Payne Rd
City of Busselton
Flora and Vegetation Survey



Prepared for Accendo Australia

Plantecology CONSULTING

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Executive Summary

Plantecology Consulting was commissioned by Accendo Australia to undertake a detailed flora and vegetation survey of the Payne Rd road reserve between SLK4.18 to 12.02), which forms part of the boundary between the localities of Jindong, Boallia and Kaloorup in the City of Busselton. The site is approximately 12.3 ha in area including the formed road and the vegetated verges.

A field survey of the site was undertaken by a botanist from Plantecology Consulting on the 9th and 10th October 2024. A detailed survey of the vegetation was undertaken at seven sampling plots or EPA-defined relevés, selected to adequately sample the flora within a stand. The narrowness of the verge vegetation within the road reserve did not allow for the establishment of measured quadrats. Plots were located to sample a representative and homogeneous area (i.e. not located in transitional areas between communities). The location of each plot was recorded with a hand-held GPS unit and a photograph of the plot taken looking along the road reserve. All vascular plant species were recorded and an estimate of the percentage cover over the area surveyed was made for each species.

A total of 46 native and 50 non-native (exotic) taxa was recorded within the site, representing 39 families and 78 genera. The dominant families containing mostly native taxa were Proteaceae (5 native taxa), Cyperaceae (6 native taxa; one weed taxon), and Myrtaceae (13 native taxa and one exotic taxon).

Two taxa of threatened flora were identified from within the road reserve: *Grevillea brachystylis* subsp. *grandis* and *Verticordia plumosa* var. *ananeotes.*

The survey identified three vegetation types within the site (Figures 5a-i):

Corymbia calophylla Woodland

Woodland of *Corymbia calophylla* and *Nuytsia floribunda* over a open shrubland of *Xanthorrhoea preissii* and *Kingia australis* over grasslands and herblands of **Pennisetum clandestinum* and/or **Watsonia meriana* var. *bulbillifera* on brown loams.

The *Corymbia calophylla* Woodland occupies the slightly higher non-saturated ground.

Melaleuca Woodland

Woodland of *Melaleuca rhaphiophylla* and/or *Melaleuca preissiana* over shrubland of *Melaleuca incana* subsp. *incana* and *Melaleuca lateritia* over sedgeland or grassland of *Leptocarpus thysananthus* and/or **Pennisetum clandestinum.*

This community occupies the saturated lower ground.

Exotic herbs and grasses

Open areas without a continuous tree canopy and consisting of pasture grasses, exotic herbs and irises such as **Watsonia meriana* var. *bulbillifera.*

The remainder of the site consists of formed roads, bare ground and driveways

The vegetation condition of the majority of the site is rated as 'Completely Degraded', where the original vegetation structure has been lost and now consists mostly of exotic species with or without a tree canopy. A small areas around Plot 2 is rated as 'Very Good' condition where a native shrub layer and some native ground taxa (e.g. sedges) remain. Areas of the site that are rated as 'Good' still retain a basic structure but have heavy infestations of pasture and other grasses such as **Pennisetum clandestinum*.

No TECs or PECs are inferred to occur within the site.

Despite the highly altered vegetation structure and being situated in a fragmented landscape, the Payne Rd site retains significant botanical values through the occurrence of two Threatened Flora. A

number of occurrences of both *Grevillea brachystylis* subsp. *grandis* and *Verticordia plumosa* var. *ananeotes* have been recorded in the local area, and their rarity likely reflects the historical clearing and fragmentation of the native vegetation. Impacts from road maintenance or construction should avoid any impacts on the occurrences of these taxa.

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1 Introduction

Plantecology Consulting was commissioned by Accendo Australia to undertake a detailed flora and vegetation survey of the Payne Rd road reserve between SLK4.18 to 12.02), which forms part of the boundary between the localities of Jindong, Boallia and Kaloorup in the City of Busselton (Figure 1). The site is approximately 12.3 ha in area including the formed road and the vegetated verges.

1.1 Existing Environment

The site is located approximately 13 km south west of Busselton on the southern Swan Coastal Plain and near the Whicher Scarp. The environs of the site is a highly modified agricultural landscape that still maintains many patches of native vegetation. The site itself consists of a formed sealed road and a vegetated verge. The native vegetation remnant within the verge is highly modified, with a mostly native overstorey but an understorey that has significant infestations of exotic herbs and grasses.

1.2 Climate

The survey area experiences a dry Mediterranean climate of hot dry summers and cool wet winters. Long-term climatic averages indicate the site is located in an area of moderate to high rainfall, receiving 666 mm on average annually (data for Busselton Aero, station number 9603, the nearest currently reporting station; Bureau of Meteorology 2025) with the majority of rainfall received between May and August. The area experiences rainfall on an average of 84 days per year. Mean maximum temperatures range from 16.9 °C in July to 30.3 °C in January. Mean minimum temperatures range from 7.0 °C in July, to 14.7 °C in February.

1.3 Soils

The Atlas of Australian Soils maps the soils for the site as Map Unit MT7, which is a plain of acid earths and leached sands and small areas of ironstone gravels (Natural Resource Information Centre 1991). On a finer scale, Tille and Lantzke (1990) places the survey area across the Abba wet flats, Abba Flats, Abba wet ironstone flats and Jindong flats phases. The Abba wet flats comprise winter-wet flats and depressions of sandy grey-brown duplexes. The Abba flats differ from the wet phase in comprising low rises of grey-brown duplexes, while the Abba wet ironstones are slight depressions of red-brown sands and loams over ironstone. The Jindong flats are well-drained with sandy gradational grey-brown soils (Tille and Lantzke 1990).

1.4 Conservation Significant Flora

Under the Biodiversity Conservation Act 2016 ('BC Act'), the Minister for the Environment produces a gazetted list of Threatened Flora under three categories: Critically Endangered, Endangered and Vulnerable. The Department of Biodiversity, Conservation and Attractions (DBCA) also produces a list of Priority Flora that have not been assigned statutory protection under the BC Act but may be under some degree of threat (DBCA 2023a). The DBCA recognises four Priority Flora levels. The definitions for each category of Threatened and Priority Flora are shown in Appendix E.

As well as protection under State legislation, selected flora are also afforded statutory protection at a Federal level pursuant to the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The EPBC Act provides for the protection of Threatened species, pursuant to Schedule 1 of the Act, and are defined as "Critically Endangered", "Endangered", "Vulnerable" or "Conservation Dependent" under Section 179. Definitions of these categories are shown in Appendix E. Any action likely to have a significant impact on a species listed under the EPBC Act requires approval from the Commonwealth Minister for the Environment.

Searches of the State databases identified 73 conservation significant taxa with the potential to occur within the site (Table 1). Those records within approximately 5 km of the site are shown in Figure 2. Of the identified taxa, 15 are listed as Threatened under the BC Act, of which two are orchids. ***Caladenia busselliana*** (Bussell's Spider Orchid) occurs in sandy loams of winter-wet swamps and flowers from September to October. ***Caladenia procera*** (Carbanup King Spider Orchid) occurs in alluvial flats of clay loams beneath jarrah, marri and peppermint woodlands and flowers between September and October.

Two records of Threatened Flora occur within the survey area. An occurrence of ***Grevillea brachystylis*** subsp. ***grandis*** is recorded on the corner of Payne Rd and Jamisons Rd at the eastern end of the survey area. There is also a record of ***Verticordia plumosa*** subsp. ***ananeotes*** on the southern side of Payne Rd toward the western end of the survey area (Figure 2).

Table 1: Threatened and Priority Flora potentially occurring within the survey area based on database searches. (VU = Vulnerable; EN = Endangered; CR = Critically Endangered; T = Threatened; 1 – 4 = Priority Flora Category)

Taxon	PWS Ranking	EPBC Act Category	Flowering Period
Acacia flagelliformis	4		Jul-Sep
Acacia lateriticola var. Glabrous variant (B.R. Maslin 6765)	3		-
Acacia semitrullata	4		Jun-Aug
Actinotus whicheranus	2		Dec-Mar
Amanita walpolei	2		-
Andersonia barbata	2		Aug-Nov
Andersonia ferricola	1		Oct
Angianthus drummondii	3		Oct, Nov
Austrostipa bronweniae	T	EN	Oct-Nov
Banksia nivea subsp. *uliginosa*	T	EN	Aug-Sep
Banksia squarrosa subsp. *argillacea*	T	VU	Jul-Aug
Blennospora doliiformis	3		Oct - Nov
Boronia capitata subsp. *gracilis*	3		Jun-Aug
Boronia tetragona	3		Oct-Dec
Caladenia busselliana	T	EN	Sep_Oct
Caladenia procera	T	CR	Sep-Oct
Calothamnus lateralis var. *crassus*	3		-
Calothamnus quadrifidus subsp. *teretifolius*	4		Sep - Dec
Calystegia sepium subsp. *roseata*	2		Oct-Dec
Chamelaucium erythrochlorum	4		Nov-Feb
Chamelaucium roycei	T	VU	Aug - Nov
Chordifex gracilior	3		Sep-Oct
Cyanothamnus tenuis	4		-
Cyathochaeta teretifolia	3		-
Daviesia elongata	T	VU	Sep, Dec- Feb
Dillwynia sp. Capel (P.A. Jurjevich 1771)	3		Sept-Oct
Drakaea micrantha	T	EN	Sep-Oct
Drosera occidentalis	4		Nov-Dec
Eryngium sp. Subdecumbens (G.J. Keighery 5390)	3		-
Gastrolobium modestum	T	VU	Sep - Nov
Gastrolobium papilio	T	CR	Sep-Oct
Grevillea brachystylis subsp. *brachystylis*	3		Aug-Nov

Taxon	PWS Ranking	EPBC Act Category	Flowering Period
Grevillea brachystylis subsp. *grandis*	T	CR	Aug, Dec
Grevillea bronweniae	3		-
Grevillea manglesioides subsp. *ferricola*	3		Jul-Dec
Hakea oldfieldii	3		Sep
Hibbertia acrotoma	1		-
Isopogon formosus subsp. *dasylepis*	3		Jun, Sep-Dec
Jacksonia gracillima	3		Oct-Nov
Johnsonia inconspicua	3		Nov
Lambertia rariflora subsp. *rariflora*	4		Jan-Mar
Lasiopetalum laxiflorum	3		Oct, Nov
Leptomeria furtiva	2		Jan, Aug-Oct
Lepyrodia extensa	2		-
Lepyrodia heleocharoides	3		Dec
Leucopogon sp. Busselton (D. Cooper 243)	2		Aug-Sep
Loxocarya magna	3		-
Loxocarya striata subsp. *implexa*	1		-
Meionectes tenuifolia	3		Nov-Dec
Melaleuca basicephala	4		Dec
Melaleuca incana subsp. Gingilup (N. Gibson & M. Lyons 593)	2		May - Jun
Morelotia australiensis	T	VU	-
Myriophyllum echinatum	3		Oct-Nov
Netrostylis sp. Blackwood River (A.R. Annels 3043)	3		-
Olearia strigosa	3		Dec - May
Ornduffia submersa	4		Sep-Oct
Platytheca sp. Sabina (G.J. & B.J. Keighery 295)	2		Oct
Pultenaea pinifolia	3		Oct
Schoenus benthamii	3		Oct - Nov
Schoenus sp. Jindong (R.D. Royce 2485)	1		-
Stachystemon exilis	1		Oct-Nov
Stylidium ferricola	1		Oct-Nov
Stylidium ireneae	4		Oct-Dec
Stylidium leeuwinense	4		Feb-May
Stylidium roseonanum	3		Oct
Synaphea decumbens	3		Sep-Oct
Synaphea hians	3		Sep-Oct
Synaphea petiolaris subsp. *simplex*	3		Sep-Oct
Thysanotus formosus	1		Jan
Thysanotus glaucus	4		Nov-Feb
Verticordia densiflora var. *pedunculata*	T	EN	Dec
Verticordia lehmannii	4		Oct
Verticordia plumosa var. *ananeotes*	T	CR	Dec
Verticordia plumosa var. *vassensis*	T	EN	Oct

1.5 Conservation Significant Communities

The DBCA defines an ecological community as "a naturally occurring assemblage that occurs in a particular type of habitat" (DBCA 2023b). A Threatened Ecological Community (TEC) is one that has declined in area or was originally limited in distribution. Uncommon ecological communities that do not strictly meet TEC defined criteria, or are inadequately defined, are listed by the DBCA as a Priority Ecological Community (PEC). Definitions of the categories of Threatened and Priority Ecological Communities are given in Appendix E.

As well as protection under State legislation, selected ecological communities are also afforded statutory protection at a Federal level pursuant to the EPBC Act. The EPBC Act provides for the protection of TECs, which are listed under section 181 of the Act, and are defined as "Critically Endangered", "Endangered" or "Vulnerable" under Section 182. Similar to flora listed under the EPBC Act, any action likely to have a significant impact on a TEC listed under the EPBC Act requires Commonwealth approval.

Six terrestrial TECs endorsed under State legislation are recorded as occurring within 10 km of the site:

- SCP01b - *'Corymbia calophylla* woodlands on heavy soils of the southern SCP'. SCP01b is listed as Critically Endangered under State legislation;
- SCP09 - Dense shrublands on clay flats'. SCP09 is listed as Endangered under State legislation and Critically Endangered pursuant to the EPBC Act;
- SCP10a - 'Shrublands on dry clay flats'. SCP10a is listed as Endangered under State legislation and Critically Endangered pursuant to the EPBC Act;
- SCP10b – 'Shrublands on southern Swan Coastal Plain Ironstones (Busselton area)', listed as Critically Endangered under State legislation and as Endangered pursuant to the EPBC Act;
- SCP07 - Herb rich saline shrublands in clay pans'. SCP07 is listed as Endangered under State legislation and Critically Endangered pursuant to the EPBC Act;
- SCP 02 – 'Southern wet shrublands, Swan Coastal Plain', listed as Endangered under State legislation.

Twelve other terrestrial FCTs listed as PECs are recorded as occurring within 25 km of the site:

- 'Central Whicher Scarp Jarrah Woodland (Whicher Scarp community C1)' (Priority 1);
- 'West Whicher Scarp *Banksia attenuata* woodland (Swan Coastal Plain centred woodlands of grey/white sands community B2)' (Priority 1);
- 'Shrublands of near permanent wetlands in creeklines of the Whicher Scarp (Whicher Scarp community G2)' (Priority 1);
- 'Central Whicher Scarp Mountain Marri Woodland (Whicher Scarp community A1)' (Priority 1);
- 'Whicher Scarp Paluslope Wetlands' (Priority 1);
- 'Whicher Scarp Jarrah woodland of deep coloured sands (Whicher Scarp community C2)' (Priority 1);
- '*Eucalyptus patens, Corymbia calophylla, Agonis flexuosa* Closed Low Forest' (Priority 1);
- SCP30b - '*Eucalyptus rudis* (flooded gum), *Corymbia calophylla, Agonis flexuosa* Closed Low Forest (near Busselton) (Priority 1);
- 'Quindalup Eucalyptus gomphocephala and/or Agonis flexuosa woodlands' (Priority 3);
- 'Southern *Banksia attenuata* woodlands' (Priority 3);
- 'Subtropical and Temperate Coastal Saltmarsh' (Priority 3); and

- 'Banksia dominated woodlands of the Swan Coastal Plain IBRA Region' (Priority 3).

The 'Banksia-dominated woodlands of the Swan Coastal Plain IBRA Region' and SCP01b are listed as 'Endangered' TECs by the Commonwealth under the EPBC Act.

The nearest conservation significant communities to the site are the 'Whicher Scarp C2' and the 'Whicher Scarp Paluslope Wetlands' PECs to the west and south-west, respectively (Figure 3).

1.6 Vegetation Complexes

Vegetation complexes are a series of plant communities forming a regularly repeating pattern associated with a particular soil unit (Government of Western Australia 2000). The vegetation complex mapped as occurring within the site is the Abba complex, which has approximately only 6.6% of its original 50 890 ha pre-European extent remaining, and 0.17% of its original extent occurs on lands with some level of protection (Government of Western Australia 2017).

1.7 Regional Ecological Linkages

Ecological linkages are important conservation tools that allow the movement of fauna, flora and genetic material between areas of remnant habitat. The movement of fauna and the exchange of genetic material between vegetation remnants improves the viability of those remnants by allowing greater access to breeding partners, food sources, refuge from disturbances such as fire and maintains the genetic diversity of plant communities and populations (Molloy *et al.* 2009).

The remnant vegetation within the site intersects part of a regional axis line and has been assigned a proximity value of 1a in the SW Regional Ecological Linkage report (Figure 4). This enhances the viability of the patch for itself, and also assists the functioning the regional linkage as well as the function of other native stands in the area.

1.8 Purpose

The purpose of the survey was to assess the botanical values within the site by:

- Undertaking a detailed flora and vegetation survey in accordance with the Environmental Protection Authority's (EPA) Technical Guidance: Flora and Vegetation Survey for Environmental Impact Assessment (2016).
- Identifying the presence of any Threatened Ecological Communities (TECs) and Priority Ecological Communities (PECs);
- Undertaking a systematic search for all vascular plant taxa present; and
- Recording the locations and numbers present of any Threatened Flora and Priority Flora identified at the time of the field survey.

2 Methods

2.1 Field Survey

A field survey of the site was undertaken by a botanist from Plantecology Consulting on the 9th and 10th October 2024. A detailed survey of the vegetation was undertaken at seven sampling plots or EPA-defined relevés, selected to adequately sample the flora within a stand (Figure 5). The narrowness of the verge vegetation within the road reserve did not allow for the establishment of measured quadrats. Plots were located to sample a representative and homogeneous area (i.e. not located in transitional areas between communities). The location of each plot was recorded with a hand-held GPS unit and a photograph of the plot taken looking along the road reserve. All vascular plant species were recorded and an estimate of the percentage cover over the area surveyed was made for each species.

Environmental data recorded included topographic position, aspect, slope, soil colour and texture class, rock outcropping, litter cover as well as the degree of disturbance and an estimate of the time since the last fire event. The condition of the vegetation of the site was assessed to assist in determining the conservation values of the site. The vegetation condition was rated according to Keighery (1994), a vegetation condition scale commonly used in the metropolitan and southwest regions. The categories are listed and defined in Table 2. Data on the vegetation structure was also recorded and included the height of the three main strata and the dominant species within each stratum. The vegetation structural description follows that of the National Vegetation Information System (Thackway et al. 2006).

Table 2: Vegetation Condition Scale (Keighery 1994)

Vegetation Condition	Definition
Pristine (1)	Pristine or nearly so, no obvious signs of disturbance.
Excellent (2)	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
Very Good	Vegetation structure altered, obvious signs of disturbance. For example, 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. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, 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. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, 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 or shrubs.

All plant specimens collected during the field survey were dried, pressed and then sorted in accordance with requirements of the Western Australian Herbarium. Identification of specimens occurred through comparison with named material and through the use of taxonomic keys. Taxonomic determinations were made using reference material at the Western Australian State

Herbarium. Taxa names utilise the current terminologies from FloraBase (2024). Family names utilise the revised phylogeny of the Angiosperm Phylogeny Group - APGIII (FloraBase 2024).

