



JURIEN MINE LEASE

Road Reserve Flora and Vegetation
Assessment

FINAL

June 2024



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Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Tronox Holdings plc

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Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
V1	David Coultas	7/6/2024	David Coultas	11/06/2024

Executive Summary

Tronox Holdings plc (Tronox) is proposing to clear remnant vegetation within two small areas (approximately 40 m x 40 m each) ('the Survey Area') within the Munbinea Road reserve adjacent to two entrance points to the Jurien Mine Lease, to improve access to the Jurien Mine Lease. Tronox commissioned Umwelt (Australia) Pty Limited (Umwelt) to undertake a flora and vegetation assessment of the Survey Area, to support future clearing permit applications. Umwelt have completed numerous flora and vegetation surveys within the Jurien Mine Lease area, including a recent survey of historical ore stockpiles immediately west of the Survey Area, and surveys of exploration drill lines immediately south-west of the Survey Area.

A reconnaissance and a targeted field survey was undertaken on the 29th of August 2023. The Survey Area was accessed via foot transects, and was sampled via relevés. Notes on vegetation pattern boundaries and distribution were also taken while traversing the Survey Area. Systematic targeted survey for significant flora taxa and vegetation was undertaken as part of this survey over all suitable habitat in the Survey Area.

A total of 63 discrete vascular flora taxa were recorded during this survey, representing 30 families and 53 genera. No significant flora taxa were identified by the survey. A total of six introduced flora taxa were recorded. One vegetation type (VT) was described and mapped within the Survey Area via structural vegetation classification; the majority of the mapped area of this VT was rated as being in Good condition. It is considered that this VT represents the 'Banksia Woodlands of the Swan Coastal Plain ecological community' (Endangered – Commonwealth, Priority 3 – WA). This VT satisfies the key diagnostic characteristics of the 'Banksia Woodlands of the Swan Coastal Plain ecological community'; most pertinently, it possesses a woodland stratum dominated by *Banksia attenuata*, *Banksia prionotes* and *Banksia menziesii*.

Table of Contents

Executive Summary		iv
1.0 Introduction		1
1.1	Background	1
1.2	Survey Area	1
1.3	Aims and Objectives	1
1.4	Level of Assessment and Compliance	2
2.0 Background		4
2.1	Climate	4
2.2	Soils and Landscapes	5
2.3	Land Tenure	5
3.0 Methods		6
3.1	Desktop Assessment	6
3.2	Personnel and Licensing	6
3.3	Field Survey Methods	7
3.3.1	Survey Timing	7
3.3.2	Sample Sites	7
3.3.3	Vegetation and Flora Notes	7
3.3.4	Targeted Survey of Significant Flora and Vegetation	8
3.3.5	Introduced Flora	10
3.4	Plant Collection and Identification	10
3.5	Vegetation Definition, Mapping and Description	10
3.6	Vegetation Condition Mapping	11
3.7	Significant Flora and Vegetation	11
3.7.1	Significant Flora	11
3.7.2	Significant Vegetation	12
4.0 Limitations		13
5.0 Results and Discussion		15
5.1	Desktop Assessment	15
5.1.1	Regional Vegetation	15
5.1.2	Local Flora and Vegetation Surveys	17
5.1.3	Significant Vegetation	17
5.1.4	Significant Flora Taxa	19
5.2	Field Survey	25

5.2.1	Vascular Flora Census	25
5.2.2	Significant Flora Taxa	25
5.2.3	Likelihood of Occurrence of Further Significant Flora Taxa	25
5.2.4	Introduced Flora Taxa	32
5.2.5	Vegetation Types	32
5.2.6	Other Areas Described	32
5.2.7	Significant Vegetation	35
5.2.8	Vegetation Condition	37
6.0	Conclusions	39
7.0	References	40

Figures

Figure 1.1	Survey Area and Desktop Study Area Location	3
Figure 2.1	Monthly Mean Climate Statistics for the Jurien Bay Weather Station (BoM, 2023)	4
Figure 3.1	Survey Track Logs and Relevé and Vegetation Mapping Note Locations	9
Figure 5.1	Vegetation System Associations of the Survey Area	16
Figure 5.2	DBCAs Threatened and Priority Ecological Communities Database Interrogation Results for the Desktop Study Area	18
Figure 5.3	Significant Flora Records of the Desktop Study Area	23
Figure 5.4	Vegetation Types of the Survey Area	34
Figure 5.5	Significant Vegetation of the Survey Area	36
Figure 5.6	Condition of Vegetation of the Survey Area	38

