occidentale* over tall sparse shrubland of *Kunzea glabrescens* and *Xanthorrhoea brunonis* over *Pteridium esculentum* fernland or grassland of **Avena barbata*, **Briza maxima* and **Ehrharta longiflora* on grey sandy loam. [Condition mainly Degraded - Good].
B	Open low woodland of *Melaleuca preissiana* over *Leptocarpus coangustatus*, *Lepidosperma longitudinale* sedgeland with patches of *Kunzea glabrescens* tall shrubland over *Hypocalymma angustifolium* low shrubland over open grassland/forbland of introduced taxa on grey sand (winter wet). [Condition mainly Degraded - Good].
C	Very open medium woodland of *Corymbia calophylla* over medium woodland of *Melaleuca preissiana* over *Aotus gracillima*, *Astartea scoparia*, *Kunzea glabrescens* tall shrubland over *Hypocalymma angustifolium* low shrubland over open sedgeland of *Lepidosperma longitudinale*, *Pteridium esculentum* and Schoenus efoliatus open forbland on grey sand (winter damp). [Condition Degraded - Very Good].
D1	Medium woodland of *Eucalyptus marginata* over open low woodland of *Banksia attenuata* and/or *Banksia ilicifolia* and *Nuytsia floribunda* over *Kunzea glabrescens* tall shrubland over shrubland of *Adenanthos meisneri*, *Brachyloma preissii* and *Melaleuca thymoides* over *Dasypogon bromeliifolius* low shrubland and *Phlebocarya ciliata* open forbland on grey sand. {Degraded-Good]
D2	Medium very open woodland of *Agonis flexuosa, Banksia ilicifolia* or *Nuytsia floribunda* over tall shrubland of *Kunzea glabrescens* over low shrubland of *Acacia semitrullata*, *A. stenoptera*, *Adenanthos meisneri*, *Dasypogon bromeliifolius*, *Hypocalymma angustifolium*, *Melaleuca thymoides* and

	Xanthorrhoea brunonis over open forbland of *Patersonia occidentalis*, *Phlebocarya ciliata* on grey sand. [Condition mainly Completely Degraded-Good]
E1	Medium woodland of *Corymbia calophylla* over very open medium shrubland of *Kingia australis* over low shrubland of *Acacia pulchella*, *Hardenbergia comptoniana*, *Leucopogon propinquus*, *Macrozamia riedlei*, *Pimelea angustifolia*, and *Xanthorrhoea brunonis* over open forbland of *Conostylis aculeata*, *Craspedia variabilis* and *Senecio quadridentatus* and very open sedgeland of *Schoenus grandiflorus* and *Tetraria octandra* and scattered *Microlaena stipoides* low grass on grey sandy loam. [Condition Very Good to Excellent]. (Southern *Corymbia calophylla* woodlands TEC).
E2	Medium woodland of *Corymbia calophylla* and *Eucalyptus rudis* over low woodland of *Agonis flexuosa* and *Melaleuca preissiana* over open medium shrubland of *Astartea scoparia*, *Acacia extensa* and *Grevillea manglesioides* over low sedgeland of *Anarthria prolifera* and *Lepidosperma longitudinale* and open forbland of *Burchardia multiflora* and *Opercularia hispidula* on grey-brown sandy loam or red-brown loam. [Condition ranges from Completely Degraded-Excellent]. (Southern *Corymbia calophylla* woodlands on heavy soils TEC).

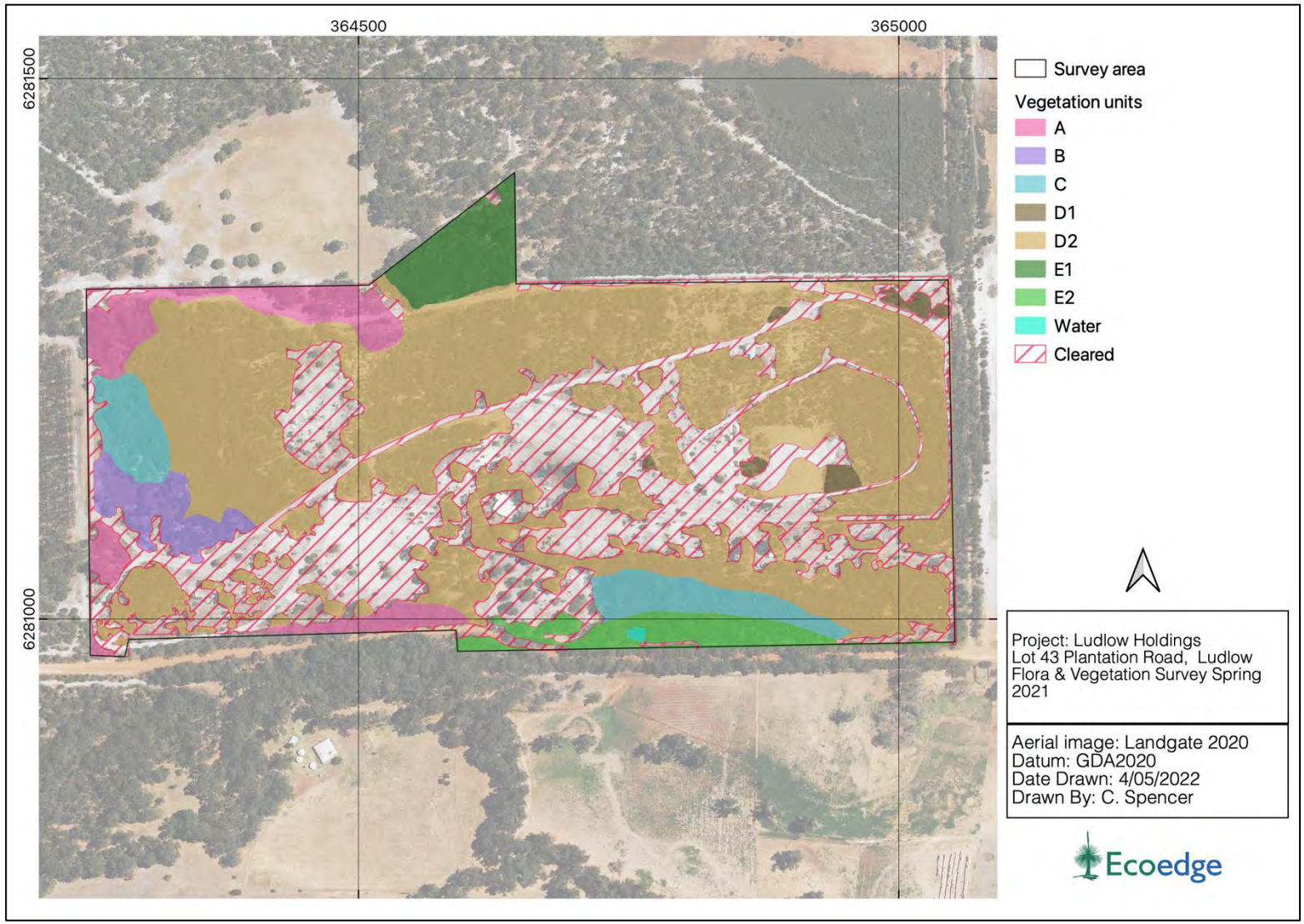

Figure 15. Vegetation units within the survey area.

5.6 Vegetation condition

Almost a third of the survey area (32%) was categorized as Cleared, with only scattered trees or shrubs. Another third of the survey area was in Good to Excellent condition. The Degraded and Completely Degraded areas represent areas that have only partly regenerated after the clearing 20-30 years ago.

A breakdown of the condition of the survey area vegetation is shown in (**Table 14**) and a breakdown of vegetation condition per unit is provided in **Table 15**. The distribution of vegetation condition in the survey area is mapped in **Figure 16**.

Table 14. Area and percentage of the survey area in vegetation condition classes.

Condition	Area (ha)	%
Excellent	0.70	3.93
Very Good	2.46	13.78
Good	5.44	30.45
Degraded	6.68	37.43
Completely Degraded	2.58	14.42
	17.86	100.00
Cleared	9.55	
Grand Total	27.41	

Table 15. Area and condition classes for the various vegetation unit within the survey area.

Vegetation Unit/Sub-unit	Cons Status	Condition	Area (ha)	%
A		Degraded	0.58	68.35
		Completely Degraded	0.27	31.65
		Total	**0.85**	100.00
B		Good	0.31	49.61
		Degraded	0.32	50.39
		Total	**0.63**	100.00
C		Very Good	0.96	82.50
		Good	0.07	6.29
		Degraded	0.10	8.53
		Completely Degraded	0.03	2.67
		Total	**1.16**	100.00
D1		Good	0.07	33.18
		Degraded	0.13	60.66
		Completely Degraded	0.01	6.16
		Total	**0.21**	100.00

Vegetation Unit/Sub-unit	Cons Status	Condition	Area (ha)	%
D2		Very Good	0.70	5.33
		Good	4.84	36.94
		Degraded	5.30	40.47
		Completely Degraded	2.26	17.26
		Total	**13.11**	100.00
E1	TEC (BC Act)	Excellent	0.70	64.19
	TEC (BC Act)	Good	0.14	12.64
	TEC (BC Act)	Degraded	0.25	23.17
		Total	**1.09**	100.00
E2	TEC (BC Act)	Very Good	0.80	100.00
		Total	**0.80**	**100.00**
		Total Remnant veg	**17.86**	
Water/Cleared			9.55	
		Grand Total	**27.41**	