2.2 Data Analysis

Hierarchical agglomerative clustering is the usual first stage in classifying vegetation data into community types. This involves calculating the similarity (or more often, the dissimilarity) between plots within the dataset and then sequentially fusing the plots into groups according to their similarity. This type of method was used in the analysis of the original Swan Coastal Plain dataset (Gibson et al. 1994) and to determine the conservation status of additional plots, data is often added to the original dataset and the analysis re-run (Environmental Protection Authority 2016). The direct use of the original dataset as the basis for assigning new plot data to the regional classification has some drawbacks, however. First, a hierarchical clustering only applies to the relationships between plots, and the relative distances between them, within that particular dataset. The addition of new data often alters the relative cophenetic distances and disrupts the clustering output. Second, as an unsupervised method, hierarchical clustering does not define rules for the membership of the defined groups, and so the addition of new plots requires the rebuilding of the entire hierarchy (De Cáceres and Wiser 2012). ll analyses described below were undertaken using R packages Cluster (Maechler et al 2019), vegclust (De Cáceres et al. 2010), labdsv (Roberts 2019), optpart (Roberts 2020) and Vegan (Oksanen et al. 2020).

The data for the Swan Coastal Plain regional survey (Gibson et al. 1994) and that of Keighery et al. (2012) was downloaded from the NatureMap website. The current Gibson et al. (1994) dataset has been modified from that of the original survey with the removal of one site (OATES-1), resulting in a dataset of 508 plots. The Keighery et al. (2012) dataset is a compilation of data from a number of floristic studies and extended the Gibson et al. (1994) dataset. The composite dataset used in this analysis was that curated on the NatureMap website as of 2015. Notwithstanding the proviso in Keighery et al. (2012) that the composite dataset should not be used for FCT analyses, it can be useful when assigning new plot data that are potentially from FCT that were under-sampled in in the Gibson et al. (1994) survey e.g. FCT 14 and FCT 18.

The species nomenclature of the datasets was updated to be consistent with current usage. Where original names could not be matched clearly to the updated usage, those taxa were removed from the analysis. Infraspecies ranks were raised to species level when no matching rank had been used in the original datasets. Taxa that could not be identified to species level in the Payne Rd dataset were removed.

The new data from the Payne Rd survey was added to both Swan Coastal Plain datasets one plot at a time to remove spatial correlation effects and the new dataset was then analysed using the Bray-Curtis distance coefficient (or resemblance measure) and the flexible beta linkage method (beta = -0.1). Assignment of the Payne Rd plots was to the nearest distinct group by inspection of the resulting dendrogram.

In practice, there is often less similarity between a new plot and the plots of the FCT to which it is assigned than between the original plots themselves. That is, new plots are usually most similar to fringing members of the original group. Also, the use of data from informal sampling rather than quadrats is problematic as there is likely a variance in alpha diversity between the datasets.

2.3 Nearest Neighbour

The nearest neighbour assignment method uses the minimum Bray-Curtis distance between a new plot and a plot from the original dataset. The comparison of individual samples is seldom useful as new plots are rarely similar to diagnostic plots from the original FCT classification. More often, the nearest neighbour is a fringe member of a FCT and may not be a 'near' neighbour, which regularly leads to misclassifications. Assignments to the nearest group (as in the clustering methods described above) are more robust.

leads to misclassifications. Assignments to the nearest group (as in the clustering methods described above) are more robust.

2.4 Survey Limitations

Various factors can limit the effectiveness of a vegetation survey. Pursuant to EPA Technical Guidance: Flora and Vegetation Survey for Environmental Impact Assessment (EPA 2016), these factors have been identified and their potential impact on the effectiveness of the survey has been assessed (Table 3).

The survey was undertaken October 2024 and would likely have intercepted the flowering period of most taxa of conservation concern with the potential to occur within the site, in particular the Threatened annual and geophytic taxa. The temperatures within the preceding three months were above average for the region, while rainfall for both July and August were well above average. Rainfall in September was well below average. At the time of the survey, the lowest ground was saturated with free-standing water in lower-lying parts. The variable conditions and saturated ground may have affected some species' phenology.

Table 3: Potential limitations affecting the vegetation survey

Potential limitations	Constraint	Comment
Availability of contextual information	No	Sufficient regional and local information was available to place the survey site in its environmental context.
Competency and experience of the botanists	No	The survey was undertaken by botanists with a comprehensive knowledge of South West vegetation, with at least 20 years experience in vegetation surveys in Western Australia.
Seasonality	Minor	The rainfall in July and August was well above average, and below average in September. However, the ground was still quite saturated and soil moisture would not have been a constraint on flowering. The variation from long-term means may have had an effect on the triggers for flowering for some species, however.
Adequate coverage and intensity of survey	No	The survey area was traversed on foot. It is considered the sampling points provided adequate coverage of the site.
Proportion of Flora identified	No	The survey recorded an estimated 62% of the plant taxa present (Chao2 estimator). This estimate is likely affected by the diversity of weeds along the roadside.
Disturbance	Yes	The vegetation was highly disturbed and the majority of species were exotics.
Resources	No	Adequate resources were available to conduct the survey.
Access restrictions	Minor	Although most of the site was fully accessible, some parts of the western end of the site were not fully accessible due to the depth of water in the drains and/or the density of shrubs against the fences.

3 Results

3.1 Flora

3.1.1 Floristic Summary

A total of 46 native and 50 non-native (exotic) taxa was recorded within the site, representing 39 families and 78 genera. The dominant families containing mostly native taxa were Proteaceae (5 native taxa), Cyperaceae (6 native taxa; one weed taxon), and Myrtaceae (13 native taxa and one exotic taxon). For a complete species list and the individual site data refer to Appendix A and Appendix B, respectively.

3.1.1 Conservation Significant Flora

Two Threatened Flora pursuant to either the Biodiversity Conservation Act (2016) or the EPBC Act (1999) were recorded during the survey (Table 4). A known occurrence of ***Grevilea brachystylis*** subsp. ***grandis*** on the corner of Payne Rd and Jamison Rd was inspected and recorded four flowering individuals outside a fenced area and one flowering individual within the fenced area (Plate 1). A known and marked occurrence of ***Verticordia plumosa*** var. ***ananeotes*** was inspected on the southern side of Payne Rd. One non-flowering individual was observed at that location (Plate 2).

Table 4: Locations of Threatened Flora within the survey area.

Taxon	Latitude	Longitude	Observed individuals
Grevilea brachystylis subsp. *grandis*	-33.751873	115.293643	5
Verticordia plumosa var. *ananeotes*	-33.751656	115.244689	1



Plate 1: *Grevillea brachystylis* subsp. *grandis* occurrence adjacent to Payne Rd.



Plate 2: A non-flowering individual of *Verticordia plumosa* var. *ananeotes* adjacent to Payne Rd.

3.2 Vegetation

3.2.1 Plant Associations

The survey identified three vegetation types within the site (Figures 5a-i):

Corymbia calophylla Woodland (Plates 3, 5 - 9)

Woodland of *Corymbia calophylla* and *Nuytsia floribunda* over a open shrubland of *Xanthorrhoea preissii* and *Kingia australis* over grasslands and herblands of **Pennisetum clandestinum* and/or **Watsonia meriana* var. *bulbillifera* on brown loams.

The *Corymbia calophylla* Woodland occupies the slightly higher non-saturated ground.

Melaleuca Woodland (Plate 4)

Woodland of *Melaleuca rhaphiophylla* and/or *Melaleuca preissiana* over shrubland of *Melaleuca incana* subsp. *incana* and *Melaleuca lateritia* over sedgeland or grassland of *Leptocarpus thysananthus* and/or **Pennisetum clandestinum.*

This community occupies the saturated lower ground.

Exotic herbs and grasses

Open areas without a continuous tree canopy and consisting of pasture grasses, exotic herbs and irises such as **Watsonia meriana* var. *bulbillifera.*

The remainder of the site consists of formed roads, bare ground and driveways (Figure 5).

3.2.2 Vegetation Condition

The vegetation condition of the majority of the site is rated as 'Completely Degraded', where the original vegetation structure has been lost and now consists mostly of exotic species with or without a tree canopy (Figures 6a-i). A small areas around Plot 2 is rated as 'Very Good' condition where a native shrub layer and some native ground taxa (e.g. sedges) remain. Areas of the site that are rated as 'Good' still retain a basic structure but have heavy infestations of pasture and other grasses such as **Pennisetum clandestinum*.

3.2.3 Floristic Community Types

The cluster analysis of the Payne Rd plots to the Gibson et al. (1994) dataset indicates high spatial correlation with most plots fusing with FCT11 – 'Wet forests and woodlands' (Figure 7). Only Plot 1 assigned to FCT 13 – 'Deeper wetlands on heavy soils'. Assignment to wetland types is often seen where the native species richness is low. Given the low-lying and damp conditions for much of the site, these assignments may be reasonable but cannot be considered definitive given the mostly poor vegetation condition.

Assignment to FCTs using the Keighery et al. (2012) dataset also assigned Plots 1 and 2 to wetland types, although to different FCTs than the Gibson et al. (1994) assignments. Plot 1 was assigned to FCT S17 – *Eucalyptus rudis/Taxandria linearifolia* wetlands, while FCT assigned to a group of S16 (Mixed dense shrublands on yellow brown sands), S19 (Dense tall shrublands) and S07 (Northern woodlands to forests over tall sedgelands alongside permanent wetlands). The remaining plots all showed some affinity to FCT 11. Given the groups that the Payne Rd data has been assigned to when using the Keighery et al. (2012) dataset, the assignments to Gibson et al. (1994) are likely more reliable.

The cross tabulation of the Bray Curtis dissimilarities between the Swan Coastal Plain and the Payne Rd plots is shown on Table 5, with mixed results. Plots 4, 5 and 6 assigned to FCT 11, which is consistent with the dataset assignments. However, the results for the other plots was mixed, with assignments to FCTs 2, S17, 6 and S05.

In determining probable FCTs for the Payne Rd plots, most weight was given to assignment to the Gibson et al. (1994) dataset, as this produced clearer and more consistent results (Table 6). Assignment to the Keighery et al. (2012) dataset was less clear, with more disruption to the original classification observed. Least weight was given to the nearest neighbour assignments as these were less consistent with the results of the clustering analyses, and no dissimilarity was less 0.725.

Table 5: Bray Curtis dissimilarity values for Payne Rd and the closest Swan Coastal Plain plots

Swan Coastal Plain Plot (FCT)	Plot_01	Plot_02	Plot_03	Plot_04	Plot_05	Plot_06	Plot_07
beel03-11			0.818				
benn01-S07							0.745
benn02-S07							0.796
Cavs02-21a	0.788						
Cavs06-S07	0.808			0.787		0.814	0.727
DEPOT-1-28					0.855		
ELE09-S05			0.778				
ELE14-4	0.811						
Hay02-17		0.818					
hymus01-11		0.811	0.787	0.787		0.767	
KERO-2-24					0.848		
low10b-11				0.825	0.782	0.736	0.741
MILT-2-13	0.814						
NEER-1-24					0.829		
PB-1-19a							0.767
Possum2-16			0.800				
raven02-S17	0.760						
rowe01-11			0.810	0.762	0.800		
star02-24						0.825	
Sunday01-6				0.815	0.846	0.800	0.725
tokyu01-25				0.815			
TWIN-11-11		0.821					
WATER-3-3c		0.803	0.815				
WHITE-2-4	0.824						
xbeer01-24		0.810					
YOON-2-2		0.795					
yuri05-S17						0.782	
Minimum dissimilarity	**0.76**	**0.795**	**0.778**	**0.762**	**0.782**	**0.736**	**0.725**

Table 6: Floristic Community Type assignment summary.

Plot	Assignment to Gibson et al. (1994)	Assignment to Keighery et al. (2012)	Nearest Neighbour	Probable FCT
Plot 1	13	S17	S17	13
Plot 2	11	S16/S07/S19	2	11
Plot 3	11	11	S05	11
Plot 4	11	11	11	11
Plot 5	11	11	11	11
Plot 6	11	11	11	11
Plot 7	11	11/S07	6	11

3.3 Weeds

Fifty of the taxa recorded during the survey are exotics (weeds), which is the majority of the flora within the site. One is a Declared Pest under the Biosecurity and Agriculture Management Act 2007. **Zantedeschia aethiopica* (Arum Lily) is a Declared Pest under the Biosecurity and Agriculture Management Act 2007, with restrictions on their sale and movement. Active management is not required for the species.

4 Discussion

Despite the highly altered vegetation structure and being situated in a fragmented landscape, the Payne Rd site retains significant botanical values through the occurrence of two Threatened Flora. A number of occurrences of both *Grevillea brachystylis* subsp. *grandis* and *Verticordia plumosa* var. *ananeotes* have been recorded in the local area, and their rarity likely reflects the historical clearing and fragmentation of the native vegetation. *Grevillea brachystylis* subsp. *grandis* only occurs within an area of approximately 14km^2 and the main threats to its survival are road maintenance and weed competition (DEHA 2008). Most occurrences of *Verticordia plumosa* var. *ananeotes* occur on road or rail reserves and the main threats are maintenance of these corridors and inappropriate fire regimes (DCCEEW 2024). The retention of these occurrences should be a priority and no impacts from roadworks should be permitted to maintain the viability of the taxa.

The Payne Rd site also intersects an axis line of the south-west regional ecological linkage network. In a highly fragmented landscape, ecological linkages are important in the movement of species and genetic material. Clearing of native species, particularly trees, during roadworks should be kept to minimum to maintain the function of the linkage as far as practicable.

No TECs or PECs were determined to be present within the Payne Rd reserve. The results of the FCT analyses indicates that 'Wet forests and woodlands' and/or FCT 13 – 'Deeper wetlands on heavy soils' may be present, but given the vegetation condition of the site, it is not possible to be definitive. The analyses produced assignments to a mixture of wetland types, but which type/s are present cannot be stated with certainty.

The presence of *Eucalyptus patens*, *Corymbia calophylla* and *Agonis flexuosa* at the western end of the site indicates some similarity to the Vasse Blackbutt (near Busselton) PEC, but the other occurrences occur over 10 km away and these tree species are common in the region. It is unlikely that this FCT occurs within the site.

The Payne Rd vegetation is part of the Abba vegetation complex, which has only approximately 6.6% of its original extent remaining. This is considerably below the national target of retaining 30% of the pre-clearing extent for each ecological community below which species loss accelerates (EPA 2008).

5 Summary

The main botanical values within the Pyne Rd road reserve are the presence of two Threatened Flora, namely *Grevillea brachystylis* subsp. *grandis* and *Verticordia plumosa* var. *ananeotes.* Impacts from road maintenance or construction should avoid any impacts on the occurrences of these taxa.

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Figures

Figure 1: Locality Plan Payne Road, City of Busselton Flora and Vegetation Survey

Figure 2: Conservation Significant Flora from the Local Region

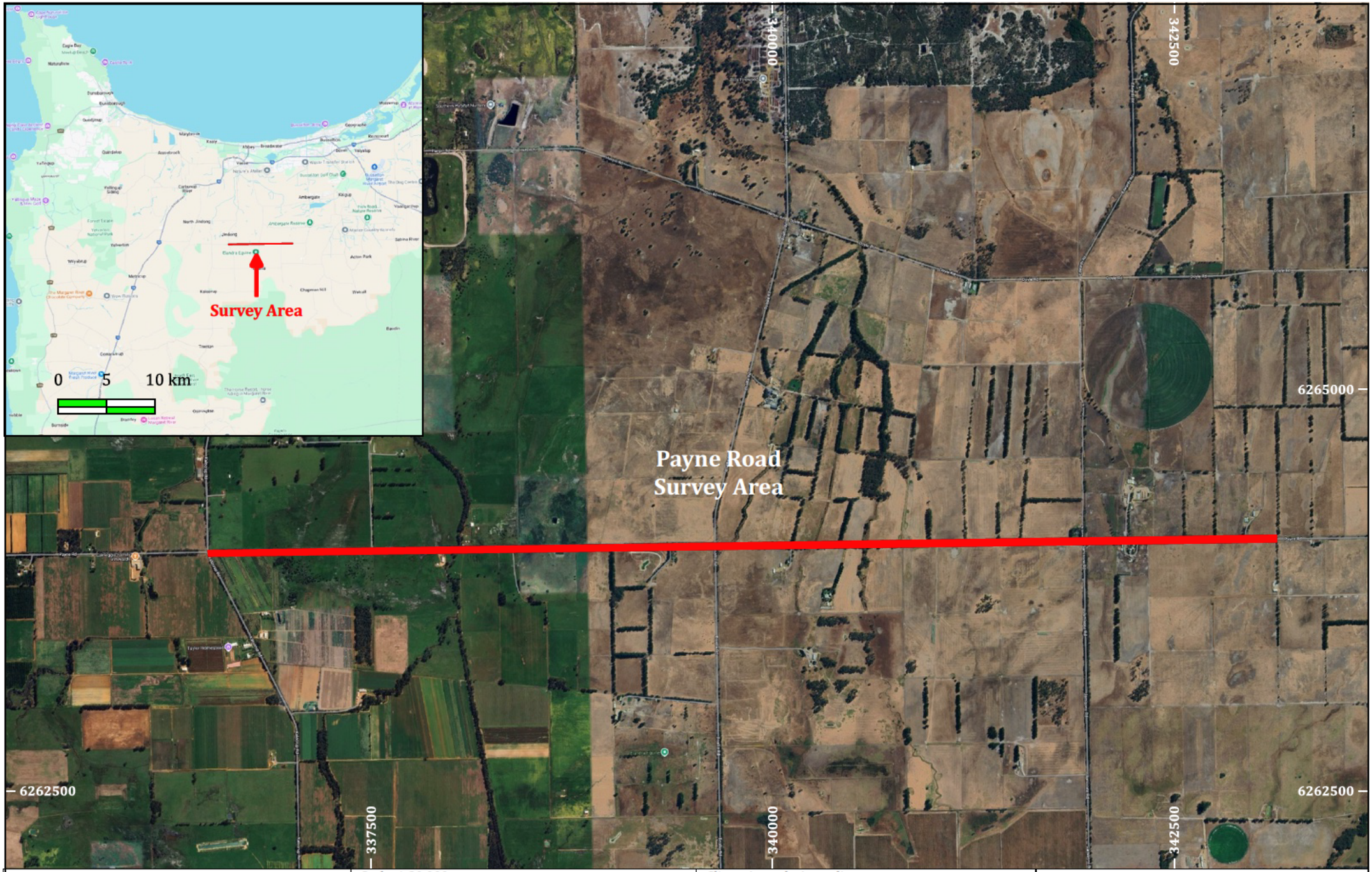
Figure 3: Conservation Significant Communities with Potential to Occur within the Site