Photos

Photo 5.1	VT 1 – Relevé TPRR01	33
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Tables

Table 3.1	Personnel and Licensing Information	6
Table 3.2	Vegetation Condition Scale for the South-West and Interzone Botanical Provinces (EPA, 2016b)	11
Table 4.1	Limitations of the Flora and Vegetation Survey	13
Table 5.1	Vegetation System Associations Occurring in the Survey Area	15

Table 5.2	Significant Flora Known or Potentially Occurring within the Desktop Study Area	19
Table 5.3	Likelihood of Occurrence of Further Significant Flora Taxa in the Survey Area	26
Table 5.4	Introduced Flora Taxa Recorded in the Survey Area	32
Table 5.5	Summary of VTs Mapped in the Survey Area	33

Appendices

Appendix A	Results of Search of the Department of Climate Change, Energy, the Environment and Water Species Profile and Threats Database (DCCEE, 2023)
Appendix B	Vascular Plant Taxa recorded in the Survey Area
Appendix C	Raw Relevé Data
Appendix D	Vegetation Mapping Note Data

1.0 Introduction

1.1 Background

Tronox Holdings plc (Tronox) conducts mining of and exploration for mineral sands in the Swan Coastal Plain and Northern Sandplains regions of Western Australia (WA), including at their Jurien Mine Lease and surrounding exploration tenements, approximately 15 kilometres (km) east of Jurien Bay townsite.

Tronox is proposing to clear remnant vegetation within two small areas (approximately 40 metres (m) x 25 m / 80 m x 25 m) ('the Survey Area') within the Munbinea Road reserve adjacent to two entrance points to the Jurien Mine Lease, to improve access to the Jurien Mine Lease ('the Project'). Tronox commissioned Umwelt (Australia) Pty Limited (Umwelt) (previously Woodman Environmental Consulting Pty Limited (Woodman Environmental)) to undertake a flora and vegetation assessment of the Survey Area, to support future clearing permit applications. Umwelt have completed numerous flora and vegetation surveys within the Jurien Mine Lease area, including a recent survey of historical ore stockpiles immediately west of the Survey Area, and surveys of exploration drill lines immediately south-west of the Survey Area (Umwelt, 2021).

The above works are undertaken in line with the Environmental Protection Authority's (EPA) *Environmental Factor Guideline – Flora and Vegetation* (EPA, 2016a), and the EPA's *Technical Guide – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016b), with specific regard to the Targeted Survey guidance.

1.2 Survey Area

For the purposes of the flora and vegetation survey, a Survey Area has been defined, as shown in **Figure 1.1**. The Survey Area consists of two small areas (as per **Section 1.1**) located in the Munbinea Road Reserve adjacent to a previously cleared paddock area where the Jurien Mine Lease is located. The Survey Area is approximately 0.16 hectares (ha) in size, and consists primarily of remnant vegetation.

A Desktop Study Area has been defined for interrogation of databases and searches for relevant literature. The Desktop Study Area includes the Survey Area with a 10 km buffer, as shown in **Figure 1.1**.

1.3 Aims and Objectives

The primary aim of this assessment was to characterise the flora and vegetation values of the Survey Area, and provide Tronox with relevant and defensible data and documentation to support the Environmental Impact Assessment (EIA) process for the Project.

The overall objectives of the assessment were to:

- Search for and census populations of the following taxa (hereafter referred to as significant flora taxa) identified as occurring or potentially occurring within the Survey Area:
 - Listed Threatened Species (T) under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

- Threatened Flora (T) listed under the WA *Biodiversity Conservation Act 2016* (BC Act).
- Priority Flora taxa (P) as classified by the WA Department of Biodiversity, Conservation and Attractions (DBCA).
- Other significant flora taxa as defined by the EPA (2016a, 2016b).
- Identify locations and determine the extent of introduced vascular flora taxa in the Survey Area, with particular focus on those that are Weeds of National Significance (WoNS), or Declared Pests under the *Biosecurity and Agriculture Management Act 2007* (BAM Act).
- Identify, map and describe Vegetation Types (VTs) that occur within the Survey Area.
- Identify, map and describe vegetation that occurs within the Survey Area that is one of the following (hereafter referred to as significant vegetation), to provide context for impact assessment:
 - Threatened Ecological Communities (TECs) listed under the EPBC Act and/or BC Act.
 - Priority Ecological Communities (PECs) classified by DBCA.
 - Other significant vegetation as defined by EPA (2016a, 2016b).
- Map the condition of the vegetation in accordance with EPA (2016a).