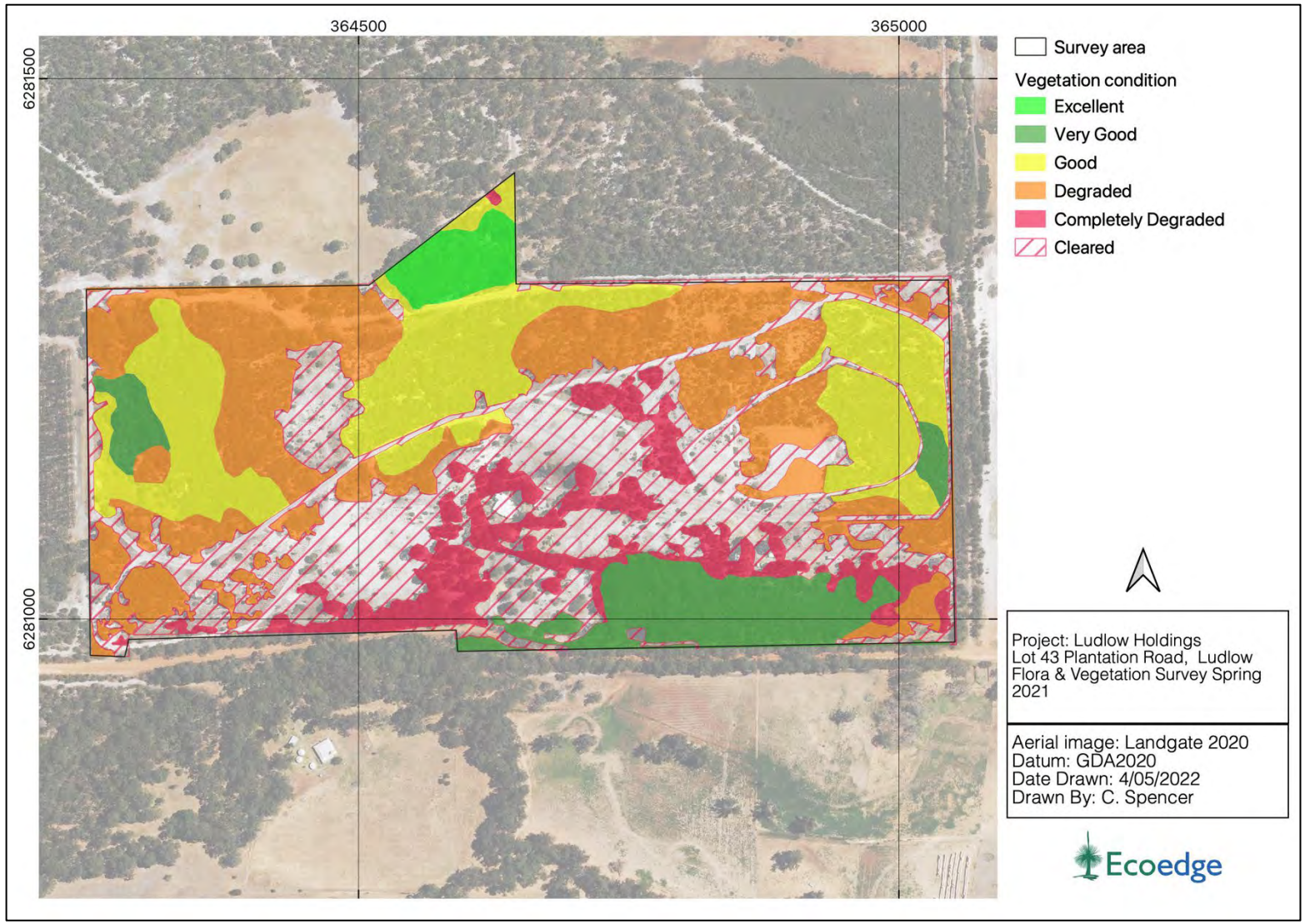

Figure 16. Vegetation condition within the survey area.

5.7 Conservation status of vegetation units

5.7.1 SWAFCT1b Southern *Corymbia calophylla* woodlands on heavy soils

Both sub-unit E1 and E2 (approximately 1.89 ha in total) resemble the State-listed TEC "Southern *Corymbia calophylla* woodlands on heavy soils" (SWAFCT1b) in that they are comprised of *C. calophylla* -dominated open forest on heavy soils, although they are quite different expressions of this floristic community type. Sub-unit E1 is a more typical variant of the community, with *Kingia australis* and *Xanthorrhoea brunonis* in the understorey and is on grey-brown sandy loam. Sub-unit E2, which has *Eucalyptus rudis* as a co-dominant, has some characteristics of the "water fringing communities" described in Webb et al. (2009). Indeed, the Ludlow River flows just to the south of the survey area. Nevertheless, sub-unit E2 is considered an occurrence of the State-listed TEC "Southern *Corymbia calophylla* woodlands on heavy soils". The areas of the TEC are shown in **Figure 17**.

Vegetation unit A is comprised of *Corymbia calophylla* woodland or open forest on sandy soils. Originally it would have been superficially similar to sub-unit E1, although with more understorey species typical of sandy soils. However, most understorey species have now been replaced by introduced grasses and forbs, and it is now in Degraded to Completely Degraded condition. Because of the paucity of native understorey species and the sandiness of the soil, it is not regarded as an occurrence of the "Southern *Corymbia calophylla* woodlands on heavy soils" TEC (SWAFCT1b). The DBCA reporting form is supplied in **Appendix 13**.

5.7.2 Banksia woodlands of the SCP

Sub-unit D1, which occurs on deep pale sands, contains either *Banksia attenuata* or *B. ilicifolia*. Originally it was either "Central *Banksia attenuata-Eucalyptus marginata* woodlands" (SWAFCT21a) or "Southern *Banksia attenuata* woodlands" (SWAFCT21b), but there are not enough remaining understorey taxa to be certain which. It is not regarded as an occurrence of State-level PEC and Federally-listed TEC "Banksia Woodlands of the Swan Coastal Plain" because no patches exceed the 2-ha minimum extent for vegetation in Good condition to qualify (DotEE 2016).

Sub-unit D2, which also occurs on pale, deep sands, represents areas of what was previously *Banksia attenuata*-dominated woodland where the Banksia has been removed either by historical clearing or by Phytophthora dieback disease. Even though this sub-unit was mapped as Very Good condition in some places, it is not regarded as an occurrence of the Banksia Woodlands of the Swan Coastal Plain PEC/TEC because of the almost complete absence of *Banksia attenuata* or *B. ilicifolia* (DotEE 2016).

5.7.3 Wetland units

Unit B comprises open low woodland dominated by *Melaleuca preissiana* and sedgeland, some of which appear to have been affected by historical clearing. This vegetation unit is

similar to the "*Melaleuca preissiana* damplands" (SWAFCT04) unit of Gibson et al. (1994). It is not regarded as a PEC or TEC.

Unit C, which is wetland vegetation comprised mainly of *Melaleuca preissiana* woodland, with occasional emergent *C. calophylla*, is again similar to the "*Melaleuca preissiana* damplands" (SWAFCT04) unit of Gibson et al. (1994). However, particularly in the southern part of the survey area, it contains species such as *Beaufortia squarrosa*, *Grevillea manglesioides* and *Taxandria fragrans*, which are not typical of that floristic community type. It is likely that unit C, particularly that portion in the southern part of the survey area, is an example of the "relictual wetlands" mentioned in Webb et al. (2009) in their report on the flora and vegetation of the Busselton Plain. Therefore, even though it does not resemble a PEC or TEC, vegetation unit C is regarded as of high conservation value.