Figure 4: Regional Ecological Linkages

Figure 5a-i: Plant Communities

Figure 6a-i: Vegetation Condition

Figure 7: Partial Dendrograms of Sampling Plot Assignments to the SCP Datasets



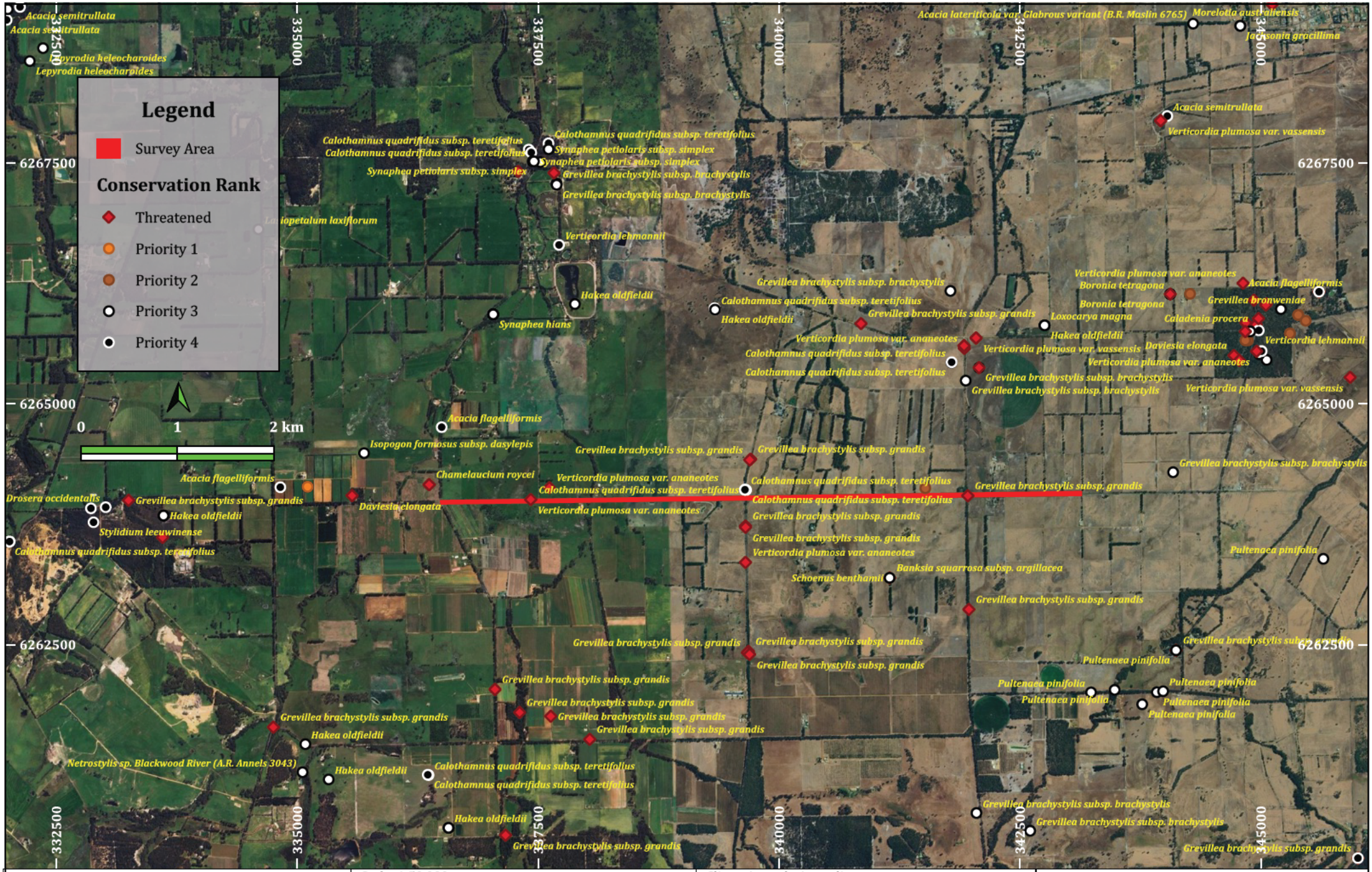
Plantecology CONSULTING

50 New Cross Rd
Kingsley WA 6026

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Original Size: A4
Basemap Source: Google Satellite Hybrid
Datum: GDA 2020
Projection: EPSG 7850

Client: Accendo Australia
Project: Payne Rd Flora Survey
Location: Payne Rd, Busselton
Author: S.T.S. Chalwell
Drawn: S.T.S. Chalwell

Figure 1: Locality Plan



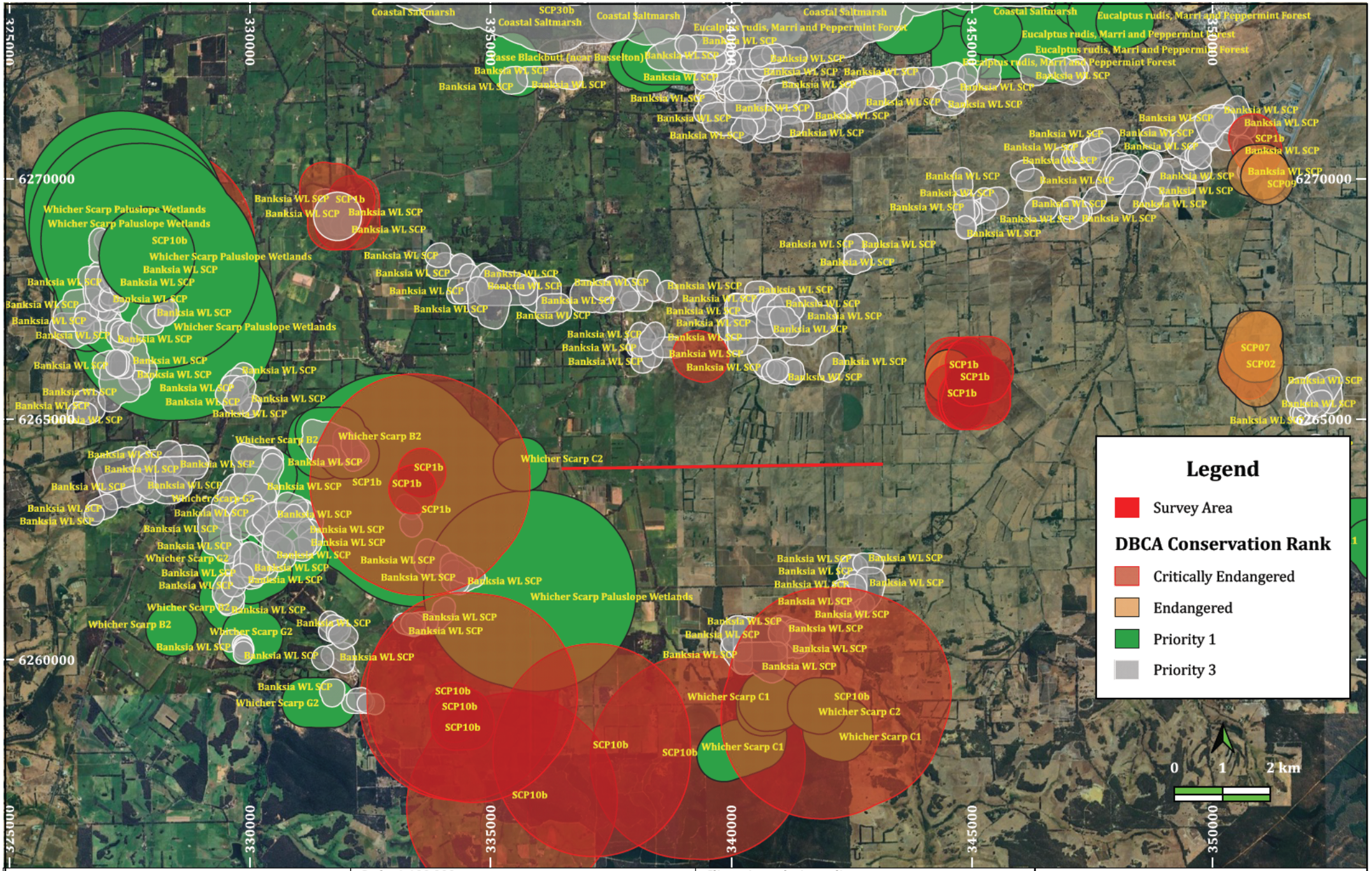
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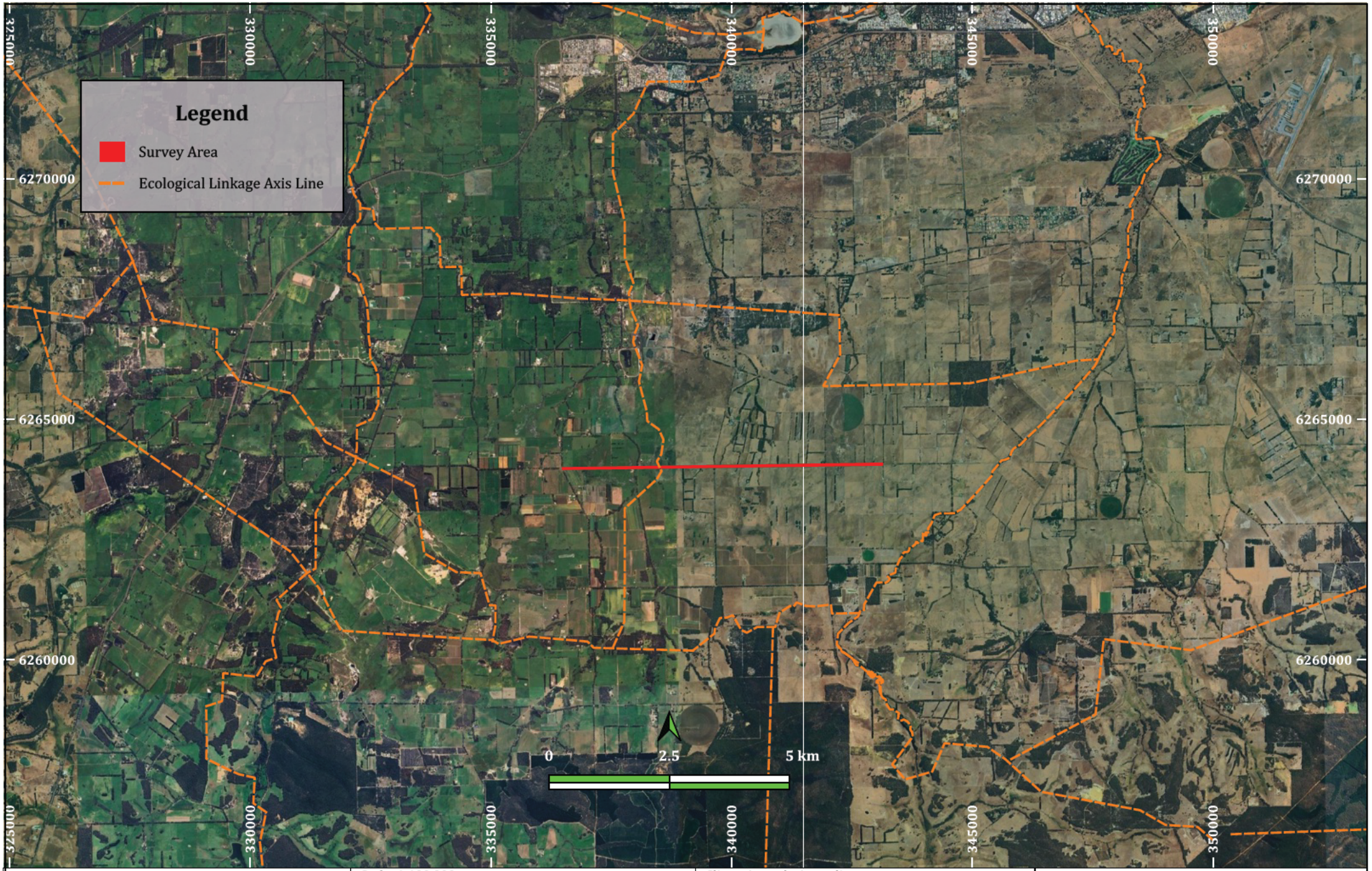
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Basemap Source: Google Satellite Hybrid
Datum: GDA 2020
Projection: EPSG 7850

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Location: Payne Rd, Busselton
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Figure 2:
Conservation Significant Flora



Plantecology CONSULTING 50 New Cross Rd Kingsley WA 6026	Scale: 1:100 000 Original Size: A4 Basemap Source: Google Satellite Hybrid Datum: GDA 2020 Projection: EPSG 7850	Client: Accendo Australia Project: Payne Rd Flora Survey Location: Payne Rd, Busselton Author: S.T.S. Chalwell Drawn: S.T.S. Chalwell	**Figure 3: Conservation Significant Communities**



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Original Size: A4
Basemap Source: Google Satellite Hybrid
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Client: Accendo Australia
Project: Payne Rd Flora Survey
Location: Payne Rd, Busselton
Author: S.T.S. Chalwell
Drawn: S.T.S. Chalwell

Figure 4:
Regional Ecological Linkages



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Kingsley WA 6026

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Original Size: A4
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Projection: EPSG 7850

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Location: Payne Rd, Busselton
Author: S.T.S. Chalwell
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Figure 5a: Vegetation Types



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Original Size: A4
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Location: Payne Rd, Busselton
Author: S.T.S. Chalwell
Drawn: S.T.S. Chalwell

Figure 5b:
Vegetation Types



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50 New Cross Rd
Kingsley WA 6026

Scale: 1:3 000
Original Size: A4
Basemap Source: Google Satellite Hybrid
Datum: GDA 2020
Projection: EPSG 7850

Client: Accendo Australia
Project: Payne Rd Flora Survey
Location: Payne Rd, Busselton
Author: S.T.S. Chalwell
Drawn: S.T.S. Chalwell

Figure 5c:
Vegetation Types



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50 New Cross Rd
Kingsley WA 6026

Scale: 1:3 000
Original Size: A4
Basemap Source: Google Satellite Hybrid
Datum: GDA 2020
Projection: EPSG 7850

Client: Accendo Australia
Project: Payne Rd Flora Survey
Location: Payne Rd, Busselton
Author: S.T.S. Chalwell
Drawn: S.T.S. Chalwell

Figure 5d:
Vegetation Types



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50 New Cross Rd
Kingsley WA 6026

Scale: 1:3 000
Original Size: A4
Basemap Source: Google Satellite Hybrid
Datum: GDA 2020
Projection: EPSG 7850

Client: Accendo Australia
Project: Payne Rd Flora Survey
Location: Payne Rd, Busselton
Author: S.T.S. Chalwell
Drawn: S.T.S. Chalwell

Figure 5e:
Vegetation Types



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50 New Cross Rd
Kingsley WA 6026

Scale: 1:3 000
Original Size: A4
Basemap Source: Google Satellite Hybrid
Datum: GDA 2020
Projection: EPSG 7850

Client: Accendo Australia
Project: Payne Rd Flora Survey
Location: Payne Rd, Busselton
Author: S.T.S. Chalwell
Drawn: S.T.S. Chalwell

Figure 5f:
Vegetation Types



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Kingsley WA 6026

Scale: 1:3 000
Original Size: A4
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Figure 5g:
Vegetation Types



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Figure 5h:
Vegetation Types



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Original Size: A4
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Location: Payne Rd, Busselton
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Figure 5i:
Vegetation Types



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Location: Payne Rd, Busselton
Author: S.T.S. Chalwell
Drawn: S.T.S. Chalwell

Figure 6a:
Vegetation Condition



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Projection: EPSG 7850

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Location: Payne Rd, Busselton
Author: S.T.S. Chalwell
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Figure 6b:
Vegetation Condition



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Kingsley WA 6026

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Basemap Source: Google Satellite Hybrid
Datum: GDA 2020
Projection: EPSG 7850

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Project: Payne Rd Flora Survey
Location: Payne Rd, Busselton
Author: S.T.S. Chalwell
Drawn: S.T.S. Chalwell

Figure 6c:
Vegetation Condition



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Kingsley WA 6026

Scale: 1:3 000
Original Size: A4
Basemap Source: Google Satellite Hybrid
Datum: GDA 2020
Projection: EPSG 7850

Client: Accendo Australia
Project: Payne Rd Flora Survey
Location: Payne Rd, Busselton
Author: S.T.S. Chalwell
Drawn: S.T.S. Chalwell

Figure 6d:
Vegetation Condition



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50 New Cross Rd
Kingsley WA 6026

Scale: 1:3 000
Original Size: A4
Basemap Source: Google Satellite Hybrid
Datum: GDA 2020
Projection: EPSG 7850

Client: Accendo Australia
Project: Payne Rd Flora Survey
Location: Payne Rd, Busselton
Author: S.T.S. Chalwell
Drawn: S.T.S. Chalwell

Figure 6e:
Vegetation Condition



Plantecology CONSULTING

50 New Cross Rd
Kingsley WA 6026

Scale: 1:3 000
Original Size: A4
Basemap Source: Google Satellite Hybrid
Datum: GDA 2020
Projection: EPSG 7850

Client: Accendo Australia
Project: Payne Rd Flora Survey
Location: Payne Rd, Busselton
Author: S.T.S. Chalwell
Drawn: S.T.S. Chalwell

Figure 6f:
Vegetation Condition



Plantecology CONSULTING

50 New Cross Rd
Kingsley WA 6026

Scale: 1:3 000
Original Size: A4
Basemap Source: Google Satellite Hybrid
Datum: GDA 2020
Projection: EPSG 7850

Client: Accendo Australia
Project: Payne Rd Flora Survey
Location: Payne Rd, Busselton
Author: S.T.S. Chalwell
Drawn: S.T.S. Chalwell

Figure 6g:
Vegetation Condition



Plantecology CONSULTING

50 New Cross Rd
Kingsley WA 6026

Scale: 1:3 000
Original Size: A4
Basemap Source: Google Satellite Hybrid
Datum: GDA 2020
Projection: EPSG 7850

Client: Accendo Australia
Project: Payne Rd Flora Survey
Location: Payne Rd, Busselton
Author: S.T.S. Chalwell
Drawn: S.T.S. Chalwell

Figure 6h:
Vegetation Condition



Plantecology CONSULTING

50 New Cross Rd
Kingsley WA 6026

Scale: 1:3 000
Original Size: A4
Basemap Source: Google Satellite Hybrid
Datum: GDA 2020
Projection: EPSG 7850

Client: Accendo Australia
Project: Payne Rd Flora Survey
Location: Payne Rd, Busselton
Author: S.T.S. Chalwell
Drawn: S.T.S. Chalwell

Figure 6i:
Vegetation Condition

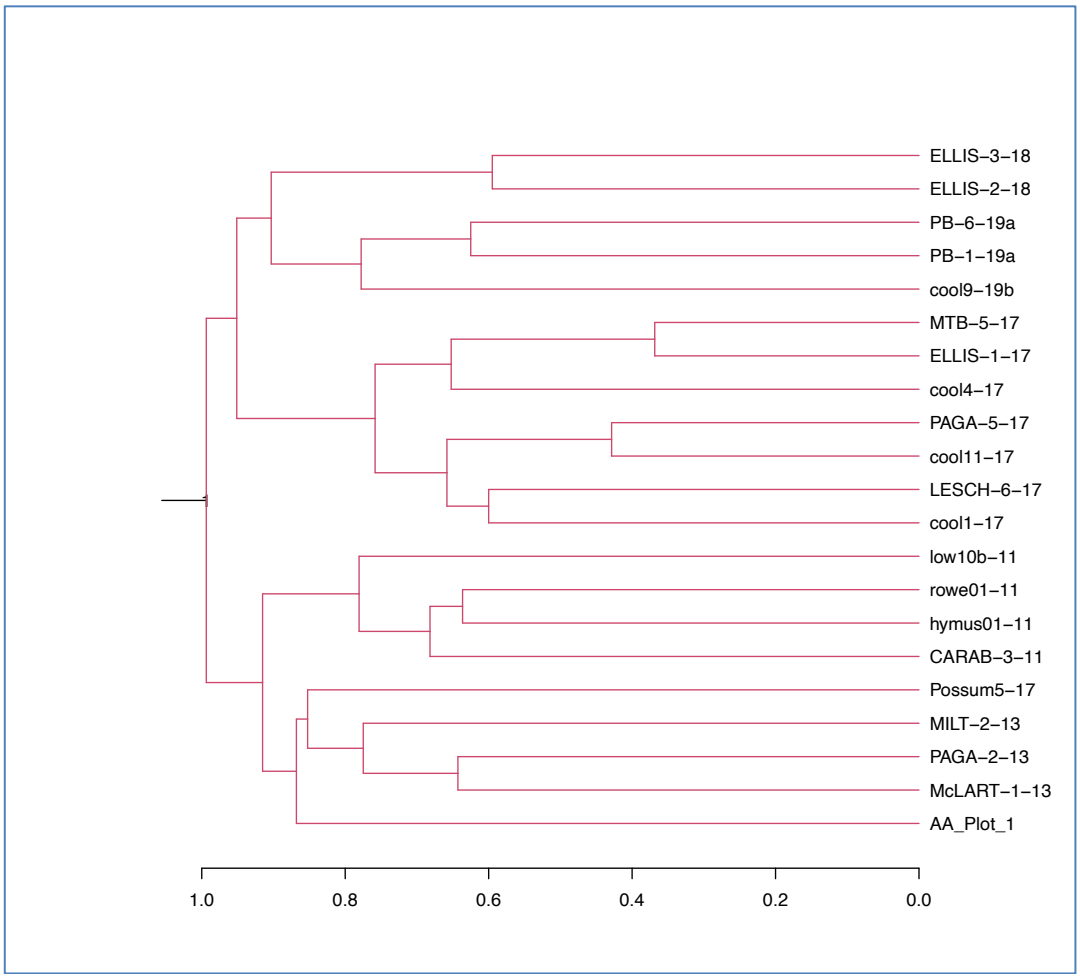


Figure 7a: Partial dendrogram of the assignment of Plot 1 to the Gibson et al. (1994) floristic community types.