Note that this assessment does not attempt to record a full census of vascular flora taxa that occur in the Survey Area.

1.4 Level of Assessment and Compliance

The flora and vegetation survey of the Survey Area involved a reconnaissance and targeted survey as defined in Sections 4.1 and 4.2 of the *Technical Guidance for Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016a). This level of survey is considered appropriate for the Project, based on the location of the Survey Area (located within the Swan Coastal Plain Interim Biogeographic Regionalisation for Australia (IBRA) region, which is known to support a high diversity of flora and vegetation relative to other areas of the state, including significant flora taxa and vegetation types (EPA 2016a)), as well as the level of previous survey effort undertaken within the area.

The survey and reporting works comply with the following documents:

- *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016a).
- *Environmental Factor Guideline – Flora and Vegetation* (EPA 2016b).

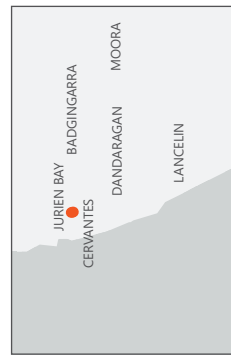
Considering the location of the Survey Area and known significant environmental values in the general vicinity of the Survey Area, several other guidance documents were considered in the context of the flora and vegetation survey, particularly in the context of the EPBC Act:

- Draft Survey Guidelines for Australia’s Threatened Orchids (DAWE, 2013).
- Approved Conservation Advice (incorporating listing advice) for the Banksia Woodlands of the Swan Coastal Plain ecological community (DoEE, 2016).
- Methods for survey and identification of Western Australian Threatened Ecological Communities (DBCA, 2023c).

FIGURE 1.1
Survey Area and Desktop
Study Area Location

Legend

- Desktop Study Area
- Survey Area
- Road
- Watercourse
- Waterbody
- Property Boundary
- Nature Reserve
- National Park