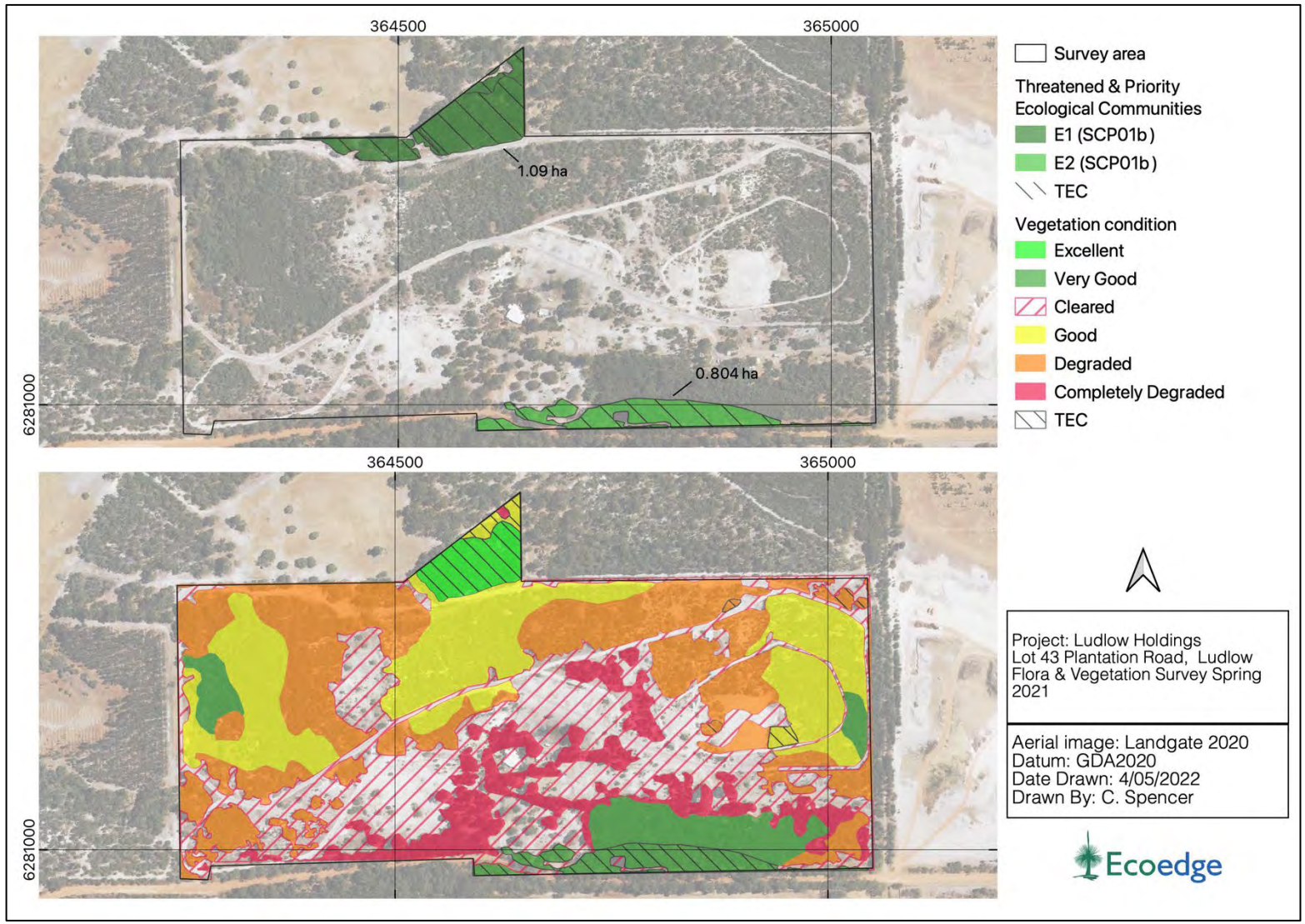

Figure 17. Vegetation condition of the TEC within the survey area.

6 Discussion and conclusions

6.1 Significance of the flora

Drakaea elastica is declared as Threatened flora under the Western Australian *BC Act* and is ranked as Critically Endangered (CR) under World Conservation Union (IUCN) criterion B2ab (ii,iii,iv,v) due to the severe fragmentation of populations and the continuing decline in the area, extent and quality of habitat and number of mature individuals (DEC, 2009). *D. elastica* is also listed as Endangered under the EPBC Act.

The main threats are land clearing, degradation and fragmentation of habitat, edge effects, density of ground-level vegetation, grazing, inappropriate disturbance, construction and maintenance work, rubbish dumping, weeds, disease, inappropriate fire regimes, poor recruitment, and salinity (DEC 2009).

The population of *D. elastica* within the survey area is one of the largest known (DEC 2009). As such, it is of particular importance for the conservation of this threatened species.

The priority 1 *Dillwynia* sp. Capel (PA Jurjevich 1771) is usually restricted to the Blackwood Plateau, and the occurrence in the survey area is one of the few known on the Swan Coastal Plain.

Boronia tetragona (priority 3) is found over a narrow range of about 40 km on the Swan Coastal Plain south of Bunbury and on the adjacent northern Blackwood Plateau. Many populations are in small reserves and native vegetation remnants on the coastal plain and therefore are vulnerable.

Acacia semitrullata, a priority 4 species, while not uncommon on the Swan Coastal Plain, is often restricted to road verges or remnant vegetation where the tenure is not secure for conservation purposes. Most of the *A. semitrullata* plants in the survey area occur in vegetation that is in Good or Very Good condition, and it is recommended that this vegetation, along with the Priority flora in it, is protected.

The priority 4 taxon *Eucalyptus rudis* subsp. *cratyantha*, which is found in the southern wetland (unit E), is restricted to the southern Swan Coastal Plain, south of Perth. Many populations consist only of “paddock” trees where there is no regeneration, so populations in native vegetation have particular value.

Several disjunct or “range end” taxa within the survey area, such as *Beaufortia squarrosa* and *Taxandria fragrans,* occur in vegetation unit C, which resembles the relictual wetland communities described by Webb et al. (2009). Range end species are at (or near) the limit of their distribution. As such, they may have genetic characteristics important in understanding the development and genetic diversity within a taxon.

A range extension species, *Drosera zonaria*, was found at several locations in vegetation unit D2. This species of taxon is normally found from just north of Perth through the Wheatbelt to the east of Esperance. Within its typical range, *D. zonaria* is common however, the population within the survey area is over 200 km from the nearest other known occurrences. As such, it is a significant outlier and possibly a genetic isolate.

The occurrence of *Conospermum teretifolium* within the survey area is one of the most northerly known, whereas the *Calytrix fraseri* in the survey area is one of the most southerly.

Macarthuria apetala occurs along the south coast and on the Swan Coastal Plain. The occurrence within the survey area would be one of the most southerly on the Swan Coastal Plain.

Sporadanthus strictus has a mainly south coast distribution from near Albany to Margaret River. The population in the survey area is one of the most northerly known and is therefore important in understanding the genetics of this taxon.

6.2 Significance of the vegetation

Both sub-units E1 and E2 are considered to represent occurrences of the "Southern *Corymbia calophylla* woodlands on heavy soils", a State-listed TEC. The occurrences of this vegetation in the survey area are mainly in Very Good to Excellent condition. Consequently, they are protected under the BC Act. Area statements for these vegetation units are provided in **Table 14** above.

Unit C, which is mainly comprises of woodland dominated by *Melaleuca preissiana*, while not a PEC or TEC, is probably one of the relictual wetlands of the Busselton Plain mentioned in Webb et al. (1994). Several disjunct or "range end" taxa, including *Beaufortia squarrosa*, *Sporadanthus strictus* and *Taxandria fragrans* occur in this vegetation unit. It is recommended that this wetland vegetation is protected during any development within the survey area.

6.3 Vegetation complexes and associations

Two vegetation complexes are mapped to occur across the survey area: the Southern River complex and the Abba Complex, with the Southern River complex making up the bulk of the survey area. The vegetation units described for the survey are broadly representative of both described complexes. The Southern River Complex has less than 30% of its pre-European extent remaining. The Abba Complex has less than 10% remaining.

There is one of Beard's vegetation associations mapped within the survey area: association 1000 'Mosaic: Medium forest; jarrah-marri / Low woodland; banksia / Low forest; teatree (Melaleuca spp.)'. This association is a reasonable match for survey area vegetation units. It

has less than the desired target of 30% of its pre-European extent remaining at all tiers of assessment.

6.4 Ecological linkages

Portions of the survey area are contiguous with vegetation linked to two formally mapped Regional ecological linkages which occur to the north of the survey area (Molloy et al. 2009). Accordingly, these areas have been assigned the highest tier proximity value ratings of 1a, 1b and 1c. Much of the area was not assigned a proximity value rating by Molloy et al. (2009) as, at the time of assessment, this was mostly cleared land. Should the site be reassessed, these formally cleared areas have regrown and would likely be assigned similarly high proximity value ratings.

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

6.5 Waterways and wetlands

There are no mapped Conservation category or Resource Enhancement wetlands within the boundary of the survey area (DBCA 2018). The nearest Conservation category and Resource Enhancement wetlands are both located approximately 920 m north-northeast of the survey area.

Vegetation units B and C and sub-unit E2, however, are considered to represent wetland or riparian vegetation because of the presence of typical wetland species such as the trees *Eucalyptus rudis* and *Melaleuca preissiana* and shrubs such as *Aotus gracillima* and *Astartea scoparia* and *Grevillea manglesioides*.

6.6 Environmentally Sensitive Areas

The survey area does not intersect a mapped ESA (DWER 2020). The nearest ESA is located approximately 830 m to the southwest of the survey area.

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.

As per the EP Act, ESA's which include threatened species should include a 50m buffer around the threatened species.

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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.	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. **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.	The taxon is known from within a five to ten 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. **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. Te 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.	The taxon was not found and is unlikely to be present for one or more of the following reasons: **U1.** No suitable habitat was observed, and the taxon is known to be restricted to a narrow and clearly defined habitat type. **U2.** Suitable or potential habitat was present and appropriately searched, but the taxon was not observed. **U3.** Suitable habitat 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
Drakaea elastica	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**	**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. 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 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 *Biodiversity Conservation Act 2016.*	
T	(T) CR – Critically endangered 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.
	(T) EN - Endangered 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.
	(T) VU - Vulnerable 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) Priority species – possible threatened communities.	
P1	Poorly known communities 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.

Conservation code	Category
P2	Poorly known communities 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.
P3	Poorly known communities 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. 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.
P4	Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring. a) Rare. 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	Conservation dependent ecological communities Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

Appendix 5. Definitions of conservation codes for Threatened and Priority flora.

Conservation code	Category
(T) Threatened species pursuant to Sect 19 of the BC Act 2016.	
T	(T) CR – Critically endangered Threatened species considered to be "*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*".
	(T) EN - Endangered Threatened species considered to be "*facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines*".
	(T) VU - Vulnerable Threatened species considered to be "*facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines*".
(P) Priority species – possible Threatened species.	
P1	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.
P2	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.