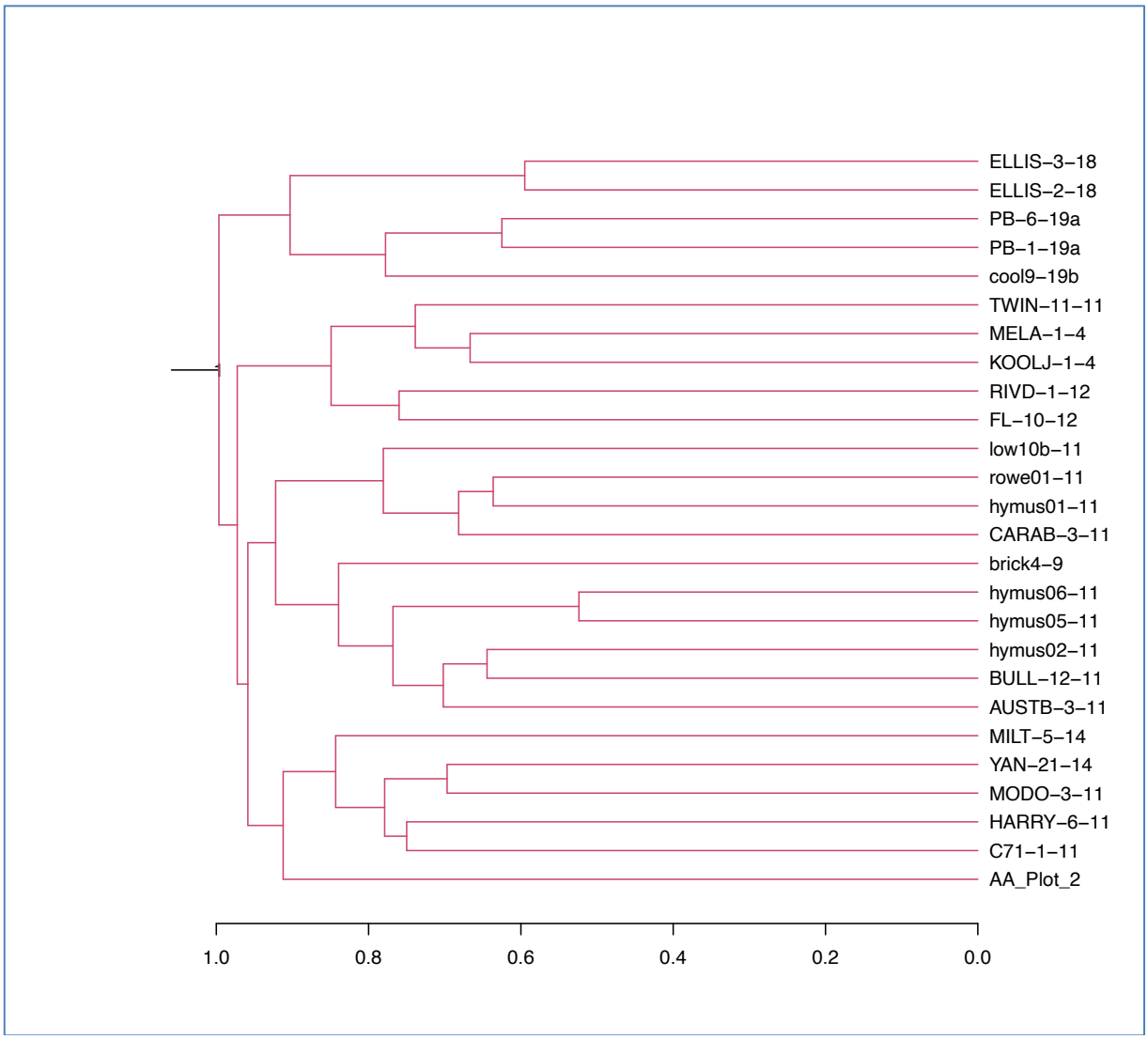


Figure 7b: Partial dendrogram of the assignment of Plot 2 to the Gibson et al. (1994) floristic community types.

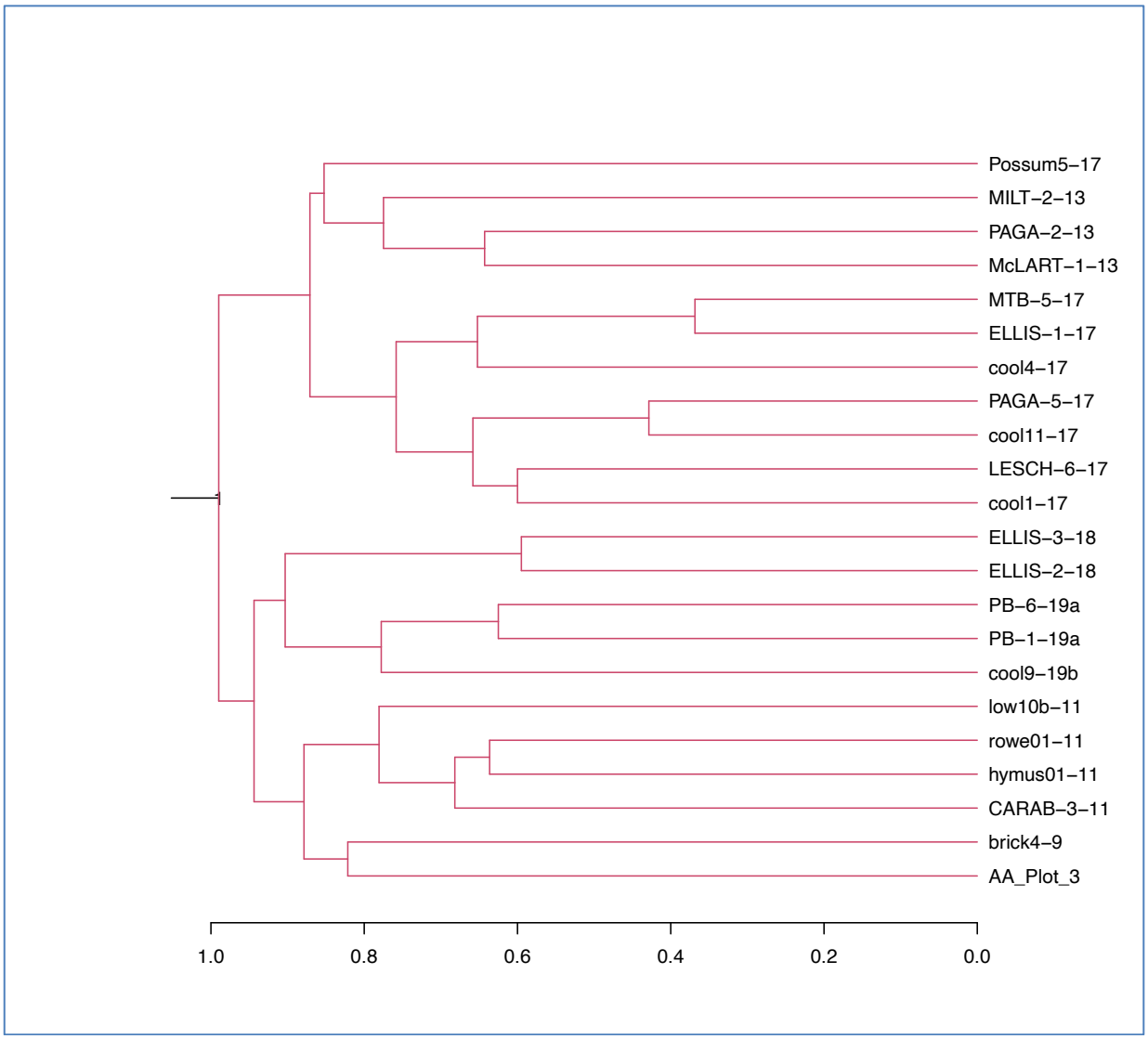


Figure 7c: Partial dendrogram of the assignment of Plot 3 to the Gibson et al. (1994) floristic community types.

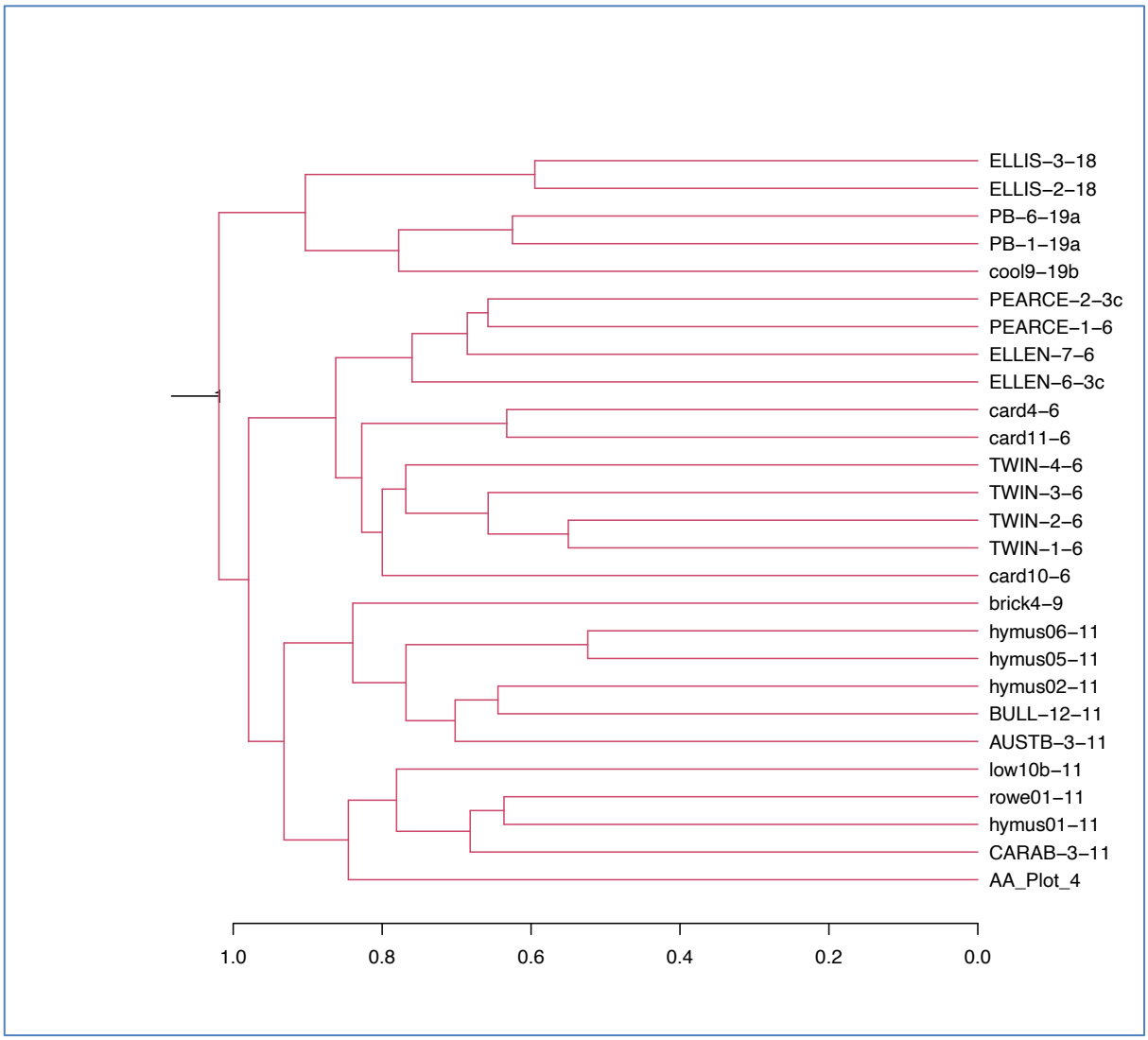


Figure 7d: Partial dendrogram of the assignment of Plot 4 to the Gibson et al. (1994) floristic community types.

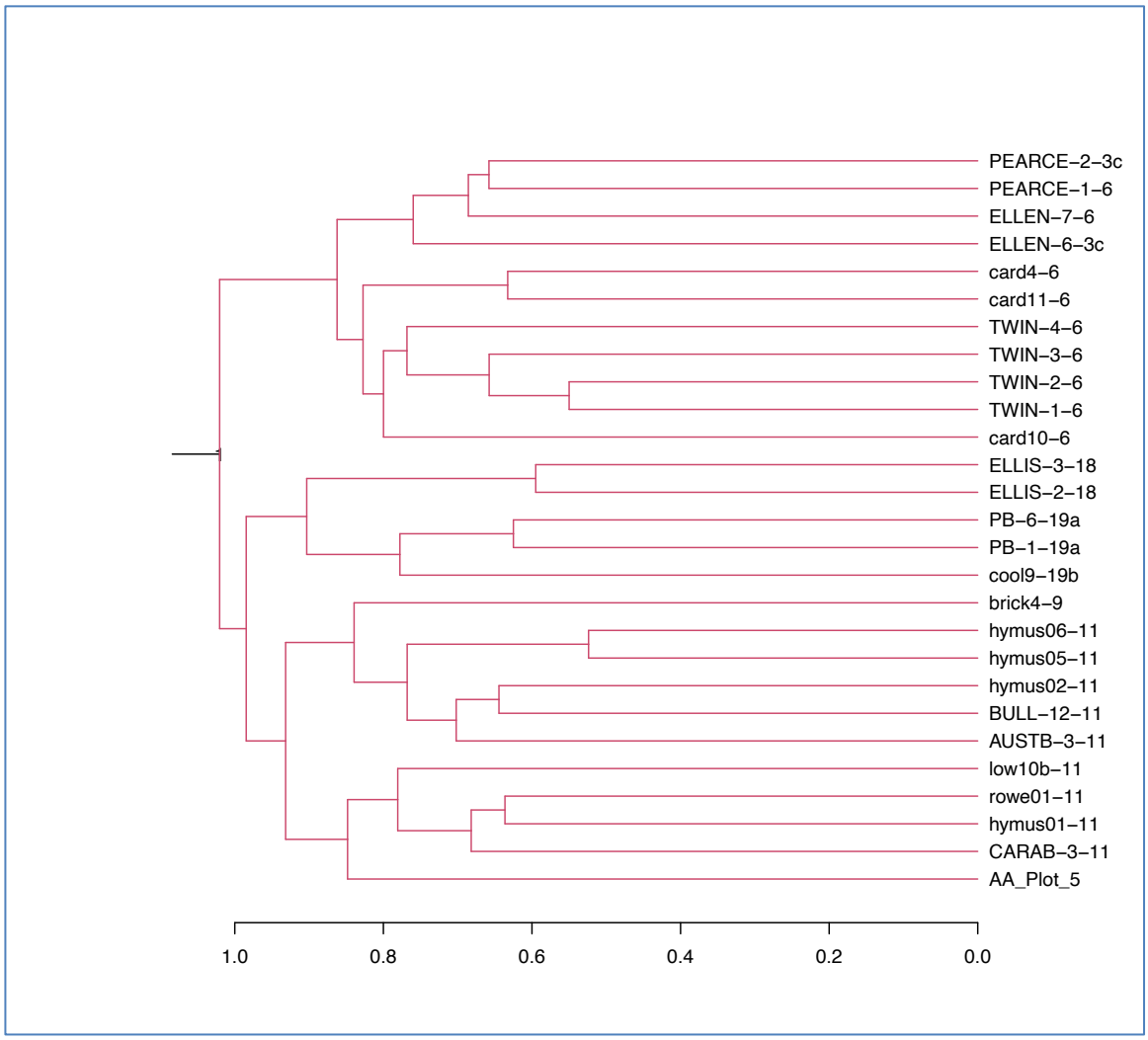


Figure 7e: Partial dendrogram of the assignment of Plot 5 to the Gibson et al. (1994) floristic community types.

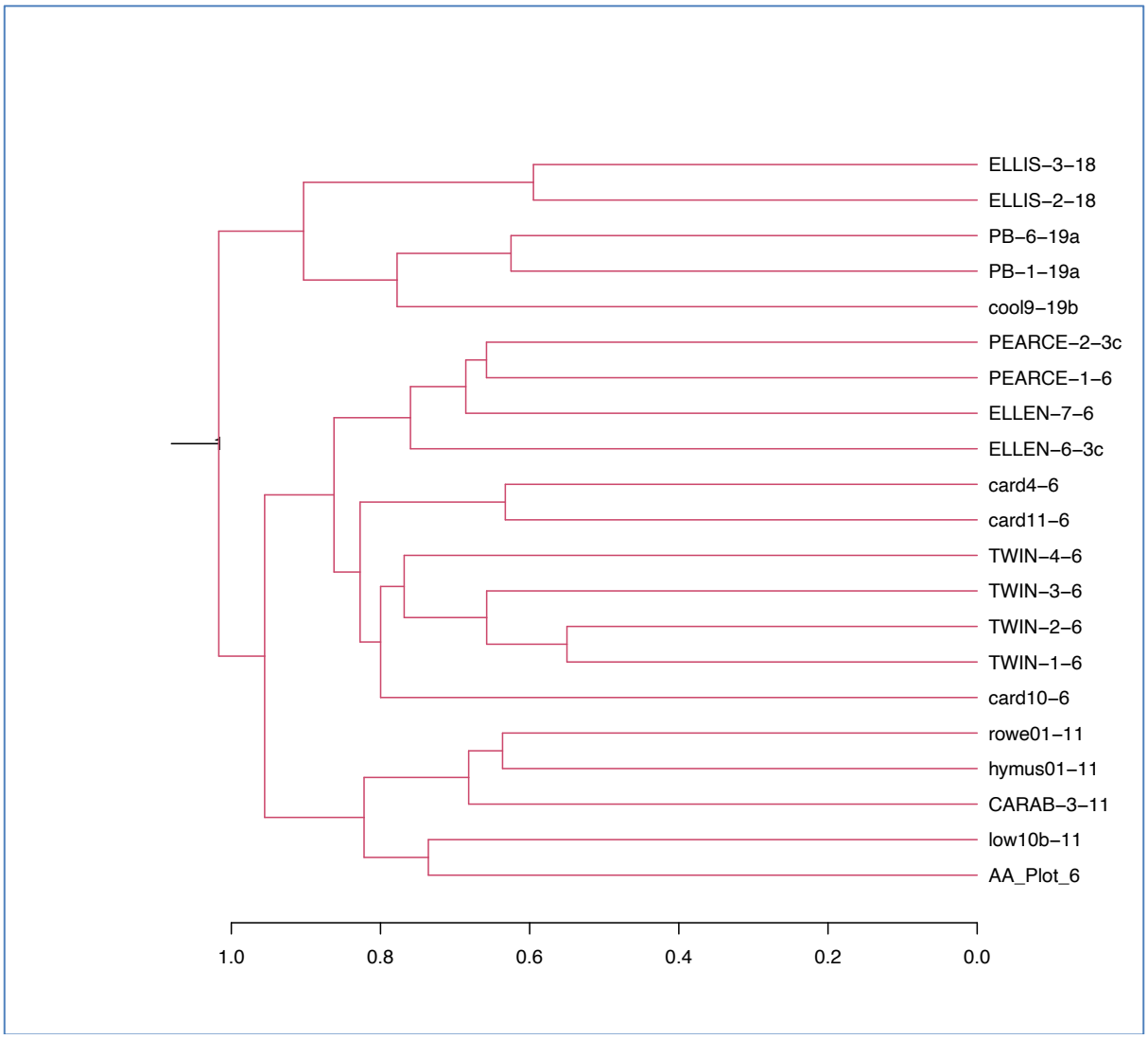


Figure 7f: Partial dendrogram of the assignment of Plot6 to the Gibson et al. (1994) floristic community types.