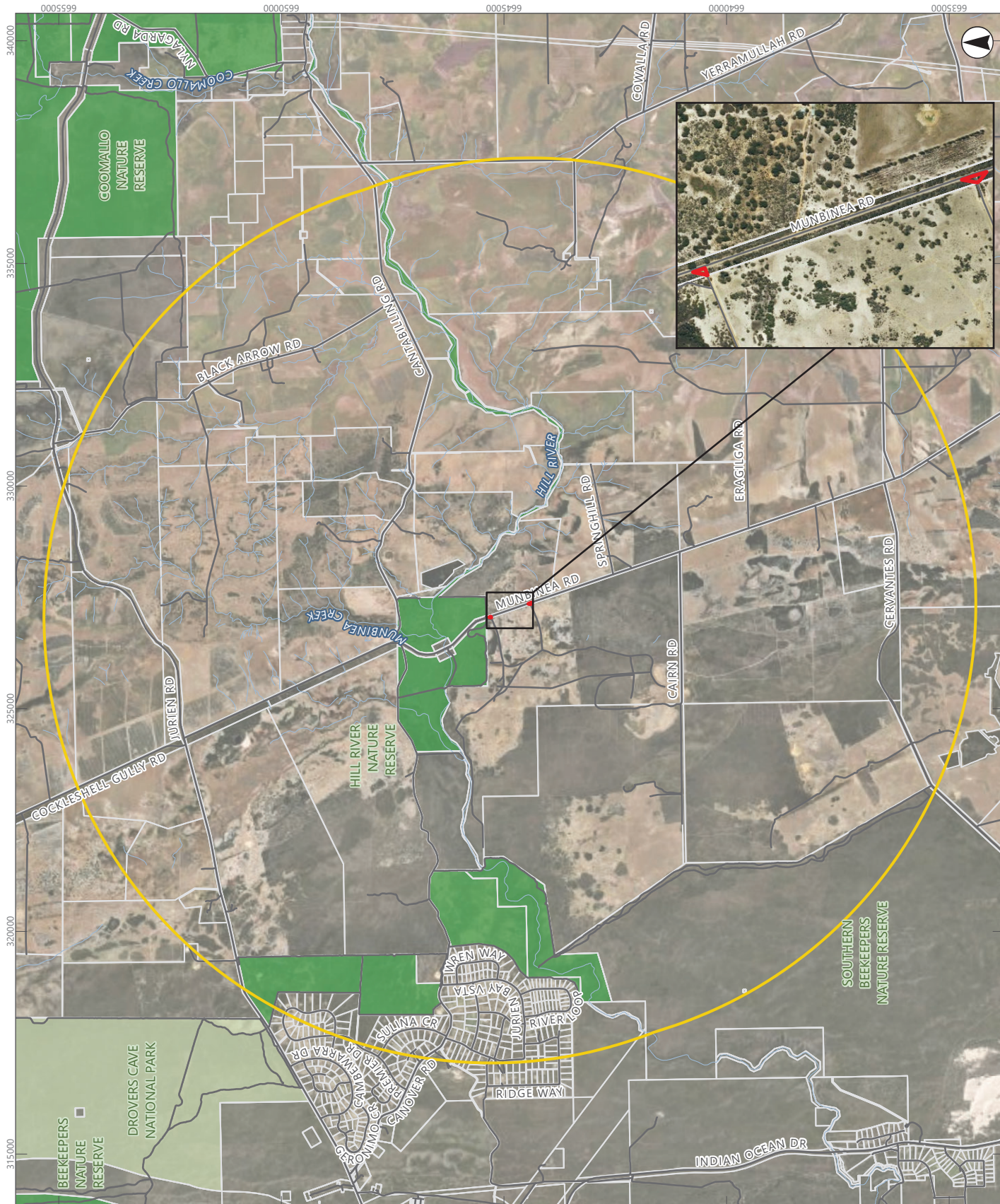


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2.0 Background

2.1 Climate

The Desktop Study Area is located within the Swan Coastal Plain IBRA region, specifically within the SWA02 Perth IBRA subregion (DAWE, 2021). The SWA02 subregion is of a Warm Mediterranean climate, experiencing an annual average rainfall of 600 to 1000 millimetres (mm) (Mitchell et al., 2002), with predominantly winter precipitation.

Figure 2.1 displays monthly precipitation and monthly maximum temperature for the months of 2023 preceding the survey, and long-term mean precipitation and maximum temperature, for Jurien Bay (Station number 009131). This station is considered the most relevant meteorological station recording such data to the Survey Area. It should be noted that some daily temperature observations in 2023 were not recorded, and much of the rainfall and temperature data from recent years (including 2023) has not been quality controlled, and therefore use of the data should be exercised with caution (BoM, 2023).

The highest long-term average maximum temperature for Jurien Bay typically occurs in February (approximately 31°C), and the lowest long-term average minimum temperature is experienced in July (20°C) (**Figure 2.1**). For the months of 2023 preceding this survey (January – August), precipitation received at Jurien Bay was well below the long-term average (294 mm compared to the long term average of approximately 440 mm), including across the ‘wet’ months of May – August (268 mm compared to the long-term average of 372 mm). The month of August was particularly dry, with approximately half of the long-term average precipitation received. Average monthly temperatures for 2023 were generally comparable to long-term averages, although August was well above the long-term average (BoM, 2023).