Conservation code	Category
P3	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.
P4	(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

Appendix 6. 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 7. Protected Matters Search Tool and NatureMap reports

Australian Government

Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

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

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

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

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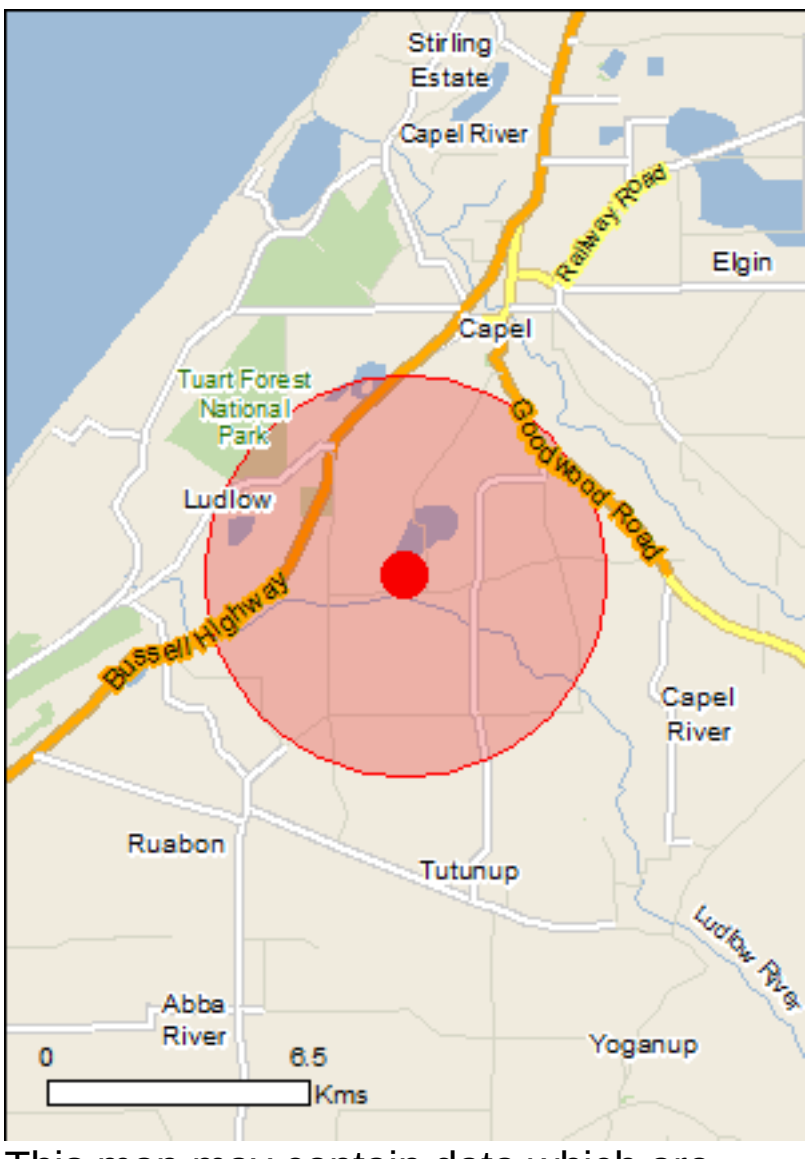

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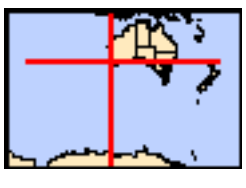

Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	33
Listed Migratory Species:	10

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	13
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	4
Regional Forest Agreements:	None
Invasive Species:	25
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Vasse-wonnerup system	Within 10km of Ramsar

Listed Threatened Ecological Communities [Resource Information]

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

Name	Status	Type of Presence
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community likely to occur within area
Clay Pans of the Swan Coastal Plain	Critically Endangered	Community likely to occur within area
Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain ecological community	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat likely to occur within area
Calyptorhynchus baudinii Baudin's Cockatoo, Long-billed Black-Cockatoo [769]	Endangered	Breeding known to occur within area
Calyptorhynchus latirostris Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area
Fish		

Name	Status	Type of Presence
Nannatherina balstoni Balston's Pygmy Perch [66698]	Vulnerable	Species or species habitat may occur within area
Mammals		
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
Pseudocheirus occidentalis Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Breeding known to occur within area
Other		
Westralunio carteri Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat known to occur within area
Plants		
Banksia nivea subsp. uliginosa Swamp Honeypot [82766]	Endangered	Species or species habitat likely to occur within area
Banksia squarrosa subsp. argillacea Whicher Range Dryandra [82769]	Vulnerable	Species or species habitat likely to occur within area
Brachyscias verecundus Ironstone Brachyscias [81321]	Critically Endangered	Species or species habitat may occur within area
Caladenia busselliana Bussell's Spider-orchid [24369]	Endangered	Species or species habitat likely to occur within area
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat likely to occur within area
Chamelaucium sp. S coastal plain (R.D.Royce 4872) Royce's Waxflower [87814]	Vulnerable	Species or species habitat known to occur within area
Darwinia whicherensis Abba Bell [83193]	Endangered	Species or species habitat likely to occur within area
Diuris drummondii Tall Donkey Orchid [4365]	Vulnerable	Species or species habitat known to occur within area
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat likely to occur within area
Drakaea elastica Glossy-leafed Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat known to occur within area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat may occur within area
Gastrolobium papilio Butterfly-leaved Gastrolobium [78415]	Endangered	Species or species habitat may occur within area
Grevillea maccutcheonii McCutcheon's Grevillea [64522]	Endangered	Species or species habitat likely to occur within area
Lambertia echinata subsp. occidentalis Western Prickly Honeysuckle [64528]	Endangered	Species or species habitat may occur within

Name	Status	Type of Presence
		area
Petrophile latericola		
Laterite Petrophile [64532]	Endangered	Species or species habitat known to occur within area
Synaphea sp. Fairbridge Farm (D. Papenfus 696)		
Selena's Synaphea [82881]	Critically Endangered	Species or species habitat likely to occur within area
Synaphea stenoloba		
Dwellingup Synaphea [66311]	Endangered	Species or species habitat likely to occur within area
Tetraria australiensis		
Southern Tetraria [10137]	Vulnerable	Species or species habitat likely to occur within area
Verticordia densiflora var. pedunculata		
Long-stalked Featherflower [55689]	Endangered	Species or species habitat known to occur within area
Verticordia plumosa var. vassensis		
Vasse Featherflower [55804]	Endangered	Species or species habitat likely to occur within area

Listed Migratory Species [Resource Information]

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

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla cinerea		
Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat likely to occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris canutus		
Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus		
Osprey [952]		Species or species habitat likely to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Capel	WA
NTWA Bushland covenant (0175)	WA
Tuart Forest	WA
Unnamed WA50190	WA

Invasive Species [Resource Information]

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

Name	Status	Type of Presence
Birds		
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Brachiaria mutica Para Grass [5879]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
McCarleys Swamp (Ludlow Swamp)	WA

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-33.60071 115.54112

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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NatureMap
Mapping Western Australia's biodiversity

Plantation Rd Significant flora NatureMap Report 5km

Created By Guest user on 26/08/2021

Kingdom Plantae
Conservation Status Conservation Taxon (T, X, IA, S, P1-P5)
Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 115° 32' 28" E,33° 36' 03" S
Buffer 5km

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
1.	3339	*Acacia flagelliformis*		P4	
2.	3537	*Acacia semitrullata*		P4	
3.	43201	*Adelphacme minima*		P3	
4.	4586	*Amperea micrantha*		P2	
5.	7829	*Angianthus drummondii*		P3	
6.	141	*Aponogeton hexatepalus (Stalked Water Ribbons)*		P4	
7.	20026	*Blennospora doliiformis*		P3	
8.	16313	*Boronia anceps*		P3	
9.	17804	*Boronia tetragona*		P3	
10.	1596	*Caladenia huegelii (Grand Spider Orchid)*		T	
11.	13862	*Caladenia speciosa*		P4	
12.	1213	*Calectasia cyanea (Blue Tinsel Lily)*		T	
13.	35796	*Calothamnus quadrifidus subsp. teretifolius*		P4	
14.	19338	*Chamaescilla gibsonii*		P3	
15.	17686	*Chordifex gracilior*		P3	
16.	34765	*Darwinia whicherensis*		T	
17.	1639	*Drakaea elastica (Glossy-leaved Hammer Orchid)*		T	
18.	41803	*Eryngium sp. Ferox (G.J. Keighery 16034)*		P3	
19.	1945	*Franklandia triaristata (Lanoline Bush)*		P4	
20.	14011	*Grevillea brachystylis subsp. brachystylis*		P3	
21.	14526	*Grevillea elongata*		T	
22.	16522	*Isopogon formosus subsp. dasylepis*		P3	
23.	20462	*Jacksonia gracillima*		P3	
24.	29492	*Leucopogon sp. Busselton (D. Cooper 243)*		P2	
25.	13779	*Loxocarya magna*		P3	
26.	33742	*Microtis quadrata*		P4	
27.	2874	*Montia australasica*		P2	
28.	36200	*Ornduffia submersa*		P4	
29.	14085	*Petrophile latericola*		T	
30.	974	*Schoenus benthamii*		P3	
31.	999	*Schoenus loliaceus*		P2	
32.	1003	*Schoenus natans (Floating Bog-rush)*		P4	
33.	25800	*Stylidium paludicola*		P3	
34.	7803	*Stylidium striatum (Fan-leaved Triggerplant)*		P4	
35.	16769	*Synaphea hians*		P3	
36.	16862	*Synaphea petiolaris subsp. simplex*		P3	
37.	1033	*Tetraria australiensis*		T	
38.	1334	*Thysanotus glaucus*		P4	
39.	44444	*Tripterococcus sp. Brachylobus (A.S. George 14234)*		P4	
40.	12392	*Verticordia attenuata*		P3	
41.	12412	*Verticordia densiflora var. pedunculata*		T	
42.	14714	*Verticordia lindleyi subsp. lindleyi*		P4	

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

Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area

5 - Priority 5

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

Appendix 8. Pre and post likelihood of occurrence.