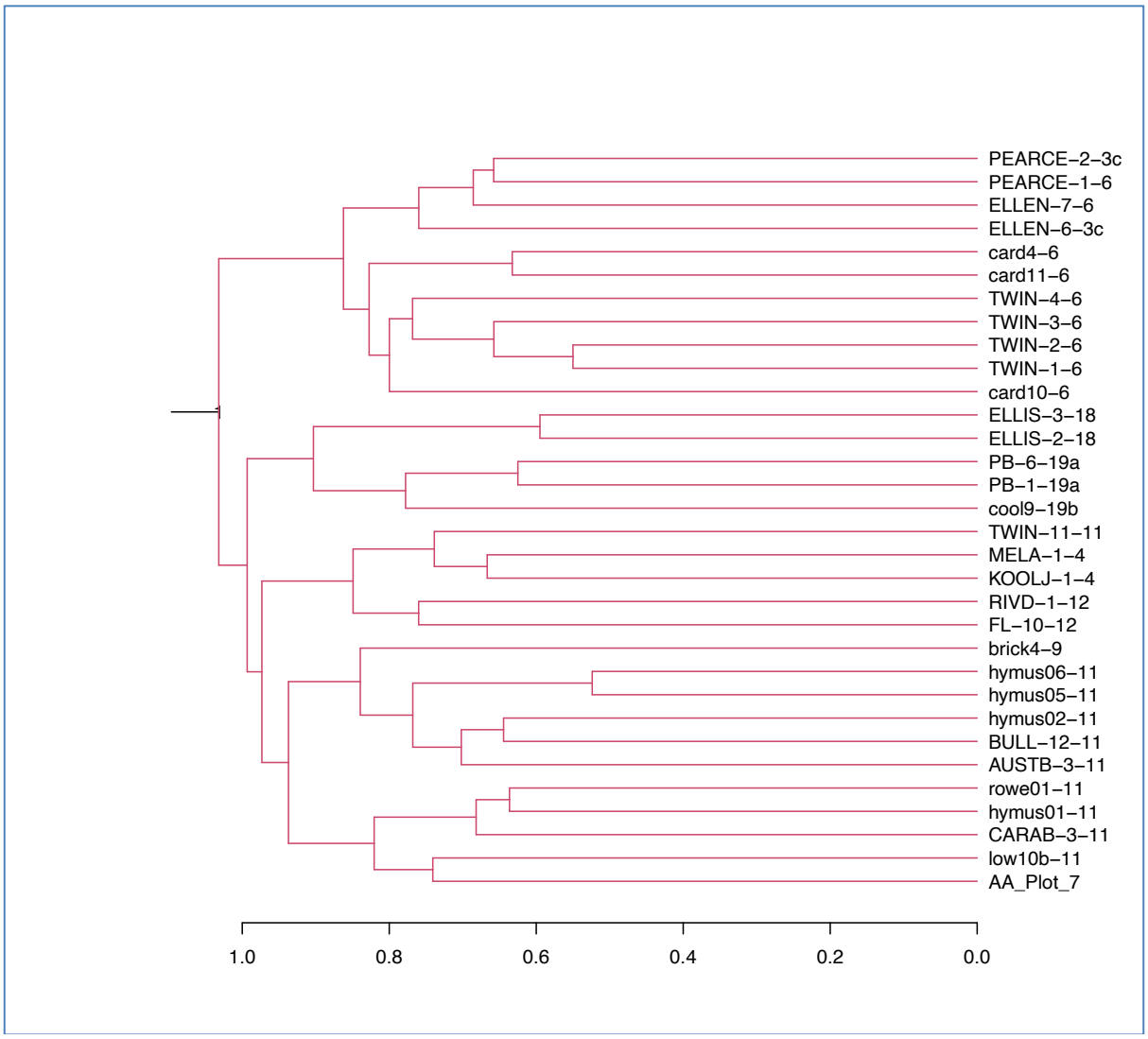


Figure 7g: Partial dendrogram of the assignment of Plot 7 to the Gibson et al. (1994) floristic community types.

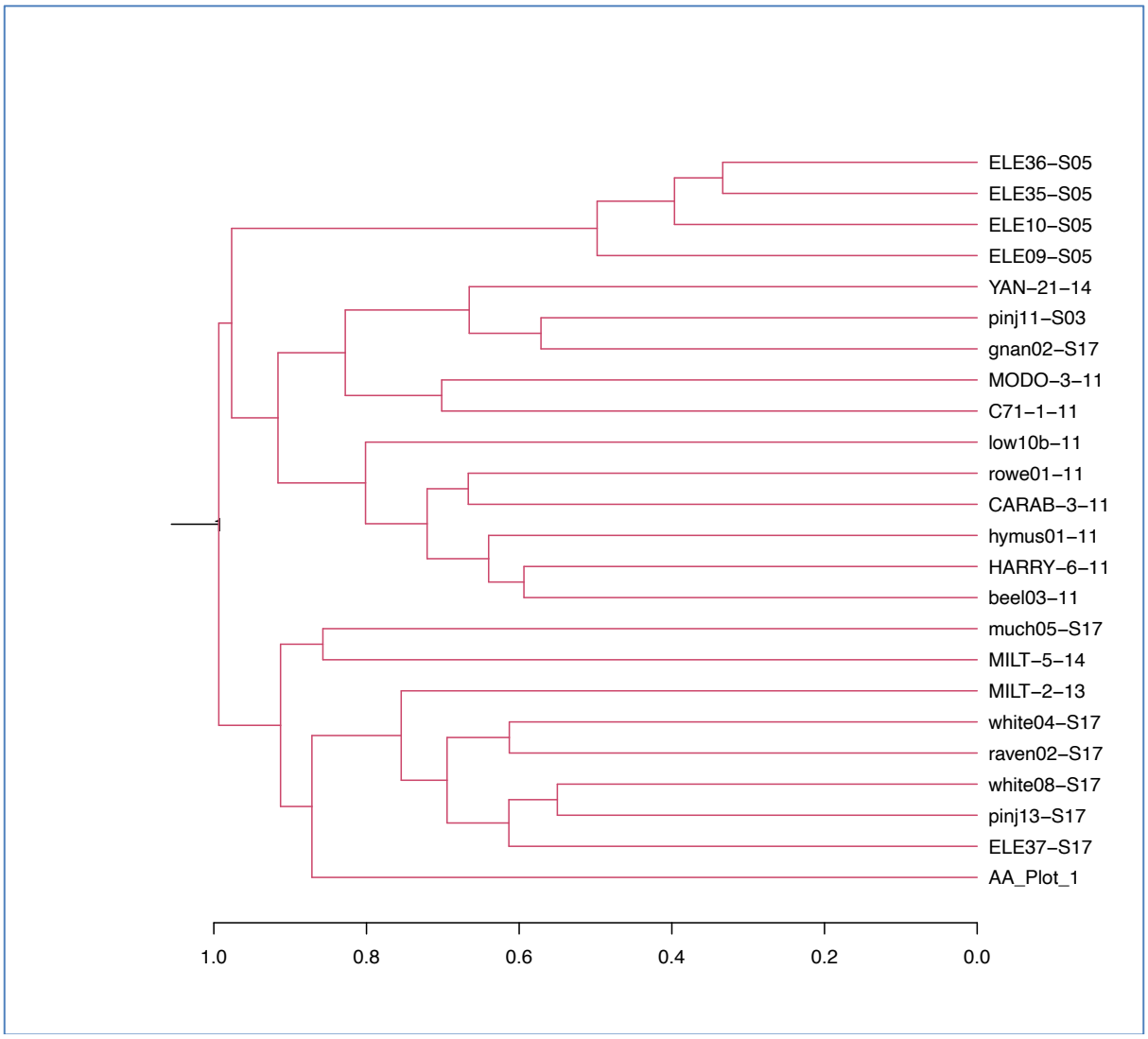


Figure 7h: Partial dendrogram of the assignment of Plot 1 to the Keighery et al. (2012) floristic community types.

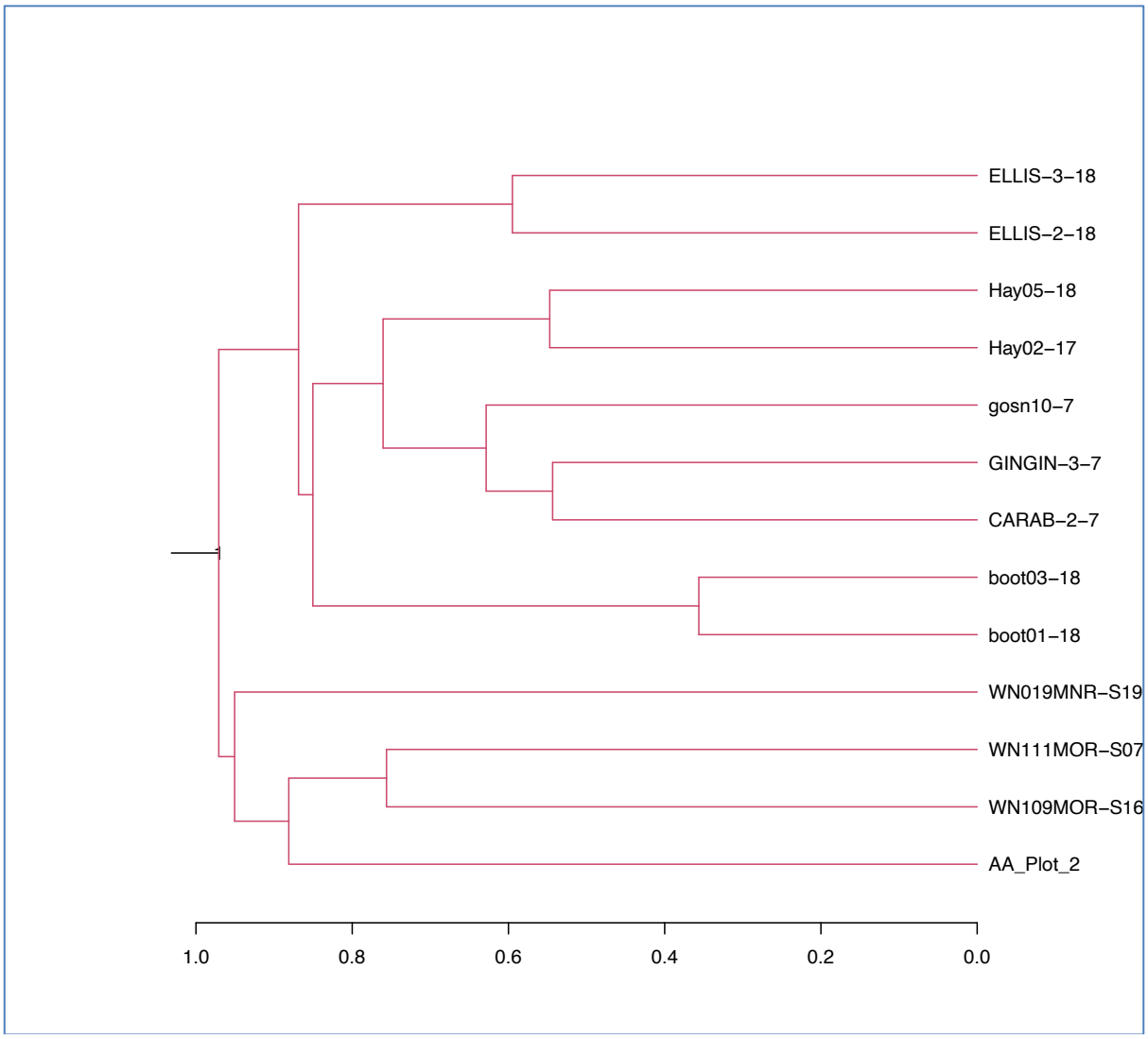


Figure 7i: Partial dendrogram of the assignment of Plot 2 to the Keighery et al. (2012) floristic community types.

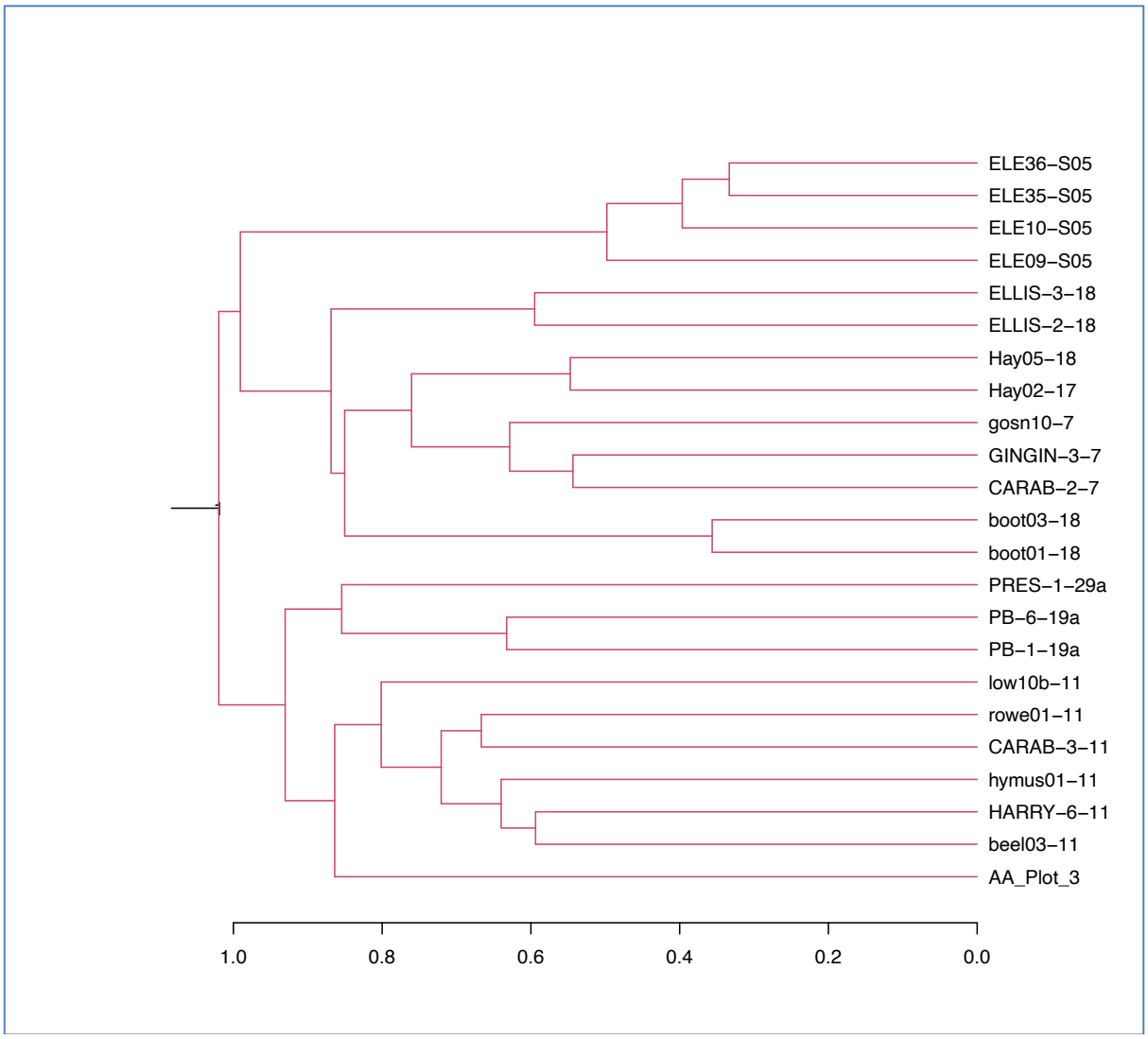


Figure 7j: Partial dendrogram of the assignment of Plot 3 to the Keighery et al. (2012) floristic community types.

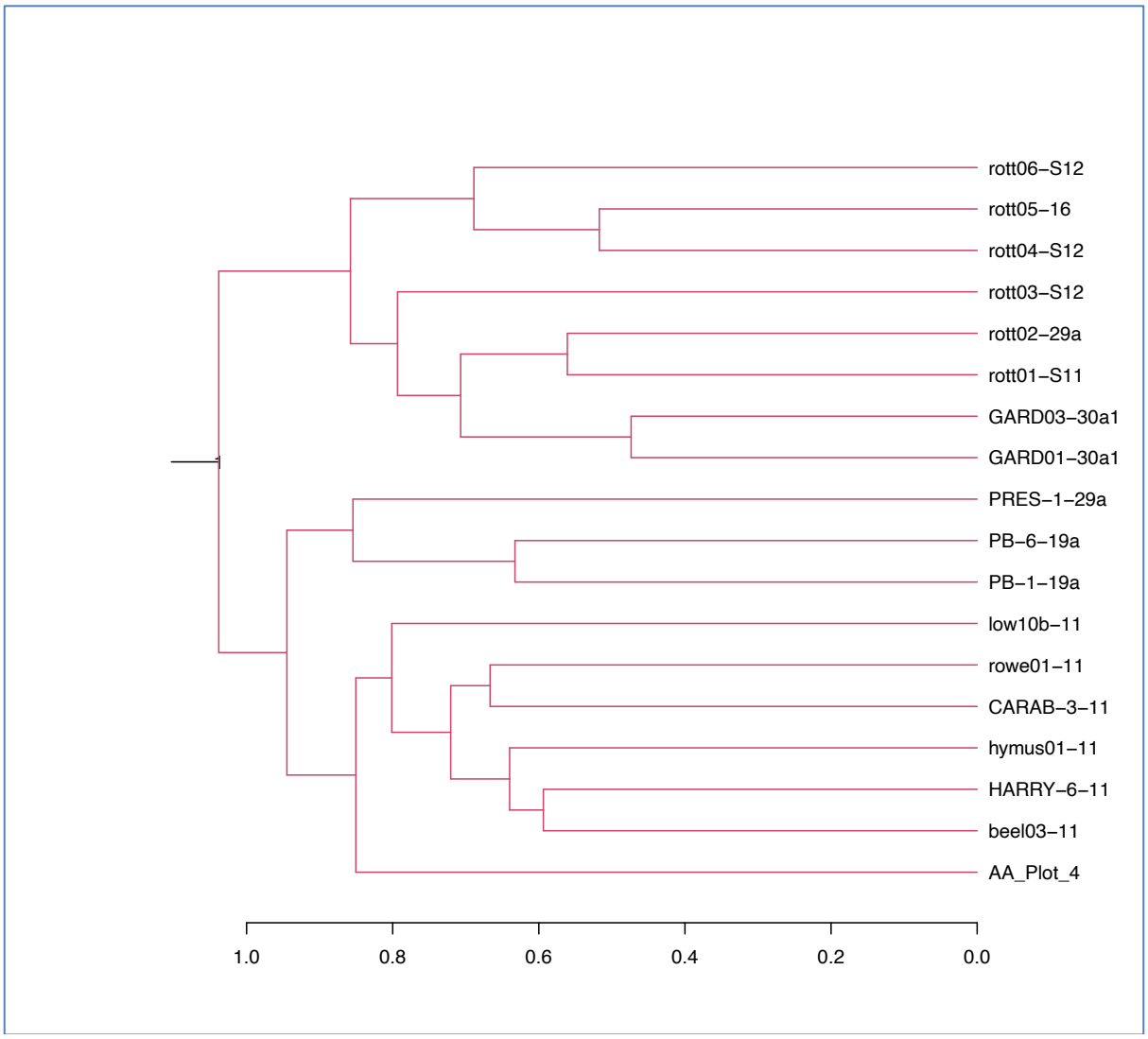


Figure 7k: Partial dendrogram of the assignment of Plot 4 to the Keighery et al. (2012) floristic community types.