SPECIES	CATEGORY*	FLOWERING	DESCRIPTION AND HABITAT	Pre-likelihood	Post Survey Likelihood
Dillwynia sp. Capel (PA Jurjevich 1771)	P1	Sept - Octo	Erect, open, spreading shrub, to 2 m high. Fl. yellow & orange & red & pink, Sep to Oct. Littered grey loamy sand, rocky soils.	-	Recorded
Amperea micrantha	P2	Oct to Nov	Low, spreading, bushy perennial, herb, 0.1-0.3 m high. Fl. brown. Sandy soils.	Possible	Unlikely (U2)
Leucopogon sp. Busselton (D. Cooper 243)	P2	Aug- Sept	Slender, erect shrub to 70 cm; flowers white. *Pericalymma ellipticum* wet shrubland, Marri-Jarrah woodland.	Possible	Unlikely (U2)
Montia australasica	P2	Nov-Mar	Terrestrial or aquatic perennial herb, rooting from leaf nodes, terrestrial plants densely tufted and carpeting, aquatics loose and open. Fl. White - pale pink. Wet soil in permanent or winter wet swamps or aquatic in slow moving watercourses.	Possible	Unlikely (U2)
Schoenus loliaceus	P2	Aug to Nov	Annual, grass-like or herb (sedge), 0.03-0.06 m high. Fl. Sandy soils. Winter-wet depressions.	Possible	Unlikely (U2)
Stylidium paludicola	P3	Oct to 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)

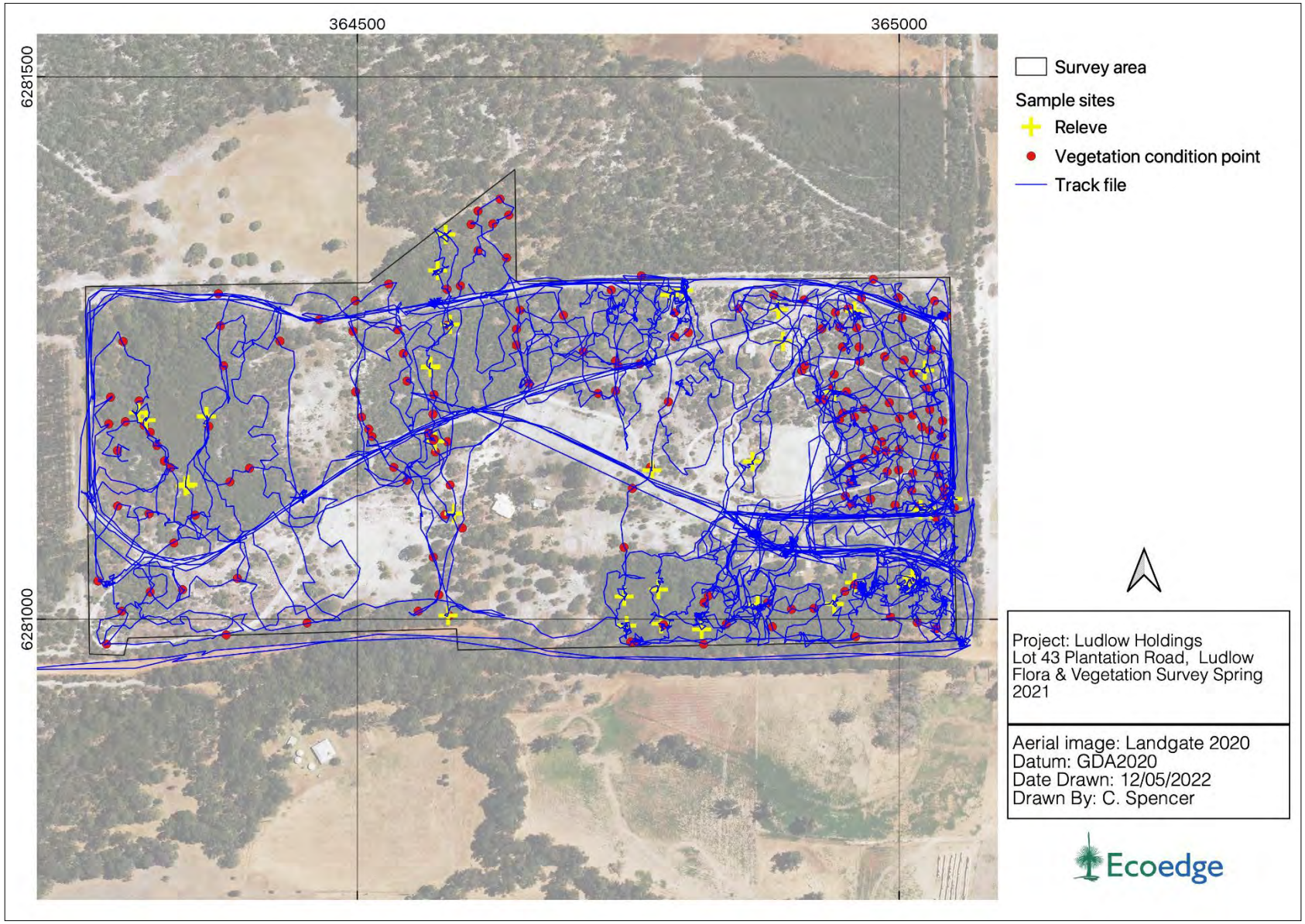
SPECIES	CATEGORY*	FLOWERING	DESCRIPTION AND HABITAT	Pre-likelihood	Post Survey Likelihood
Verticordia attenuata	P3	Dec or Jan to May	Shrub, 0.4-1 m high. Fl. pink. White or grey sand. Winter-wet depressions.	Likely	Unlikely (U2)
Adelphacme minima	P3		Erect annual, herb, 0.03-0.05m high. Fl. white. Grey sand, wet flats, swamps.	Possible	Unlikely (U2)
Boronia anceps	P3	Sep to 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)
Boronia tetragona	P3	Oct to Dec	Perennial, herb, 0.3-0.7 m high, leaves sessile, entire, with papillate margins, branches quadrangular, sepals ciliate. Fl. pink & red. Black/white sand, laterite, brown sandy loam. Winter-wet flats, swamps, open woodland.	Possible	Recorded
Grevillea brachystylis subsp. *brachystylis*	P3	Sep to Dec or Jan	Prostrate or erect, non-lignotuberous shrub, 0.1-2 m high. Fl. red. Sand, sandy clay. Swampy situations, stream banks.	Possible	Unlikely (U2)
Isopogon formosus subsp. *dasylepis*	P3	Jun to 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.	Possible	Unlikely (U2)
Jacksonia gracillima	P3	Oct- Nov	Prostrate, spreading or scrambling, shrub, spindly shrub (broom-like), to 1(-1.5) m high. Fl. orange, yellow, rose pink. Sand, loam, clay. Flat, lower slopes, some winter wet.	Possible	Unlikely (U2)
Loxocarya magna	P3	Sep or Nov	Rhizomatous, perennial, herb (sedge-like), 0.5-1.5 m high. Fl. ? Sand, loam, clay, ironstone. Seasonally inundated or damp habitats.	Possible	Unlikely (U2)

SPECIES	CATEGORY*	FLOWERING	DESCRIPTION AND HABITAT	Pre-likelihood	Post Survey Likelihood
Olearia strigosa	P3	Dec or Jan to May	Erect shrub, 0.5-1.5 m high. Fl. blue-purple. Sandy loam. Open forest	Possible	Unlikely (U2)
Schoenus benthamii	P3	Oct to 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)
Synaphea hians	P3	Jul or Sep to Nov	Prostrate or decumbent shrub, 0.15-0.6 m high, to 1 m wide. Fl. yellow. Sandy soils. Rises.	Possible	Unlikely (U2)
Synaphea petiolaris subsp. *simplex*	P3	Sep to Oct	Tufted shrub, 0.1-0.6 m high. Fl. yellow. Sandy soils. Flats, winter-wet areas.	Possible	Unlikely (U2)
Chordifex gracilior	P3	Sept to Dec	Rhizomatous, erect perennial, herb, 0.3-0.5 m high. Fl. brown. Peaty sand. Swamps.	Possible	Unlikely (U2)
Angianthus drummondii	P3	Oct to Dec	Erect annual, herb, to 0.1 m high. Fl. yellow. Grey or brown clay soils, ironstone. Seasonally wet flats.	Unlikely	Unlikely (U1)
Blennospora doliiformis	P3	Oct to Nov	Erect annual, herb, to 0.15 m high. Fl. yellow. Grey or red clay soils over ironstone. Seasonally wet flats.	Unlikely	Unlikely (U2)
Chamaescilla gibsonii	P3	Sept	Clumped tuberous, herb. Fl. blue, Sep. Clay to sandy clay. Winter-wet flats, shallow water-filled claypans.	Unlikely	Unlikely (U2)
Eryngium 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.	Unlikely	Unlikely (U2)
Acacia flagelliformis	P4	May-Sept	Rush-like, erect or sprawling shrub, 0.3-0.75(-1.6) m high. Fl. yellow. Sandy soils. Winter-wet areas.	Possible	Unlikely (U2)
Acacia semitrullata	P4	May to 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.	Possible	Recorded

SPECIES	CATEGORY*	FLOWERING	DESCRIPTION AND HABITAT	Pre-likelihood	Post Survey Likelihood
Aponogeton hexatepalus	P4	Jul to Oct	Rhizomatous or cormous, aquatic perennial, herb, leaves floating. Fl. green-white. Mud. Freshwater: ponds, rivers, claypans.	Possible	Unlikely (U2)
Caladenia speciosa	P4	Sep to Oct	Tuberous, perennial, herb, 0.35-0.6 m high. Fl. white-pink. White, grey or black sand	Possible	Unlikely (U2)
Calothamnus quadrifidus subsp. *teretifolius*	P4	Sept to Dec	Tall woody erect shrub to 3 m, conifer like foliage, ornamental Fl. bright red. Sand, loam, clay, Winter-wet flats.	Possible	Unlikely (U2)
Franklandia triaristata	P4	Aug to Oct	Erect, lignotuberous shrub, 0.2-1 m high. Fl. white-cream-yellow/brown-purple. White or grey sand.	Possible	Unlikely (U2)
Microtis quadrata	P4	Dec-Jan	Slender erect annual herb, 0.3 - 0.8 m high, up to 100 yellowish-green flowers 2.5 - 3mm across. Clay based coastal flats.	Possible	Unlikely (U1)
Ornduffia submersa	P4	Sep to Oct	Tuberous emergent aquatic perennial dwarf shrub, height to 35 cm; flowers white; leaves floating on surface of water. Clay-based ponds and swamps (semi-aquatic)	Possible	Unlikely (U2)
Schoenus natans	P4	Oct	Aquatic annual, grass-like or herb (sedge), 0.3 m high. Fl. brown. Winter-wet depressions	Possible	Unlikely (U2)
Thysanotus glaucus	P4	Oct to Dec or Jan to Mar	Caespitose, glaucose perennial, herb, 0.1-0.2 m high. Fl. Purple. White, grey or yellow sand, sandy gravel.	Possible	Unlikely (U2)
Tripterococcus sp. *brachylobus* (A.S. George 14234)	P4	Nov-Dec or Feb	Erect perennial herb to 0.3-0.7 m high Fl. yellow. Grey/black sand. Winter wet depressions	Possible	Unlikely (U2)
Verticordia lindleyi subsp. *lindleyi*	P4	May or Nov to Dec or Jan	Erect shrub, 0.2-0.75 m high. Fl. Pink. Sand, sandy clay. Winter-wet depressions	Possible	Unlikely (U2)

SPECIES	CATEGORY*	FLOWERING	DESCRIPTION AND HABITAT	Pre-likelihood	Post Survey Likelihood
Caladenia huegelii	T (EN)	Sep to Oct	Tuberous, perennial, herb, 0.25-0.6 m high. Fl. green & cream & red. Grey or brown sand, clay loam.	Possible	Unlikely (U2)
Drakaea elastica	T (EN)	Oct to 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.	Possible	Recorded
Verticordia densiflora var. *pedunculata*	T (EN)	Dec or 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)
Darwinia whicherensis	T (EN)	Oct to Nov	Erect shrub to 0.7 m high. Fl. green, red. Sand/clay over ironstone. Winter wet/damp.	Unlikely	Unlikely (U2)
Petrophile latericola	T (EN)	Nov	Multi-stemmed shrub, 0.4-1.5 m high. Fl. yellow, Red lateritic clay. Winter-wet flats	Unlikely	Unlikely (U2)
Grevillea elongata	T (VU)	Oct	Shrub, 1.5-2 m high. Fl. white-cream. Gravelly clay, sandy clay, sand. Road verges, swamps, creek banks.	Possible	Unlikely (U2)
Morelotia australiensis	T (VU)	Nov to 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.	Unlikely	Unlikely (U2)

Appendix 9. Track log and relevé points.



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

#	FAMILY_NAME	SPECIES	COMMENT	NATURALISED	CONSV_CODE
1	Aizoaceae	*Carpobrotus edulis*		*	
2	Anarthriaceae	*Anarthria prolifera*			
3	Anarthriaceae	*Lyginia imberbis*			
4	Apiaceae	*Xanthosia candida*			
5	Araceae	*Zantedeschia aethiopica*		*	
6	Asparagaceae	*Asparagus asparagoides*		*	
7	Asparagaceae	*Chamaescilla corymbosa*			
8	Asparagaceae	*Dichopogon preissii*			
9	Asparagaceae	*Lomandra preissii*			
10	Asparagaceae	*Thysanotus manglesianus*			
11	Asteraceae	*Arctotheca calendula*		*	
12	Asteraceae	*Craspedia variabilis*			
13	Asteraceae	*Hypochaeris glabra*		*	
14	Asteraceae	*Lagenophora huegelii*			
15	Asteraceae	*Quinetia urvillei*			
16	Asteraceae	*Senecio diaschides*			
17	Asteraceae	*Senecio quadridentatus*			
18	Asteraceae	*Ursinia anthemoides*		*	
19	Colchicaceae	*Burchardia congesta*			
20	Colchicaceae	*Burchardia multiflora*			
21	Commelinaceae	*Cartonema philydroides*			
22	Crassulaceae	*Crassula colorata*			
23	Cyperaceae	*Isolepis marginata*			
24	Cyperaceae	*Lepidosperma longitudinale*			
25	Cyperaceae	*Lepidosperma squamatum*			
26	Cyperaceae	*Mesomelaena tetragona*			
27	Cyperaceae	*Schoenus efoliatus*			
28	Cyperaceae	*Schoenus grandiflorus*			
29	Cyperaceae	*Tetraria octandra*			
30	Dasypogonaceae	*Dasypogon bromeliifolius*			
31	Dasypogonaceae	*Kingia australis*			
32	Dennstaedtiaceae	*Pteridium esculentum*			
33	Dilleniaceae	*Hibbertia cunninghamii*			
34	Dilleniaceae	*Hibbertia ferruginea*			
35	Dilleniaceae	*Hibbertia hypericoides*			
36	Dilleniaceae	*Hibbertia racemosa*			
37	Dilleniaceae	*Hibbertia vaginata*			
38	Droseraceae	*Drosera drummondii*			
39	Droseraceae	*Drosera enodes*			
40	Droseraceae	*Drosera erythrorhiza*			
41	Droseraceae	*Drosera glanduligera*			

#	FAMILY_NAME	SPECIES	COMMENT	NATURALISED	CONSV_CODE
42	Droseraceae	*Drosera macrantha*			
43	Droseraceae	*Drosera pallida*			
44	Droseraceae	*Drosera rosulata*			
45	Droseraceae	*Drosera zonaria*			
46	Ericaceae	*Andersonia caerulea*			
47	Ericaceae	*Brachyloma preissii*			
48	Ericaceae	*Conostephium pendulum*			
49	Ericaceae	*Leucopogon australis*			
50	Ericaceae	*Leucopogon conostephioides*			
51	Ericaceae	*Leucopogon glabellus*			
52	Ericaceae	*Leucopogon cordatus*	herb. spec.		
53	Ericaceae	*Sphenotoma gracilis*	sterile		
54	Ericaceae	*Styphelia conostephioides*			
55	Ericaceae	*Styphelia propinqua*			
56	Fabaceae	*Acacia extensa*			
57	Fabaceae	*Acacia huegelii*			
58	Fabaceae	*Acacia pulchella*			
59	Fabaceae	*Acacia semitrullata*			4
60	Fabaceae	*Acacia stenoptera*			
61	Fabaceae	*Aotus gracillima*			
62	Fabaceae	*Bossiaea eriocarpa*			
63	Fabaceae	*Daviesia divaricata subsp. divaricata*			
64	Fabaceae	*Dillwynia* sp. Capel (P.A. Jurjevich 1771)			1
65	Fabaceae	*Euchilopsis linearis*			
66	Fabaceae	*Gompholobium tomentosum*			
67	Fabaceae	*Hardenbergia comptoniana*			
68	Fabaceae	*Jacksonia horrida*			
69	Fabaceae	*Mirbelia dilatata*			
70	Fabaceae	*Ornithopus compressus*		*	
71	Goodeniaceae	*Dampiera pedunculata*			
72	Haemodoraceae	*Anigozanthos manglesii*			
73	Haemodoraceae	*Conostylis aculeata*			
74	Haemodoraceae	*Conostylis serrulata*			
75	Haemodoraceae	*Phlebocarya ciliata*			
76	Hemerocallidaceae	*Caesia micrantha*			
77	Hemerocallidaceae	*Johnsonia lupulina*			
78	Iridaceae	*Patersonia occidentalis*			
79	Iridaceae	*Romulea rosea*		*	
80	Juncaceae	*Juncus pallidus*			
81	Lamiaceae	*Hemiandra pungens*			
82	Loganiaceae	*Phyllangium paradoxum*			
83	Loranthaceae	*Nuytsia floribunda*			
84	Macarthuriaceae	*Macarthuria apetala*	cons. sig.		
85	Myrtaceae	*Agonis flexuosa*			

#	FAMILY_NAME	SPECIES	COMMENT	NATURALISED	CONSV_CODE
86	Myrtaceae	*Astartea scoparia*			
87	Myrtaceae	*Beaufortia squarrosa*			
88	Myrtaceae	*Calytrix fraseri*			
89	Myrtaceae	*Corymbia calophylla*			
90	Myrtaceae	*Eremaea pauciflora*			
91	Myrtaceae	*Eucalyptus marginata*			
92	Myrtaceae	*Eucalyptus rudis* subsp. *cratyantha*			4
93	Myrtaceae	*Hypocalymma angustifolium*			
94	Myrtaceae	*Hypocalymma ericifolium*			
95	Myrtaceae	*Hypocalymma robustum*			
96	Myrtaceae	*Kunzea glabrescens*			
97	Myrtaceae	*Melaleuca preissiana*			
98	Myrtaceae	*Melaleuca rhaphiophylla*			
99	Myrtaceae	*Melaleuca thymoides*			
100	Myrtaceae	*Taxandria fragrans*			
101	Orchidaceae	*Caladenia flava*			
102	Orchidaceae	*Diuris corymbosa*			
103	Orchidaceae	*Diuris cruenta*			
104	Orchidaceae	*Drakaea elastica*			T
105	Orchidaceae	*Drakaea glyptodon*			
106	Orchidaceae	*Elythranthera brunonis*			
107	Orchidaceae	*Leporella fimbriata*			
108	Orchidaceae	*Paracaleana nigrita*			
109	Orchidaceae	*Pterostylis glebosa*			
110	Orchidaceae	*Pterostylis pyramidalis*			
111	Orchidaceae	*Pterostylis vittata*			
112	Orchidaceae	*Pterostylis* sp. Bloated snail orchid (W. Jackson BJ 486)			
113	Orchidaceae	*Pyrorchis nigricans*			
114	Orchidaceae	*Thelymitra antennifera*			
115	Orchidaceae	*Thelymitra crinita*			
116	Orchidaceae	*Thelymitra macrophylla*			
117	Orchidaceae	*Thelymitra vulgaris*			
118	Papaveraceae	*Fumaria capreolata*		*	
119	Poaceae	*Amphipogon turbinatus*			
120	Poaceae	*Anthoxanthum odoratum*		*	
121	Poaceae	*Austrostipa compressa*			
122	Poaceae	*Bromus diandrus*		*	
123	Poaceae	*Ehrharta longiflora*		*	
124	Poaceae	*Microlaena stipoides*			
125	Proteaceae	*Adenanthos meisneri*			
126	Proteaceae	*Adenanthos obovatus*			
127	Proteaceae	*Banksia attenuata*			
128	Proteaceae	*Banksia grandis*			
129	Proteaceae	*Banksia ilicifolia*			