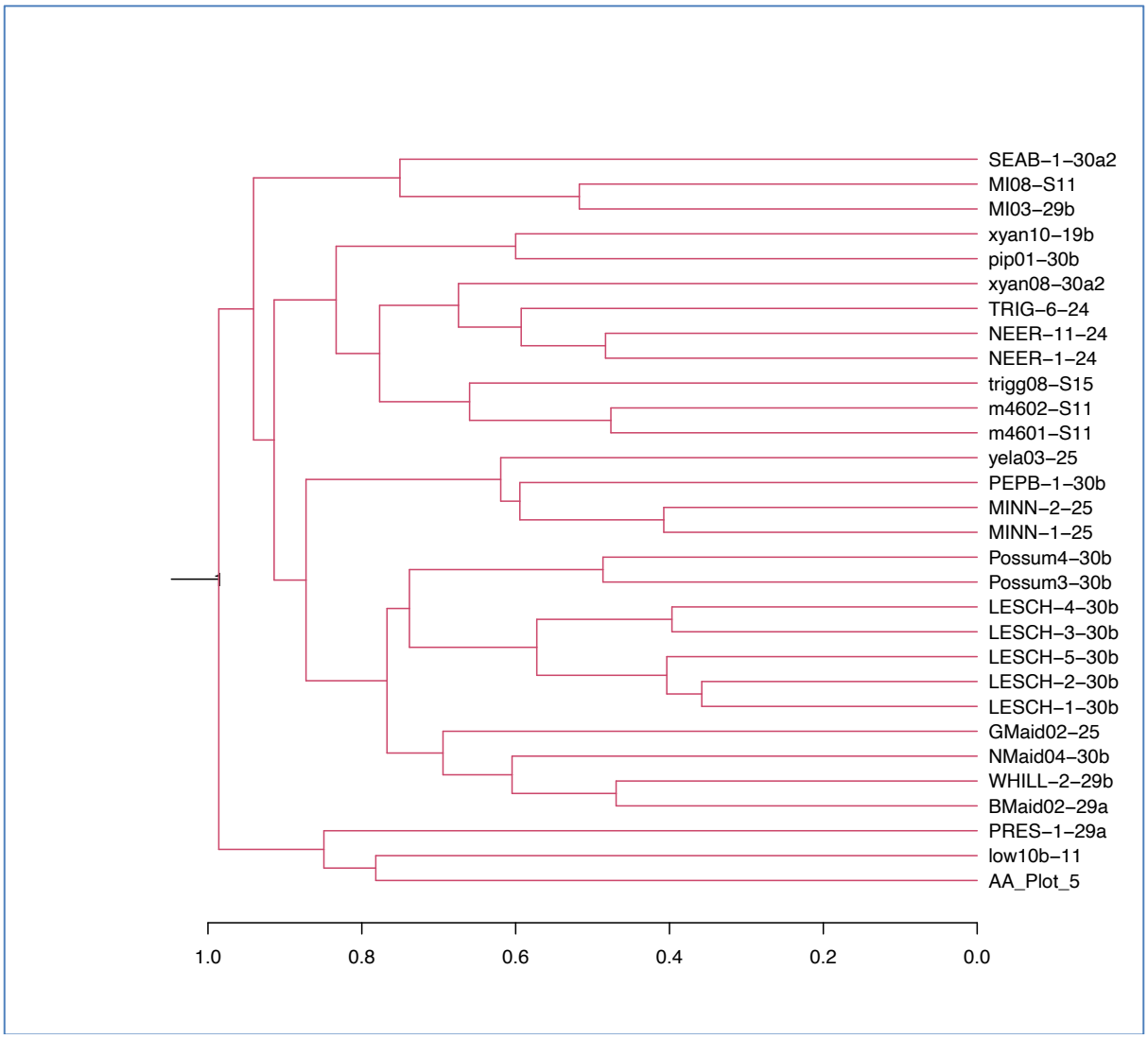


Figure 7l: Partial dendrogram of the assignment of Plot 5 to the Keighery et al. (2012) floristic community types.

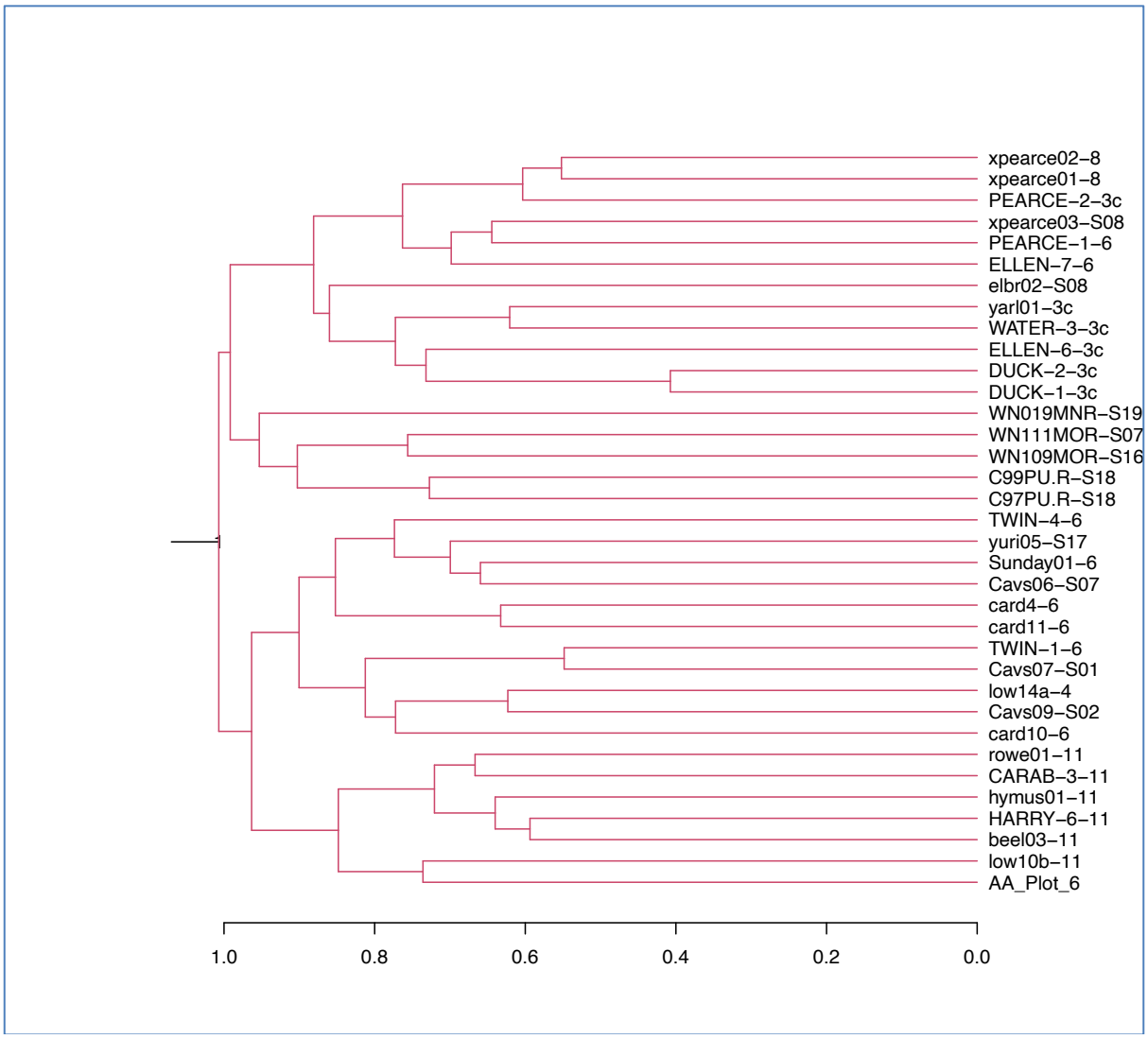


Figure 7m: Partial dendrogram of the assignment of Plot 6 to the Keighery et al. (2012) floristic community types.

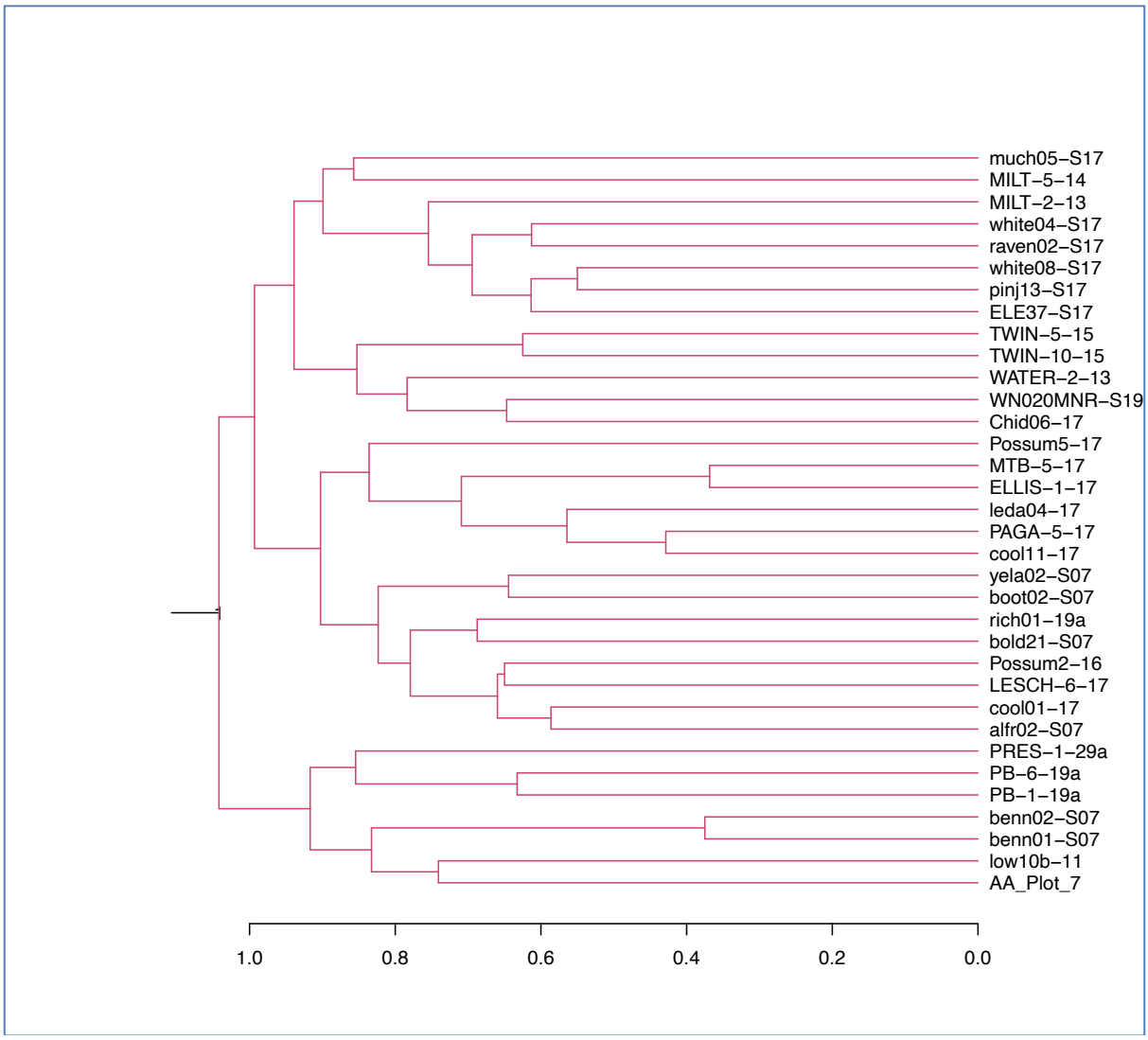


Figure 7n: Partial dendrogram of the assignment of Plot 7 to the Keighery et al. (2012) floristic community types.

Plates



Plate 3: View of sampling Plot 1: *Corymbia calophylla* Woodland in 'Completely Degraded' condition.



Plate 4: View of sampling Plot 2: *Melaleuca* Woodland in 'Very Good' condition.



Plate 5: View of sampling plot 3: *Corymbia calophylla* Woodland in 'Good' condition.



Plate 6: View of sampling Plot 4: *Corymbia calophylla* Woodland in 'Degraded' condition.



Plate 7: View of sampling Plot 5: *Corymbia calophylla* Woodland in 'Completely Degraded' condition.



Plate 8: View of sampling Plot 6: *Corymbia calophylla* Woodland in 'Completely Degraded' condition.



Plate 9: View of sampling Plot 7: *Corymbia calophylla* Woodland in 'Completely Degraded' condition.

Appendix A

List of flora recorded within the survey area, including opportunistically observed taxa.

NB: * indicates introduced flora

Family	Taxon
Dennstaedtiaceae	*Pteridium esculentum*
Lauraceae	*Cassytha ?pomiformis*
Araceae	* *Zantedeschia aethiopica*
Colchicaceae	*Wurmbea monantha*
Iridaceae	* *Gladiolus caryophyllaceus* *Patersonia occidentalis* *Patersonia umbrosa* var. *xanthina* * *Romulea rosea* * *Sparaxis bulbifera* * *Watsonia meriana* var. *bulbillifera*
Xanthorrhoeaceae	*Xanthorrhoea preissii*
Asparagaceae	* *Asparagus officinalis* *Lomandra pauciflora*
Hemerocallidaceae	*Agrostocrinum hirsutum*
Dasypogonaceae	*Dasypogon hookeri* *Kingia australis*
Juncaceae	*Juncus pallidus*
Cyperaceae	* *Ficinia marginata* *Lepidosperma pubisquameum* *Lepidosperma sp.* *Machaerina juncea* *Machaerina laxa* *Netrostylis* sp Jarrah forest *Schoenus* sp.
Anarthriaceae	*Anarthria prolifera*
Restionaceae	*Hypolaena exsulca* *Leptocarpus ?thysananthus* *Loxocarya magna*
Poaceae	* *Anthoxanthum odoratum* * *Avena barbata* * *Briza maxima* * *Briza minor* * *Bromus diandrus* * *Cynodon dactylon* * *Ehrharta longiflora* * *Eragrostis curvula* * *Holcus lanatus*

Family	Taxon	
Poaceae	* *Lolium rigidum*	
	* *Pennisetum clandestinum*	
Papaveraceae	* *Fumaria capreolata*	
Proteaceae	*Grevillea brachystylis* subsp. *grandis*	T
	Grevillea manglesioides ?subsp. *metaxa*	
	Hakea amplexicaulis	
	Hakea cyclocarpa	
	Hakea varia	
Crassulaceae	* *Crassula glomerata*	
Fabaceae	*Acacia saligna*	
	Acacia stenoptera	
	* *Chamaecytisus palmensis*	
	Daviesia decurrens	
	* *Dipogon lignosus*	
	Kennedia coccinea	
	* *Lotus subbiflorus*	
	* *Trifolium dubium*	
	* *Trifolium sp.*	
	* *Trifolium subterraneum*	
	* *Vicia sativa* subsp. *sativa*	
Rosaceae	* *Rubus ulmifolius*	
Oxalidaceae	* *Oxalis glabra*	
Elaeocarpaceae	*Tremandra stelligera*	
Euphorbiaceae	* *Euphorbia terracina*	
	* *Homalanthus populifolius*	
Salicaceae	* *Salix babylonica*	
Geraniaceae	* *Erodium cicutarium*	
	* *Geranium molle*	
Onagraceae	* *Oenothera mollissima*	
Myrtaceae	*Agonis flexuosa*	
	Astartea scoparia	
	Corymbia calophylla	
	Eucalyptus patens	
	* *Eucalyptus* sp.	
	Hypocalymma angustifolium	
	Melaleuca incana subsp. *incana*	
	Melaleuca lateritia	
	Melaleuca preissiana	

Family		Taxon	
Myrtaceae		*Melaleuca radula*	
		Melaleuca rhaphiophylla	
		Taxandria linearifolia	
		Verticordia plumosa var. *ananeotes*	T
Brassicaceae	*	*Brassica tournefortii*	
Loranthaceae		*Nuytsia floribunda*	
Polygonaceae	*	*Rumex acetosella*	
	*	*Rumex crispus*	
	*	*Rumex pulcher*	
Primulaceae		*Lysimachia arvensis*	
Oleaceae	*	*Olea europaea* subsp. *europaea*	
Plantaginaceae	*	*Plantago lanceolata*	
Lamiaceae	*	*Stachys arvensis*	
Menyanthaceae	*	*Ornduffia parnassifolia*	
Goodeniaceae		*Dampiera pedunculata*	
Asteraceae	*	*Arctotheca calendula*	
	*	*Cotula coronopifolia*	
	*	*Cotula turbinata*	
	*	*Hypochaeris glabra*	
	*	*Sonchus oleraceus*	
Pittosporaceae	*	*Pittosporum undulatum*	

Appendix B

Site x species matrix of flora recorded within plots in the survey area.