#	FAMILY_NAME	SPECIES	COMMENT	NATURALISED	CONSV_CODE
130	Proteaceae	*Grevillea manglesioides* subsp. *manglesioides*			
131	Proteaceae	*Stirlingia latifolia*			
132	Restionaceae	*Chaetanthus aristatus*			
133	Restionaceae	*Chordifex laxus*			
134	Restionaceae	*Cytogonidium leptocarpoides*			
135	Restionaceae	*Desmocladus fasciculatus*			
136	Restionaceae	*Desmocladus flexuosus*			
137	Restionaceae	*Hypolaena exsulca*			
138	Restionaceae	*Hypolaena pubescens*			
139	Restionaceae	*Leptocarpus coangustatus*			
140	Restionaceae	*Sporadanthus strictus*	*cons. sig.*		
141	Rubiaceae	*Opercularia hispidula*			
142	Rutaceae	*Boronia crenulata* subsp. *pubescens*			
143	Rutaceae	*Boronia dichotoma*			
144	Rutaceae	*Boronia tetragona*			3
145	Rutaceae	*Philotheca spicata*			
146	Stylidiaceae	*Stylidium repens*			
147	Stylidiaceae	*Stylidium hesperium*			
148	Thymelaeaceae	*Pimelea angustifolia*			
149	Xanthorrhoeaceae	*Xanthorrhoea brunonis*			
150	Zamiaceae	*Macrozamia riedlei*			

Appendix 11. Reporting forms for Threatened and Priority flora.

Department of Biodiversity, Conservation and Attractions

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: Drakaea elastica **TPFL Pop. No:**

OBSERVATION DATE: 3/09/2021 **CONSERVATION STATUS:** T New population ☒

OBSERVER/S: Russell Smith & Colin Spencer **PHONE:** 0447809124

ROLE: botanist **ORGANISATION:** Ecoedge

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

Lot 4499, Plantation Road, in the shire of Capel

Reserve No:

DBCA DISTRICT: **LGA:** Capel Land manager present: ☐

DATUM:
GDA94 / MGA94 ☐
AGD84 / AMG84 ☐
WGS84 ☐
Unknown ☐

COORDINATES: (If UTM coords provided, **Zone** is also required)
DecDegrees ☐ DegMinSec ☐ UTMs ☐
Lat / Northing: 6281104
Long / Easting: 364997
ZONE: 50

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

LAND TENURE:

Nature reserve ☐	Timber reserve ☐	Private property ☒	Rail reserve ☐	Shire road reserve ☐
National park ☐	State forest ☐	Pastoral lease ☐	MRWA road reserve ☐	Other Crown reserve ☐
Conservation park ☐	Water reserve ☐	UCL ☐	SLK/Pole _____ to _____	Specify other: _____

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

EFFORT: Time spent surveying (minutes): _____ 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:**
Alive	193			193
Dead				

Area of pop (m²): 5000

Note: Pls record count as numbers (not percentages) for database.

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: ____%

CONDITION OF PLANTS: Healthy ☒ Moderate ☐ Poor ☐ Senescent ☐

COMMENT:

THREATS - type, agent and supporting information: 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+)	**Current impact (N-E)**	**Potential Impact (L-E)**	**Potential Threat Onset (S-L)**
• Potential clearing	N	E	M
•			
•			

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** ❑

Department of Biodiversity, Conservation and Attractions

Threatened and Priority Flora Report Form

Version 1.3 August 2017

HABITAT INFORMATION:

LANDFORM:
Crest ☐
Hill ☐
Ridge ☐
Outcrop ☐
Slope ☐
Flat ☒
Open depression ☐
Drainage line ☐
Closed depression ☐
Wetland ☐

ROCK TYPE:
Granite ☐
Dolerite ☐
Laterite ☐
Ironstone ☐
Limestone ☐
Quartz ☐
Specify other: _____

LOOSE ROCK:
(on soil surface; eg gravel, quartz fields)
0-10% ☐
10-30% ☐
30-50% ☐
50-100% ☐

SOIL TYPE:
Sand ☒
Sandy loam ☐
Loam ☐
Clay loam ☐
Light clay ☐
Peat ☐
Specify other: _____

SOIL COLOUR:
Red ☐
Brown ☐
Yellow ☐
White ☐
Grey ☒
Black ☐
Specify other: _____

DRAINAGE:
Well drained ☒
Seasonally inundated ☐
Permanently inundated ☐
Tidal ☐

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

CONDITION OF SOIL: Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

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. Agonis flexuosa
2. Kunzea glabrescens
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 matieral is taken) then no permit/licence is required. For further information on permit and licening 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: Russell Smith Date: 07/02/2022

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** ❑

Department of Biodiversity, Conservation and Attractions

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: Boronia tetragona **TPFL Pop. No:**

OBSERVATION DATE: 3/9/2021 **CONSERVATION STATUS:** P3 New population ☒

OBSERVER/S: Colin Spencer **PHONE:**

ROLE: botanist **ORGANISATION:** Ecoedge

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

Lot 4499, Plantation Road, shire of Capel

Reserve No:

DBCA DISTRICT: **LGA:** Land manager present: ☐

DATUM:
GDA94 / MGA94 ☐
AGD84 / AMG84 ☐
WGS84 ☐
Unknown ☐

COORDINATES: (If UTM coords provided, **Zone** is also required)
DecDegrees ☐ DegMinSec ☐ UTMs ☐

Lat / Northing: 6281270

Long / Easting: 364567

ZONE: 50

METHOD USED:
GPS ☒ Differential GPS ☐ Map ☐

No. satellites: ___ Map used: _____

Boundary polygon captured: ☐ Map scale: _____

LAND TENURE:

Nature reserve ☐	Timber reserve ☐	Private property ☒	Rail reserve ☐	Shire road reserve ☐
National park ☐	State forest ☐	Pastoral lease ☐	MRWA road reserve ☐	Other Crown reserve ☐
Conservation park ☐	Water reserve ☐	UCL ☐	SLK/Pole _____ to _____	Specify other: _____

AREA ASSESSMENT: Edge survey ☐ Partial survey ☐ Full survey ☒ Area observed (m²): _____

EFFORT: Time spent surveying (minutes): _____ 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:
Alive	1			1
Dead				

Area of pop (m²): 1

Note: Pls record count as numbers (not percentages) for database.

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: 100%

CONDITION OF PLANTS: Healthy ☐ Moderate ☐ Poor ☐ Senescent ☐

COMMENT:

THREATS - type, agent and supporting information: 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+)	**Current impact (N-E)**	**Potential Impact (L-E)**	**Potential Threat Onset (S-L)**
•			
•			
•			

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** ❑

Department of Biodiversity, Conservation and Attractions

Threatened and Priority Flora Report Form

Version 1.3 August 2017

HABITAT INFORMATION:

LANDFORM:
Crest ☐
Hill ☐
Ridge ☐
Outcrop ☐
Slope ☐
Flat ☐
Open depression ☐
Drainage line ☐
Closed depression ☐
Wetland ☐

ROCK TYPE:
Granite ☐
Dolerite ☐
Laterite ☐
Ironstone ☐
Limestone ☐
Quartz ☐
Specify other: _____

LOOSE ROCK:
(on soil surface; eg gravel, quartz fields)
0-10% ☐
10-30% ☐
30-50% ☐
50-100% ☐

SOIL TYPE:
Sand ☒
Sandy loam ☐
Loam ☐
Clay loam ☐
Light clay ☐
Peat ☐
Specify other: _____

SOIL COLOUR:
Red ☐
Brown ☐
Yellow ☐
White ☐
Grey ☒
Black ☐
Specify other: _____

DRAINAGE:
Well drained ☒
Seasonally inundated ☐
Permanently inundated ☐
Tidal ☐

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

CONDITION OF SOIL: Dry ☒ Moist ☐ Waterlogged ☐ Inundated ☐

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. Agonis flexuosa woodland
2. Kunzea glabrescens
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 matieral is taken) then no permit/licence is required. For further information on permit and licening 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: Russell Smith Date: 7/02/2022

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** ❑

Department of Biodiversity, Conservation and Attractions

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: Acacia semitrullata **TPFL Pop. No:**

OBSERVATION DATE: 07/09/2021 **CONSERVATION STATUS:** P4 New population ☒

OBSERVER/S: Russell Smith & Colin Spencer **PHONE:** 0447 809124

ROLE: Botanists **ORGANISATION:** Ecoedge

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

Lot 4499, Plantation Road, shire of Capel

Reserve No:

DBCA DISTRICT: **LGA:** Capel Land manager present: ☐

DATUM:
GDA94 / MGA94 ☐
AGD84 / AMG84 ☐
WGS84 ☐
Unknown ☐

COORDINATES: (If UTM coords provided, **Zone** is also required)
DecDegrees ☐ DegMinSec ☐ UTMs ☐

Lat / Northing: 628 1133

Long / Easting: 365008

ZONE: 50

METHOD USED:
GPS ☒ Differential GPS ☐ Map ☐

No. satellites: ___ Map used: _____

Boundary polygon captured: ☐ Map scale: _____

LAND TENURE:

Nature reserve ☐	Timber reserve ☐	Private property ☐	Rail reserve ☐	Shire road reserve ☐
National park ☐	State forest ☐	Pastoral lease ☐	MRWA road reserve ☐	Other Crown reserve ☐
Conservation park ☐	Water reserve ☐	UCL ☐	SLK/Pole _____ to _____	Specify other: _____

AREA ASSESSMENT: Edge survey ☐ Partial survey ☐ Full survey ☒ Area observed (m²): _____

EFFORT: Time spent surveying (minutes): _____ 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:**
Alive	87			87
Dead				

Area of pop (m²): 5000

Note: Pls record count as numbers (not percentages) for database.

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: 100%

CONDITION OF PLANTS: Healthy ☐ Moderate ☐ Poor ☐ Senescent ☐

COMMENT:

THREATS - type, agent and supporting information: 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+)	**Current impact (N-E)**	**Potential Impact (L-E)**	**Potential Threat Onset (S-L)**
•			
•			
•			

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** ❑

Department of Biodiversity, Conservation and Attractions

Threatened and Priority Flora Report Form

Version 1.3 August 2017

HABITAT INFORMATION:

LANDFORM:
Crest ☐
Hill ☐
Ridge ☐
Outcrop ☐
Slope ☐
Flat ☒
Open depression ☐
Drainage line ☐
Closed depression ☐
Wetland ☐

ROCK TYPE:
Granite ☐
Dolerite ☐
Laterite ☐
Ironstone ☐
Limestone ☐
Quartz ☐
Specify other: _____

LOOSE ROCK:
(on soil surface; eg gravel, quartz fields)
0-10% ☒
10-30% ☐
30-50% ☐
50-100% ☐

SOIL TYPE:
Sand ☒
Sandy loam ☐
Loam ☐
Clay loam ☐
Light clay ☐
Peat ☐
Specify other: _____

SOIL COLOUR:
Red ☐
Brown ☐
Yellow ☐
White ☒
Grey ☒
Black ☐
Specify other: _____

DRAINAGE:
Well drained ☒
Seasonally inundated ☐
Permanently inundated ☐
Tidal ☐

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

CONDITION OF SOIL: Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

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. Kunzea glabrescens tall shrubland with occasional Banksia attenuata or B. ilicifolia.
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 matieral is taken) then no permit/licence is required. For further information on permit and licening 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: Russell Smith Date: 07/02/2022

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. Vegetation units and sub-units including photographs.

Unit A

Medium open forest of *Corymbia calophylla* over very open low woodland of *Xylomelum occidentale* over tall sparse shrubland of *Kunzea glabrescens* and *Xanthorrhoea brunonis* over *Pteridium esculentum* fernland or grassland of **Avena barbata*, **Briza maxima* and **Ehrharta longiflora* on grey sandy loam [Condition mainly Degraded].

Unit B

Open low woodland of *Melaleuca preissiana* over *Leptocarpus coangustatus*, *Lepidosperma longitudinale* sedgeland with patches of *Kunzea glabrescens* tall shrubland over *Hypocalymma angustifolium* low shrubland over open grassland/forbland of introduced taxa on grey sand (winter wet). [Condition mainly Degraded to Good].

Unit C

Very open medium woodland of *Corymbia calophylla* over medium woodland of *Melaleuca preissiana* over *Aotus gracillima*, *Astartea scoparia*, *Kunzea glabrescens* tall shrubland over *Hypocalymma angustifolium* low shrubland over open sedgeland of *Lepidosperma longitudinale*, *Pteridium esculentum* and Schoenus efoliatus open forbland on grey sand (winter damp). [Condition Degraded to Very Good].

Sub-unit D1

Medium woodland of *Eucalyptus marginata* over open low woodland of *Banksia attenuata* and/or *Banksia ilicifolia* and *Nuytsia floribunda* over *Kunzea glabrescens* tall shrubland over shrubland of *Adenanthos meisneri*, *Brachyloma preissii* and *Melaleuca thymoides* over *Dasypogon bromeliifolius* low shrubland and *Phlebocarya ciliata* open forbland on grey sand. [Condition Degraded to Very Good].

Sub-unit D2

Medium very open woodland of *Agonis flexuosa, Banksia ilicifolia* or *Nuytsia floribunda* over tall shrubland of *Kunzea glabrescens* over low shrubland of *Acacia semitrullata*, *A. stenoptera*, *Adenanthos meisneri*, *Dasypogon bromeliifolius*, *Hypocalymma angustifolium*, *Melaleuca thymoides* and *Xanthorrhoea brunonis* over open forbland of *Patersonia occidentale*, *Phlebocarya ciliata* on grey sand. [Condition mainly Completely Degraded to Good]

Sub-unit E1

Medium woodland of *Corymbia calophylla* over very open medium shrubland of *Kingia australis* over low shrubland of *Acacia pulchella*, *Hardenbergia comptoniana*, *Leucopogon propinquus*, *Macrozamia riedlei*, *Pimelea angustifolia*, and *Xanthorrhoea brunonis* over open forbland of *Conostylis aculeata*, *Craspedia variabilis* and *Senecio quadridentatus* and very open sedgeland of *Schoenus grandiflorus* and *Tetraria octandra* and scattered *Microlaena stipoides* low grass on grey sandy loam. [Condition Very Good to Excellent].

Sub-unit E2

Medium woodland of *Corymbia calophylla* and *Eucalyptus rudis* subsp. *cratyantha* over low woodland of *Agonis flexuosa* and *Melaleuca preissiana* over open medium shrubland of *Astartea scoparia*, *Acacia extensa* and *Grevillea manglesioides* over low sedgeland of *Anarthria prolifera* and *Lepidosperma longitudinale* and open forbland of *Burchardia multiflora* and *Opercularia hispidula* on grey-brown sandy loam or red-brown loam. [Condition ranges from Completely Degraded to Excellent]. (Southern *Corymbia calophylla* woodlands TEC).

Appendix 13. Reporting forms for Threatened Ecological Communities.

Department of Parks and Wildlife

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

Version 6.0 July 2013

COMMUNITY: SWAFCT1b Southern Corymbia calophylla woodlands on heavy soils **OBSERVATION DATE:** 29/09/2020

New occurrence ☐ **Site ID:** **CONS STATUS:**

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)**:**

Lot 4499, Plantation Road

Reserve No:

DISTRICT: **LGA:** Capel Land manager present: ☐

DATUM:

GDA94 / MGA94 ☒
AGD84 / AMG84 ☐
WGS84 ☐
Unknown ☐

COORDINATES: (If UTM coords provided, **Zone** is also required)

DecDegrees ☐ DegMinSec ☐ UTMs ☒

Lat / Northing: 6281330

Long / Easting: 364600

Zone: 50

METHOD USED:

GPS ☒ Differential GPS ☐ Map ☐

No. satellites: Map used:

Boundary polygon captured: ☒ Map used:

LAND TENURE:

Nature reserve ☐ Timber reserve ☐ Private property ☒ Rail reserve ☐ Shire road reserve ☐
National park ☐ State forest ☐ Pastoral lease ☐ MRWA road reserve ☐ Other Crown reserve ☐
Conservation park ☐ Water reserve ☐ UCL ☐ SLK/Pole _____ to _____ Specify other: _____

AREA ASSESSMENT: Edge survey ☐ Partial survey ☐ Full survey ☒ Area observed (m²): 9800

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 ☐ _____% Very Good ☐ _____% Degraded ☐ _____%

Excellent ☒ 80% Good ☒ 20% Completely Degraded ☐ _____%

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:*_____

Department of Parks and Wildlife

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

Version 6.0 July 2013

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 ☐	Granite ☐	(on soil surface; e.g. gravel, quartz fields)	Sand ☐	Red ☐	Well drained ☒
Hill ☐	Dolerite ☐		Sandy loam ☐	Brown ☒	Seasonally inundated ☐
Ridge ☐	Laterite ☐	0-10% ☒	Loam ☒	Yellow ☐	
Outcrop ☐	Ironstone ☐	10-30% ☐	Clay loam ☐	White ☐	Permanently inundated ☐
Slope ☐	Limestone ☐	30-50% ☐	Light clay ☐	Grey ☒	
Flat ☒	Quartz ☐	50-100% ☐	Peat ☐	Black ☐	Tidal ☐
Open depression ☐					
Drainage line ☐	Specify other:		Specify other:	Specify other:	Specify other:
Closed depression ☐					
Wetland ☐					

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

CONDITION OF SOIL:

Dry ☒ Moist ☐ Waterlogged ☐ Inundated ☐ Cracked ☐ Saline ☐ Other:

VEGETATION CLASSIFICATION:	1. Corymbia calophylla medium woodland
	2. Kingia australis over low shrubland of Acacia pulchella, Hardenbergia comptoniana, Leucopogon propinquus, Macrozamia riedlei, Pimelea angustifolia, and Xanthorrhoea brunonis
	3. open forbland of Conostylis aculeata, Craspedia variabilis and Senecio quadridentatus and very open sedgeland of Schoenus grandiflorus and Tetraria octandra
	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:*_____

Department of Parks and Wildlife

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

Version 6.0 July 2013

Adjacent Landuse:

Associated Flora Species:

Associated Fauna Species:

OTHER COMMENTS:

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐

Other:

COPY SENT TO: Regional Office ☐ District Office ☐ Other:

Submitter of record: **Russell Smith** **Role:** **botanist**

Signature: **Russell Smith** **Date submitted:** **19/01/2021**

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:*_____