Taxon	Plot_1	Plot_2	Plot_3	Plot_4	Plot_5	Plot_6	Plot_7	Opportunistics
Acacia saligna		0.5						
Acacia stenoptera		0.3						
Agonis flexuosa	0.3							
Agrostocrinum hirsutum			0.5					
Anarthria prolifera					0.1			
**Anthoxanthum odoratum*				0.2	0.1		0.1	
**Arctotheca calendula*							0.1	
**Asparagus officinalis*		0.5						
Astartea scoparia	0.3		0.1					
**Avena barbata*	1	3	0.1		0.1			
**Brassica tournefortii*				0.1		0.1	0.2	
**Briza maxima*		0.2	0.3			0.1		
**Briza minor*							0.1	
**Bromus diandrus*	0.1			0.5	1	0.3	0.1	
Cassytha ?pomiformis		0.2						
**Chamaecytisus palmensis*					0.1	0.2		
Corymbia calophylla	35		35	35	35		2	
**Cotula coronopifolia*					0.1			
**Cotula turbinata*	0.1		0.1			0.1	0.1	
**Crassula glomerata*							0.1	
**Cynodon dactylon*						0.3	0.1	
Dampiera pedunculata		0.3						
Dasypogon hookeri	1				0.2			
Daviesia decurrens		0.1						
**Dipogon lignosus*		0.4						
**Ehrharta longiflora*	3		0.3	5	0.1	0.1	0.1	
**Eragrostis curvula*	1		0.2	2	1			
**Erodium cicutarium*							0.1	
Eucalyptus patens	0.5							
**Eucalyptus sp.* (planted)								X
**Euphorbia terracina*		0.3					0.1	
**Ficinia marginata*					0.1			
**Fumaria capreolata*		0.2						
**Geranium molle*					0.1	0.1	0.1	
**Gladiolus caryophyllaceous*								
Grevillea manglesioides ?subsp. *metaxa*		0.1						
Hakea amplexicaulis			0.2					
Hakea cyclocarpa				0.1				
Hakea varia	0.5		0.3					
**Holcus lanatus*				0.1		0.1		
**Homalanthus populifolius*	0.5							
Hypocalymma angustifolium		0.3						
**Hypochaeris glabra*				0.1				
Hypolaena exsulca	0.5							
Juncus pallidus	0.3		0.2		0.1			
Kennedia coccinea			0.1					
Kingia australis			0.1	0.3		0.1		
Lepidosperma pubisquameum	0.2			0.3				
Lepidosperma sp.		0.2						
Leptocarpus ?thysananthus	0.5	4						
**Lolium rigidum*						0.2	0.1	
Lomandra pauciflora	0.1							
**Lotus subbiflorus*		0.2	0.1				0.1	
Loxocarya magna			0.1	0.1	0.1			
Lysimachia arvensis		0.1	0.1			0.2	0.1	
Machaerina juncea			0.5					
Machaerina laxa		0.1		0.3	0.1	0.1		
Melaleuca incana subsp. *incana*		5						
Melaleuca lateritia		4						
Melaleuca preissiana	5	5				0.5		
Melaleuca radula		0.5						
Melaleuca rhaphiophylla	0.3	25						
Netrostylis sp. Jarrah forest			0.5					
Nuytsia floribunda	0.3		0.3	0.5				
**Oenothera mollissima*		0.1						
**Olea europaea* subsp. *europaea*	0.7	0.5	0.3	0.1				
**Ornuduffia parnassifolia*		0.1						
**Oxalis glabra*					0.1		0.5	
Patersonia occidentalis	0.3							
Patersonia umbrosa var. *xanthina*								
**Pennisetum clandestinum*	70	50	25	20	50	0.5		
**Pittosporum undulatum*		0.3						
**Plantago lanceolata*	0.1	0.1			0.1			
Pteridium esculentum	5							
**Romulea rosea*				0.1				
**Rubus ulmifolius*	0.5							
**Rumex acetosella*				0.1		0.1	0.1	
**Rumex crispus*		0.5					0.1	

Taxon	Plot_1	Plot_2	Plot_3	Plot_4	Plot_5	Plot_6	Plot_7	Opportunistics
**Rumex pulcher*					0.1	0.1		
**Salix alba* (planted)				3				
Schoenus sp.		0.2						
**Sonchus oleraceus*	0.1	0.1	0.1	0.1				
**Sparaxis bulbifera*	0.1			1	0.5	0.1	0.1	
**Stachys arvensis*		0.1						
Taxandria linearifolia	1		0.2	0.3				
Tremandra stelligera			0.5					
**Trifolium dubium*				0.2		0.1		
**Trifolium* sp.					0.1			
**Trifolium subterraneum*						0.1	0.1	
**Vicia sativa* subsp. *sativa*	0.1			0.1	0.1	0.1	0.1	
**Watsonia meriana* var. *bulbillifera*	2	1	8	3	0.5	45	60	
Wurmbea monantha		0.1						
Xanthorrhoea preissii	0.5	0.5	0.3	2	1			
**Zantedeschia aethiopica*			0.3	0.1	0.1	0.1	0.2	

Appendix C

Sampling plot environmental data

Site Name	Latitude	Longitude	Site Type	Date	Plot Shape	Plot size (m^2)	Topography
Plot_1	115.236065	-33.75151	Relevé	9/10/2024	N/A		Flat
Plot_2	115.239259	-33.751615	Relevé	9/10/2024	N/A		Flat
Plot_3	115.253181	-33.751558	Relevé	10/10/2024	N/A		Flat
Plot_4	115.263956	-33.751581	Relevé	10/10/2024	N/A		Flat
Plot_5	115.277739	-33.751773	Relevé	10/10/2024	N/A		Flat
Plot_6	115.294077	-33.751778	Relevé	10/10/2024	N/A		Flat
Plot_7	115.305814	-33.751779	Relevé	10/10/2024	N/A		Flat

Site Name	Relief	Slope (°)	Aspect	Soil Colour	Soil Depth (cm)	Texture	Fire Interval (yrs)
Plot_1	LP	0-5		Brown	>50 cm	Clay Loam	>3 years
Plot_2	LP	0-5		Brown	>50 cm	Clay Loam	>3 years
Plot_3	LP	0-5		Brown	>50 cm	Loam	>3 years
Plot_4	LP	0-5		Brown	>50 cm	Loam	>3 years
Plot_5	LP	0-5		Brown	>50 cm	Loam	>3 years
Plot_6	LP	0-5		Brown	>50 cm	Loam	>3 years
Plot_7	LP	0-5		Brown	>50 cm	Loam	>3 years

Site Name	Gravel Cover (%)	Gravel Size (mm)	Outcrop %	Rock Type	Disturbance Level	Vegetation Condition
Plot_1					High	Completely Degraded
Plot_2					High	Very Good
Plot_3					High	Good
Plot_4					High	Degraded
Plot_5					High	Completely Degraded
Plot_6					High	Completely Degraded
Plot_7					High	Completely Degraded

Site Name	Strata 1 Cover (%)	Strata 2 Cover (%)	Strata 3 Cover (%)	Strata 1 Structure	Strata 2 Structure	Strata 3 Structure	Strata 1 Dominants	Strata 2 Dominants	Strata 3 Dominants
Plot_1	30-70%	2-10%	70-100%	Trees 10-30 m	Shrubs >2 m	Tussock grass	*Corymbia calophylla, Melaleuca preissiana*	*Dasypogon hookeri, Taxandria linearifolia*	*Pennisetum clandestinum*
Plot_2	30-70%	2-10%	30-70%	Trees <10 m	Shrubs >2 m	Tussock grass	*Melaleuca preissiana, Melaleuca rhaphiophylla*	*Xanthorrhoea preissii*	*Pennisetum clandestinum*
Plot_3	30-70%	2-10%	70-100%	Trees 10-30 m	Shrubs >2 m	Tussock grass	*Corymbia calophylla*	*Xanthorrhoea preissii*	*Pennisetum clandestinum*
Plot_4	30-70%	2-10%	70-100%	Trees 10-30 m	Shrubs 1-2 m	Tussock grass	*Corymbia calophylla*	*Xanthorrhoea preissii*	*Pennisetum clandestinum*
Plot_5	30-70%	2-10%	70-100%	Trees 10-30 m	Shrubs 1-2 m	Tussock grass	*Corymbia calophylla*	*Xanthorrhoea preissii*	*Pennisetum clandestinum*
Plot_6	<2%	<2%	70-100%	Trees <10 m	Shrubs 1-2 m	Herbs	*Melaleuca preissiana*		*Watsonia meriana*
Plot_7	2-10%	<2%	70-100%	Trees 10-30 m	Shrubs 1-2 m	Herbs	*Corymbia calophylla*		*Watsonia meriana*

Appendix D

Definitions of Threatened and Priority Flora and Communities

Australian Government

Department of Climate Change, Energy, the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 19-Jan-2025

Summary

Details

- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat

Acknowledgements

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	77
Listed Migratory Species:	54

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	9
Commonwealth Heritage Places:	None
Listed Marine Species:	74
Whales and Other Cetaceans:	13
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	20
Regional Forest Agreements:	1
Nationally Important Wetlands:	1
EPBC Act Referrals:	57
Key Ecological Features (Marine):	None
Biologically Important Areas:	6
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

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

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

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

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

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anous tenuirostris melanops			
Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Ardenna grisea			
Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area	In buffer area only
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area	In buffer area only
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area	In buffer area only
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Diomedea sanfordi](#) Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In buffer area only
[Falco hypoleucos](#) Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
[Limosa lapponica menzbieri](#) Northern Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit [86432]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Macronectes giganteus](#) Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
[Macronectes halli](#) Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
[Pachyptila turtur subantarctica](#) Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Phaethon rubricauda westralis](#) Red-tailed Tropicbird (Indian Ocean), Indian Ocean Red-tailed Tropicbird [91824]	Endangered	Species or species habitat may occur within area	In buffer area only
[Phoebetria fusca](#) Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Sternula nereis nereis](#) Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Thalassarche carteri](#) Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In feature area
Zanda baudinii listed as Calyptorhynchus baudinii Baudin's Cockatoo, Baudin's Black-Cockatoo, Long-billed Black-cockatoo [87736]	Endangered	Breeding known to occur within area	In feature area
Zanda latirostris listed as Calyptorhynchus latirostris Carnaby's Black Cockatoo, Short-billed Black-cockatoo [87737]	Endangered	Species or species habitat known to occur within area	In feature area
CRUSTACEAN			
Cherax tenuimanus Hairy Marron, Margaret River Hairy Marron, Margaret River Marron [78931]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Engaewa pseudoreducta Margaret River Burrowing Crayfish [82674]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Engaewa reducta Dunsborough Burrowing Crayfish [82675]	Critically Endangered	Species or species habitat known to occur within area	In feature area
FISH			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Nannatherina balstoni Balston's Pygmy Perch [66698]	Vulnerable	Species or species habitat known to occur within area	In feature area
MAMMAL			
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In buffer area only
Myrmecobius fasciatus Numbat [294]	Endangered	Species or species habitat may occur within area	In buffer area only
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In buffer area only
Pseudocheirus occidentalis Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Breeding known to occur within area	In feature area
OTHER			
Westralunio carteri Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat known to occur within area	In feature area
PLANT			
Banksia mimica Summer Honeypot [82765]	Endangered	Species or species habitat likely to occur within area	In feature area
Banksia nivea subsp. uliginosa Swamp Honeypot [82766]	Endangered	Species or species habitat known to occur within area	In feature area
Banksia squarrosa subsp. argillacea Whicher Range Dryandra [82769]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Brachyscias verecundus Ironstone Brachyscias [81321]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Caladenia busselliana Bussell's Spider-orchid [24369]	Endangered	Species or species habitat known to occur within area	In feature area
Caladenia hoffmanii Hoffman's Spider-orchid [56719]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat may occur within area	In feature area
Caladenia procera Carbunup King Spider Orchid [68679]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Caladenia viridescens Dunsborough Spider-orchid [56776]	Endangered	Species or species habitat may occur within area	In buffer area only
Chamelaucium sp. S coastal plain (R.D.Royce 4872) Royce's Waxflower [87814]	Vulnerable	Species or species habitat known to occur within area	In feature area
Daviesia elongata subsp. elongata Long-leaved Daviesia [64883]	Vulnerable	Species or species habitat known to occur within area	In feature area
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat likely to occur within area	In feature 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	In feature area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Eucalyptus x phylacis Meelup Mallee [87817]	Endangered	Species or species habitat may occur within area	In buffer area only
Gastrolobium modestum Broad-leaved Gastrolobium [78361]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Gastrolobium papilio Butterfly-leaved Gastrolobium [78415]	Endangered	Species or species habitat may occur within area	In feature area
Grevillea brachystylis subsp. grandis Large-flowered Short-styled Grevillea [85001]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Grevillea elongata Ironstone Grevillea [64578]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Lambertia echinata subsp. occidentalis Western Prickly Honeysuckle [64528]	Endangered	Species or species habitat likely to occur within area	In feature area
Morelotia australiensis listed as Tetraria australiensis Southern Tetraria [92784]	Vulnerable	Species or species habitat known to occur within area	In feature area
Petrophile latericola Laterite Petrophile [64532]	Endangered	Species or species habitat likely to occur within area	In feature area
Synaphea sp. Fairbridge Farm (D.Papenfus 696) Selena's Synaphea [82881]	Critically Endangered	Species or species habitat may occur within area	In feature area
Verticordia densiflora var. pedunculata Long-stalked Featherflower [55689]	Endangered	Species or species habitat known to occur within area	In feature area
Verticordia plumosa var. ananeotes Tufted Plumed Featherflower [23871]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Verticordia plumosa var. vassensis](#) Vasse Featherflower [55804]	Endangered	Species or species habitat known to occur within area	In feature area
REPTILE			
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In buffer area only
[Natator depressus](#) Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
SHARK			
[Carcharias taurus (west coast population)](#) Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Carcharodon carcharias](#) White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Pristis pristis](#) Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Rhincodon typus](#) Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Sphyrna lewini](#) Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area	In buffer area only

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area	In buffer area only
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area	In buffer area only
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area	In buffer area only
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In buffer area only
Hydroprogne caspia Caspian Tern [808]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Onychoprion anaethetus](#) Bridled Tern [82845]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Phoebetria fusca](#) Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Thalassarche carteri](#) Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Thalassarche cauta](#) Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Thalassarche impavida](#) Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Thalassarche melanophris](#) Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Thalassarche steadi](#) White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Migratory Marine Species			
[Balaenoptera edeni](#) Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In buffer area only
[Caperea marginata](#) Pygmy Right Whale [39]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area	In buffer area only
Carcharias taurus Grey Nurse Shark [64469]		Species or species habitat likely to occur within area	In buffer area only
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In buffer area only
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In buffer area only
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area	In buffer area only
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area	In buffer area only
Megaptera novaeangliae Humpback Whale [38]		Congregation or aggregation known to occur within area	In buffer area only
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat may occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In buffer area only
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Migratory Terrestrial Species			
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Calidris ruficollis](#) Red-necked Stint [860]		Species or species habitat known to occur within area	In buffer area only
[Calidris subminuta](#) Long-toed Stint [861]		Species or species habitat known to occur within area	In buffer area only
[Charadrius bicinctus](#) Double-banded Plover [895]		Species or species habitat known to occur within area	In buffer area only
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Charadrius mongolus](#) Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
[Pandion haliaetus](#) Osprey [952]		Species or species habitat known to occur within area	In buffer area only
[Tringa glareola](#) Wood Sandpiper [829]		Species or species habitat known to occur within area	In buffer area only
[Tringa nebularia](#) Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In feature area
[Tringa stagnatilis](#) Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

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

Commonwealth Land Name	State	Buffer Status
Unknown		
Commonwealth Land - [51487]	WA	In buffer area only
Commonwealth Land - [51488]	WA	In buffer area only
Commonwealth Land - [50388]	WA	In buffer area only
Commonwealth Land - [50390]	WA	In buffer area only
Commonwealth Land - [50387]	WA	In buffer area only
Commonwealth Land - [51992]	WA	In buffer area only
Commonwealth Land - [50389]	WA	In buffer area only
Commonwealth Land - [51105]	WA	In buffer area only
Commonwealth Land - [50268]	WA	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Anous tenuirostris melanops			
Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna carneipes as Puffinus carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Calidris subminuta Long-toed Stint [861]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Charadrius bicinctus Double-banded Plover [895]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area	In buffer area only
Charadrius ruficapillus Red-capped Plover [881]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area	In buffer area only
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area	In buffer area only
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In buffer area only
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Hydroprogne caspia as Sterna caspia Caspian Tern [808]		Foraging, feeding or related behaviour known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
[Macronectes giganteus](#) Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
[Macronectes halli](#) Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Merops ornatus](#) Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
[Motacilla cinerea](#) Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
[Onychoprion anaethetus as Sterna anaethetus](#) Bridled Tern [82845]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Pachyptila turtur](#) Fairy Prion [1066]		Species or species habitat known to occur within area	In buffer area only
[Pandion haliaetus](#) Osprey [952]		Species or species habitat known to occur within area	In buffer area only
[Phoebetria fusca](#) Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Puffinus assimilis Little Shearwater [59363]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
Recurvirostra novaehollandiae Red-necked Avocet [871]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat may occur within area overfly marine area	In buffer area only
Tringa glareola Wood Sandpiper [829]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Tringa stagnatilis](#) Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Fish			
[Acentronura australe](#) Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area	In buffer area only
[Campichthys galei](#) Gale's Pipefish [66191]		Species or species habitat may occur within area	In buffer area only
[Heraldia nocturna](#) Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In buffer area only
[Hippocampus angustus](#) Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area	In buffer area only
[Hippocampus breviceps](#) Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In buffer area only
[Hippocampus subelongatus](#) West Australian Seahorse [66722]		Species or species habitat may occur within area	In buffer area only
[Histiogamphelus cristatus](#) Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In buffer area only
[Lissocampus caudalis](#) Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In buffer area only
[Lissocampus fatiloquus](#) Prophet's Pipefish [66250]		Species or species habitat may occur within area	In buffer area only
[Lissocampus runa](#) Javelin Pipefish [66251]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In buffer area only
Mitotichthys meraculus Western Crested Pipefish [66259]		Species or species habitat may occur within area	In buffer area only
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area	In buffer area only
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In buffer area only
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In buffer area only
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In buffer area only
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area	In buffer area only
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In buffer area only
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In buffer area only
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In buffer area only
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Vanacampus phillipi			
Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In buffer area only
Vanacampus poecilolaemus			
Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In buffer area only
Mammal			
Arctocephalus forsteri			
Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In buffer area only
Neophoca cinerea			
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In buffer area only
Reptile			
Caretta caretta			
Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Chelonia mydas			
Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In buffer area only
Natator depressus			
Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only

Whales and Other Cetaceans		[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera acutorostrata			
Minke Whale [33]		Species or species habitat may occur within area	In buffer area only
Balaenoptera edeni			
Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only

Current Scientific Name	Status	Type of Presence	Buffer Status
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area	In buffer area only
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In buffer area only
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In buffer area only
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In buffer area only
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area	In buffer area only
Megaptera novaeangliae Humpback Whale [38]		Congregation or aggregation known to occur within area	In buffer area only
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In buffer area only
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area	In buffer area only
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In buffer area only
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In buffer area only

Extra Information

State and Territory Reserves [Resource Information]

Protected Area Name	Reserve Type	State	Buffer Status
Broadwater	Nature Reserve	WA	In buffer area only
Fish Road	Nature Reserve	WA	In buffer area only
Haag	Nature Reserve	WA	In buffer area only
Locke	Nature Reserve	WA	In buffer area only
Ngari Capes	Marine Park	WA	In buffer area only
NTWA Bushland covenant (0069)	Conservation Covenant	WA	In buffer area only
NTWA Bushland covenant (0116A)	Conservation Covenant	WA	In buffer area only
NTWA Bushland covenant (0116B)	Conservation Covenant	WA	In buffer area only
NTWA Bushland covenant (0148)	Conservation Covenant	WA	In buffer area only
NTWA Bushland covenant (0149)	Conservation Covenant	WA	In buffer area only
NTWA Bushland covenant (0173)	Conservation Covenant	WA	In buffer area only
NTWA Bushland covenant (0178)	Conservation Covenant	WA	In buffer area only
Rapids	Conservation Park	WA	In buffer area only
Sussex Location 2561	NRS Addition - Gazettal in Progress	WA	In buffer area only
Unnamed WA25836	Nature Reserve	WA	In buffer area only
Unnamed WA26620	Nature Reserve	WA	In buffer area only
Unnamed WA41597	Nature Reserve	WA	In buffer area only
Unnamed WA42879	Nature Reserve	WA	In buffer area only
Unnamed WA45533	Nature Reserve	WA	In buffer area only
Unnamed WA48837	Nature Reserve	WA	In buffer area only

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

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

Nationally Important Wetlands [Resource Information]

Wetland Name	State	Buffer Status
Vasse-Wonnerup Wetland System	WA	In buffer area only

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Dunsborough water supply pipeline upgrade	2024/09883		Completed	In buffer area only
Gravel Extraction Project	2022/09278		Assessment	In buffer area only
Installation of additional potable water tank	2023/09518		Assessment	In buffer area only
Mara Team Testing Dan 30 July 2024	2024/09952		Referral Decision	In buffer area only
Mara Team Testing Dan July 2024	2024/09932		Referral Decision	In buffer area only
Mara team testing R40	2024/09908		Assessment	In buffer area only
Mara Team Testing Release 37 Dan	2024/09832		Referral Decision	In buffer area only
Mara Team Testing Release 37 Dan 2	2024/09836		Referral Decision	In buffer area only
Mara Team Testing Release 37 Dan 3	2024/09838		Referral Decision	In buffer area only
Mara Team Testing Sayers 2024	2024/10011		Assessment	In buffer area only
Controlled action				
Cape View Resort at Lot 190 Little Colin Street	2006/3070	Controlled Action	Post-Approval	In buffer area only
Dawson Beach Estate Stage 2	2005/2153	Controlled Action	Post-Approval	In buffer area only
Development Guide Plan for 46 ha Residential Subdivision	2008/4102	Controlled Action	Post-Approval	In buffer area only
Development of Busselton Health Campus	2011/6011	Controlled Action	Post-Approval	In buffer area only
Develop Trails and a Wetlands Demonstration Site and Centre	2008/4439	Controlled Action	Post-Approval	In buffer area only
Eastern Link Project, Busselton WA	2018/8155	Controlled Action	Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Lennox Weir Removal, 12kms west Busselton	2021/8915	Controlled Action	Assessment Approach	In buffer area only
Lower Vasse River Sediment Removal	2021/9051	Controlled Action	Post-Approval	In buffer area only
Old Broadwater Farm Estate Subdivision - Stage 3	2009/5231	Controlled Action	Post-Approval	In buffer area only
Peppermint Park Residential Subdivision - Stage 5	2008/4028	Controlled Action	Post-Approval	In buffer area only
Residential/Industrial subdivision, Lot 18, Vasse Highway, Shire of Busselton	2006/3208	Controlled Action	Post-Approval	In buffer area only
Residential Development, Lot 3 & 4 Dorsett Street	2006/2774	Controlled Action	Completed	In buffer area only
Residential development Lot 3, 500 Bussell Highway, WA	2013/7098	Controlled Action	Post-Approval	In buffer area only
Residential development Lots 8 & 9 King Street	2006/2787	Controlled Action	Completed	In buffer area only
retirement units & aged care facility development	2007/3533	Controlled Action	Post-Approval	In buffer area only
Three Turning Pockets West of Busselton Townsite	2002/846	Controlled Action	Post-Approval	In buffer area only
Tourism Villa Facility Development	2008/4025	Controlled Action	Post-Approval	In buffer area only
Upgrade of Ford Road	2005/2113	Controlled Action	Completed	In buffer area only
Urban development, multiple lots Northerly Street, Vasse, WA	2019/8494	Controlled Action	Assessment Approach	In buffer area only
Vasse Diversion Drain Upgrade	2017/7932	Controlled Action	Post-Approval	In buffer area only
Yarragadee Water Supply Development	2005/2073	Controlled Action	Completed	In buffer area only
Yoongarillup Mineral Sands Project, WA	2012/6521	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
25 Lot Residential Subdivision	2009/4830	Not Controlled Action	Completed	In buffer area only
Busselton-Margaret River Regional Airport Development Project, WA	2016/7675	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Busselton to Flinders Bay Rails to Trails Project, WA	2013/6835	Not Controlled Action	Completed	In buffer area only
Busselton to Margaret River Transmission Line	2008/3964	Not Controlled Action	Completed	In feature area
Causeway Bridge Duplication, Busselton, WA	2018/8309	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Nuttman Road, Busselton Gravel Extraction, WA	2017/8086	Not Controlled Action	Completed	In buffer area only
Residential & Light Industrial Development, Vasse WA	2013/6932	Not Controlled Action	Completed	In buffer area only
Residential development, Lot 42, Farmhouse Court, Bovell, WA	2014/7195	Not Controlled Action	Completed	In buffer area only
Vasse Hotel and Supermarket Redevelopment	2001/288	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
Aerial Mosquito Spraying Vasse-Wonnerup System	2005/1952	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Ambergate North Residential Development	2009/4802	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Country Road Estate - Final Stage Development	2006/3095	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Extension of existing mains water supply pipeline	2009/4686	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Locations 2629, 2699 & 2991 - Jamisons Road	2002/771	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
Monaghan's Roundabout Project - Intersection of Bussell Highway and Caves Road, Shire of Busselton	2007/3515	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Novacare Lifestyle Village	2001/311	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
South Busselton Primary School	2001/290	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Subdivision and development of residential dwelling on part Lot 1, Bussell Highw	2006/3023	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Waterloo to Busselton 132kV Transmission Line	2002/816	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Referral decision				
Ambergate North Residential Community (4896 lots)	2008/4617	Referral Decision	Completed	In buffer area only
Riverbank and Country Road Estates Lot 43 Bussell Highway	2005/2367	Referral Decision	Completed	In buffer area only
Water quality improvement trial, Lower Vasse River, Busselton, WA	2013/6975	Referral Decision	Completed	In buffer area only

Biologically Important Areas

[Resource Information]

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Ardenna pacifica			
Wedge-tailed Shearwater [84292]	Foraging (in high numbers)	Known to occur	In buffer area only
Onychoprion anaethetus			
Bridled Tern [82845]	Foraging (in high numbers)	Known to occur	In buffer area only
Puffinus assimilis tunneyi			
Little Shearwater [59363]	Foraging (in high numbers)	Known to occur	In buffer area only
Whales			

Scientific Name	Behaviour	Presence	Buffer Status
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur	In buffer area only
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Migration	Known to occur	In buffer area only
Megaptera novaeangliae Humpback Whale [38]	Migration (south)	Known to occur	In buffer area only

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

Please feel free to provide feedback via the Contact us page.

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Appendix E

Definitions of Threatened and Priority Flora and Communities

Conservation Codes for Western Australian Flora and Fauna

Specially protected fauna or flora are species* which have been adequately searched for and are deemed to be, in the wild, either rare, at risk of extinction, or otherwise in need of special protection, and have been gazetted as such. Conservation codes have been transitioned under regulations 170, 171 and 172 of the *Biodiversity Conservation Regulations 2018.*

T Threatened species – Schedules 1-4

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

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

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

CR Critically endangered species

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

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

EN Endangered species

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

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

VU Vulnerable species

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

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the *Wildlife*

Conservation (Specially Protected Fauna) Notice 2018 for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.

EX Presumed extinct species

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

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

EW Extinct in the wild species

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

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

Specially protected species

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

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

MI Migratory species

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

Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

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

CD Species of special conservation interest (conservation dependent fauna)

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

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

OS Other specially protected species

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

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

P Priority species

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

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

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

Priority 1: Poorly-known species

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

Priority 2: Poorly-known species

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

Priority 3: Poorly-known species

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

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

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

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

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

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

Western Australian Ecological Communities

Threatened Ecological Communities

The BC Act provides for the statutory listing of threatened ecological communities (TECs) by the Minister.

Presumed Totally Destroyed (PD)

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

Critically Endangered (CR)

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

Endangered (EN)

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

Vulnerable (VU)

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

Priority Ecological Communities

Possible threatened ecological communities that do not meet survey criteria or that are not adequately defined are added to the Priority Ecological Community List under priorities 1, 2 and 3. These three categories are ranked in order of priority for survey and/or definition of the community. Ecological communities that are adequately known, and are rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

Priority One: Poorly-known ecological communities

Ecological communities 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.

Priority Two: Poorly-known ecological 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.

Priority Three: Poorly known ecological communities

(i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or:

(ii) communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat (within approximately 10 years), or;

(iii) munities 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.

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

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

(ii) Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for a higher threat category.

(iii) Ecological communities that have been removed from the list of threatened communities during the past five years.

Priority Five: Conservation Dependent ecological communities

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

Commonwealth of Australia Conservation Codes

Threatened Flora and Fauna

Threatened fauna and flora may be listed under Section 178 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in any one of the following six categories:

Extinct

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

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

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the five criteria for the category identified in Part 7.01 of the EPBC Regulations, and it is therefore considered to be facing an extremely high risk of extinction in the wild.

Endangered

A taxon is Endangered when the best available evidence indicates that it meets any of the five criteria for the category identified in Part 7.01 of the EPBC Regulations, and it is therefore considered to be facing a very high risk of extinction in the wild.

Vulnerable

A taxon is Vulnerable when the best available evidence indicates that it meets any of the five criteria for the category identified in Part 7.01 of the EPBC Regulations, and it is therefore considered to be facing a high risk of extinction in the wild.

Conservation dependent

A native species is eligible to be included in the conservation dependent category at a particular time if, at that time:

a) 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; or
b) the following subparagraphs are satisfied:
    i. the species is a species of fish;

ii. the species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised;
iii. the plan of management is in force under a law of the Commonwealth or of a State or Territory;
iv. cessation of the plan of management would adversely affect the conservation status of the species.

The EPBC Act does not provide for listing in a data deficient category. Where sufficient data (evidence) is unavailable to allow assessment by the Threatened Species Scientific Committee against the criteria for listing, the species are found to be ineligible. A recommendation is made to the Minister to not include the species in any category under the EPBC Act. For reasons of transparency and to inform future research, the Threatened Species Scientific Committee publishes the names of those species found to be data deficient. As data deficient is not a listing category under the EPBC Act, this has no statutory implications and the species is not considered to be listed under the EPBC Act.

Threatened Ecological Communities

Threatened Ecological communities under the EPBC Act are listed in three categories.

Critically endangered

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

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

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).

Categories of Threatened Species pursuant to the Environment Protection and Biodiversity Conservation Act 1999

EPBC Act Category	Department of Environment and Energy Definition
Extinct	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	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	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	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	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	A native species is eligible to be included in the conservation dependent category at a particular time if, at that time: (a) 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; or (b) the following subparagraphs are satisfied: (i) the species is a species of fish; (ii) the species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised; (iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory; (iv) cessation of the plan of management would adversely affect the conservation status of the species.

CONSERVATION CATEGORY DEFINITIONS

for Western Australian Ecological Communities

GENERAL DEFINITIONS

An **ecological community** is a naturally occurring assemblage of organisms that occurs in a particular habitat, as defined in the *Biodiversity Conservation Act 2016* (BC Act). Ecological communities may comprise various life forms including plants, animals and microorganisms.

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

A **threatened ecological community** (TEC) means an ecological community that is listed under section 27(1) of the BC Act as a critically endangered, endangered or vulnerable ecological community, or is a rediscovered ecological community to be regarded as a threatened ecological community under section 33 of the BC Act.

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

Habitat, as defined in the BC Act, means the biophysical medium or media —

a) occupied (continuously, periodically or occasionally) by an organism or group of organisms, or
b) once occupied (continuously, periodically or occasionally) by an organism, or group of organisms, and into which organisms of that kind have the potential to be reintroduced.

An **occurrence** is a discrete example of an ecological community, separated from other examples of the same community by more than 20 metres with, for example: a different ecological community, a sealed road, a building, a water body (for terrestrial communities), or a terrestrial body (for aquatic communities). There is no minimum size of an occurrence of a threatened or priority ecological community. By ensuring that every discrete occurrence is recognised and recorded, future changes in status can be readily monitored.

Adequately surveyed is defined as an ecological community that has been searched for thoroughly in most likely habitats, by relevant experts.

Community structure is defined as the spatial organisation, construction and arrangement of the biological elements comprising a biological assemblage. For example, the vegetation structure (e.g., *Eucalyptus salmonophloia* woodland over scattered small shrubs over dense herbs) or the trophic structure in a faunal assemblage (e.g., dominance by feeders on detritus as distinct from feeders on live plants).

To **modify** an occurrence of an ecological community, as defined in section 44 of the BC Act, means to take action that results in —

(a) the modification of the occurrence of the threatened ecological community to such an extent that the occurrence is unlikely to recover —
    (i) its species composition or structure; or
    (ii) its species composition and structure; or
(b) the destruction of the occurrence of the threatened ecological community.

Destruction of an occurrence of an ecological community means modification such that reestablishment of ecological processes, species composition or community structure within the range of variability exhibited by the original community is unlikely within the foreseeable future even with positive human intervention.

Modification and destruction are difficult concepts to quantify, and their application will be determined by scientific judgement. Refer to the document Guidance note – Modification of an occurrence of a threatened ecological community for more information on what constitutes modification and how to determine whether an action is likely to modify an occurrence of a threatened ecological community.

Threatening process means a process that threatens, or may threaten, the survival, abundance or evolutionary development of a native species or ecological community, as defined under the BC Act. Examples of some of the continuing threatening processes in Western Australia include: vegetation clearance; competition and land degradation by introduced fauna; dieback caused by the root-rot fungus (*Phytophthora cinnamomi*); competition and displacement of native plants by introduced flora; hydrological changes (declining groundwater levels); drying climate, fire regimes that cause declines in biodiversity; direct human exploitation and disturbance of ecological communities.

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

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

LISTED ECOLOGICAL COMMUNITIES

Assessment of the conservation status of ecological communities is carried out in accordance with the BC Act listing criteria and the requirements of Ministerial Guideline Number 1 and Ministerial Guideline Number 4 that adopt the use of the International Union for Conservation of Nature (IUCN) Red List of Ecosystems Categories and Criteria.

CO Collapsed ecological communities

An ecological community listed by order of the Minister as collapsed under section 31(1) of the BC Act. As determined by criteria set out in section 32 of the BC Act, an ecological community is eligible for listing as a collapsed ecological community at a particular time if, at that time —

(a) there is no reasonable doubt that the last occurrence of the ecological community has collapsed; or
(b) the ecological community has been so extensively modified throughout its range that no occurrence of it is likely to recover —
    (i) its species composition or structure; or
    (ii) its species composition and structure.

CR Critically endangered ecological communities

A threatened ecological community listed in the category of critically endangered under section 27(1)(a) of the BC Act, as determined by criteria set out in section 28 of the BC Act and the ministerial guidelines. A critically endangered ecological community faces an extremely high risk of becoming eligible for listing as a collapsed ecological community in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines.

Examples of use:

- ‘Assemblages of the organic springs and mound springs of the Mandora Marsh area’ is listed as a critically endangered threatened ecological community under the *Biodiversity Conservation Act 2016.*
- ‘Assemblages of the organic springs and mound springs of the Mandora Marsh area’ is listed as critically endangered under the *Biodiversity Conservation Act 2016.*
- Listing reference in a table – column heading: BC Act; row text: CR.

EN Endangered ecological communities

A threatened ecological community listed in the category of endangered ecological community under section 27(1)(b) of the BC Act, as determined by criteria set out in section 29 of the BC Act and the ministerial guidelines. A threatened ecological community faces a very high risk of becoming eligible for listing as a collapsed ecological community in the near future, as determined in accordance with criteria set out in the ministerial guidelines.

Examples of use:

- ‘Herb rich shrublands in clay pans (floristic community type 8 as originally described in Gibson *et al*. (1994))’ is listed as an endangered threatened ecological community under the *Biodiversity Conservation Act 2016.*
- ‘Herb rich shrublands in clay pans (floristic community type 8 as originally described in Gibson et al. (1994))’ is listed as endangered under the *Biodiversity Conservation Act 2016.*
- Listing reference in a table – column heading: BC Act; row text: EN.

VU Vulnerable ecological communities

A threatened ecological community listed in the category of vulnerable ecological community under section 27(1)(c) of the BC Act, as determined by criteria set out in section 30 of the BC Act and the ministerial guidelines. A vulnerable ecological community faces a high risk of becoming eligible for listing as a collapsed ecological community in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines.

Examples of use:

- '*Calothamnus graniticus* subsp. *graniticus* heaths on south west coastal granites' is listed as a vulnerable threatened ecological community under the *Biodiversity Conservation Act 2016.*
- '*Calothamnus graniticus* subsp. *graniticus* heaths on south west coastal granites' is listed as vulnerable under the *Biodiversity Conservation Act 2016.*
- Listing reference in a table – column heading: BC Act; row text: VU.

PRIORITY ECOLOGICAL COMMUNITIES

Priority is not a listing category under the BC Act. The Priority Ecological Communities list is maintained by the department and is published on the department's website.

All fauna and flora that may be present in an ecological community are protected in WA following the provisions in Part 10 of the BC Act. The protection applies even when these species occur in an ecological community that is not listed as threatened, and regardless of land tenure (State managed land (Crown land), private land, or Commonwealth land).

Possible threatened ecological communities that do not meet survey criteria or are not adequately defined to enable listing are added to the department's Priority Ecological Communities for Western Australia list under priority 1, 2 or 3. Ecological communities that are adequately known and not threatened but rare, near threatened, or have recently been removed from the threatened list are placed in priority 4. Conservation dependent ecological communities are placed in priority 5.

P1 Priority 1: Poorly known ecological communities – very few occurrences, very restricted distribution

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.

Examples of use:

- 'Banded Ironstone Hills with *Dryandra arborea*' is listed as a Priority 1 ecological community by the Department of Biodiversity, Conservation and Attractions.
- 'Banded Ironstone Hills with *Dryandra arborea*' is listed as Priority 1 on the DBCA Priority Ecological Communities List.
- Listing reference in a table – column heading: DBCA; row text: P1.

P2 Priority 2: Poorly known ecological communities – few occurrences, restricted distribution

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.

Examples of use:

- 'Aquatic invertebrate communities of peat swamps' is listed as a Priority 2 ecological community by the Department of Biodiversity, Conservation and Attractions.
- 'Aquatic invertebrate communities of peat swamps' is listed as Priority 2 on the DBCA Priority Ecological Communities List.
- Listing reference in a table – column heading: DBCA; row text: P2.

P3 Priority 3: Poorly known ecological communities – inadequately surveyed or not well defined

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. This category includes three sub-categories:

(i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation.

(ii) 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).

(iii) 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.

Examples of use:

- 'Assemblages of gypsum dunes of the central and southern wheatbelt' is listed as a Priority 3(iii) ecological community by the Department of Biodiversity, Conservation and Attractions.
- 'Assemblages of gypsum dunes of the central and southern wheatbelt' is listed as Priority 3(iii) on the DBCA Priority Ecological Communities List.
- Listing reference in a table – column heading: DBCA; row text: P3(iii).

P4 Priority 4: Adequately known ecological communities – rare, near threatened, or recently removed from the threatened list

Ecological communities that are adequately known and either rare but not threatened, near threatened, or have recently been removed from the threatened list. These communities require regular monitoring.

(i) Rare: ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands.

(ii) Near threatened: ecological communities that are considered to have been adequately surveyed and that do not qualify as conservation dependent, but that are close to qualifying for a higher threat category.

(iii) Ecological communities that have been removed from the list of threatened communities during the past five years.

Examples of use:

- 'Nimalaica (Nimalarragun) claypan and associated wetland assemblages' is listed as a Priority 4(ii) ecological community by the Department of Biodiversity, Conservation and Attractions.
- 'Nimalaica (Nimalarragun) claypan and associated wetland assemblages' is listed as Priority 4(ii) on the DBCA Priority Ecological Communities List.
- Listing reference in a table: column heading: DBCA, row text: P4(ii).

P5 Priority 5: 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.

Categories of Threatened Communities pursuant to the Environment Protection and Biodiversity Conservation Act 1999

Category	Definition
Critically Endangered	(1) An ecological community 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	(2) An ecological community 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	(3) An ecological community is eligible to be included in the ***vulnerable*** category at a particular time if, at that time: (a) it is not critically endangered nor 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.