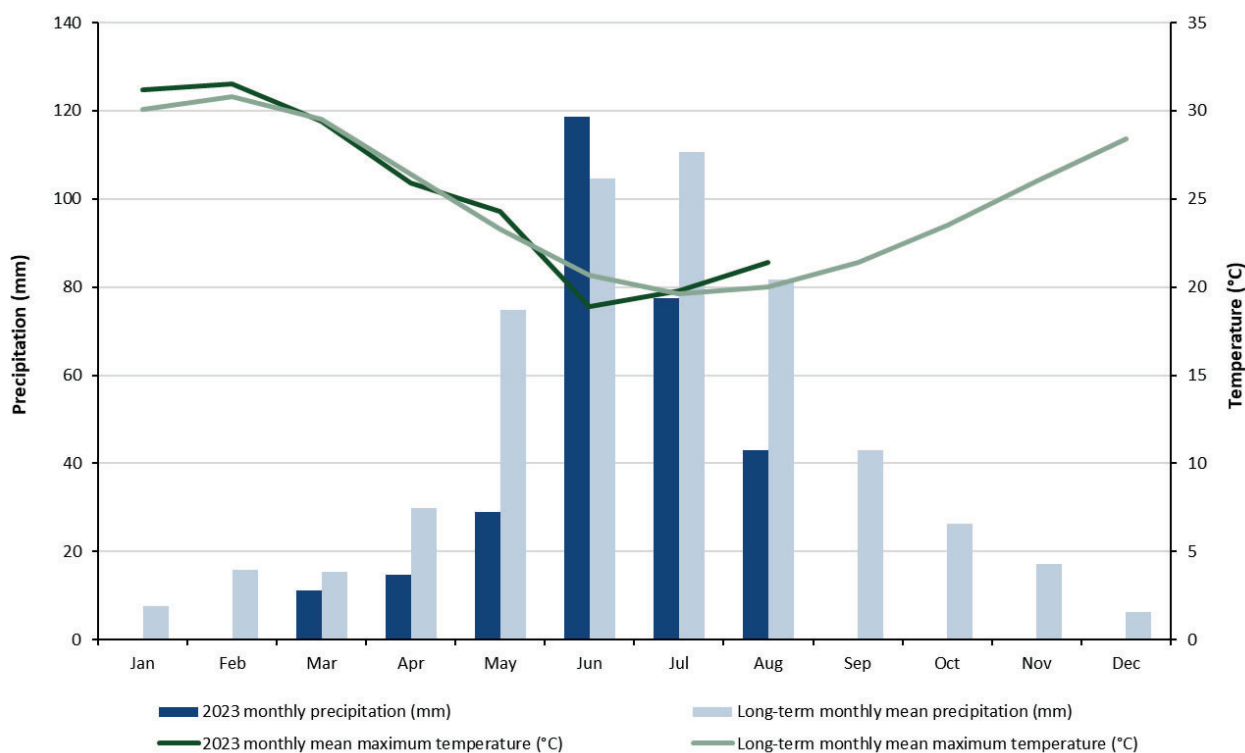


Figure 2.1 Monthly Mean Climate Statistics for the Jurien Bay Weather Station (BoM, 2023)

2.2 Soils and Landscapes

Soil landscape mapping has been prepared across South-West WA as a compilation of the results of a variety of soil and soil-landscape surveys, considering general ecological information, vegetation physiognomy and composition, patterns of variation, conservation status, gradational association, and land system representation. Soil landscape mapping information for the Survey Area originates from the North Coastal Plain land resources survey (Schoknecht et al., 2004).

The Survey Area occurs over two soil landscape systems. The northern section of the Survey Area is within the Bassendean System (specifically the Bassendean 2 Subsystem), which consists of dunes and sandplains with pale deep non-calcareous sands, and semi-wet and wet soils in low-lying wet areas. Ironstone is also occasionally present. The southern section of the Survey Area is located within the Yerramullah System (specifically the Yerramullah 4 Subsystem), which is characterised by the presence of a subdued dissected lateritic plateau, with undulating low hills and rises on lateritised weathered sandstone. Soils are pale deep sands, sandy gravels (sometimes shallow gravels over duricrust), and yellow deep sands (DPIRD, 2022a).

2.3 Land Tenure

The Survey Area is located within Shire Road Reserve (Munbinea Road, Shire of Dandaragan). The vegetation within the Munbinea Road Reserve connects to Hill River Nature Reserve just north of the Survey Area (**Figure 1.1**).

3.0 Methods

3.1 Desktop Assessment

For the purposes of conducting the desktop review, database searches were undertaken to include the Survey Area with a buffer of approximately 10 km. Data sources relating to ecological values of the areas included:

- DBCA Threatened and Priority Ecological Community database (DBCA, 2023a).
- DBCA Significant Flora Databases (WA Herbarium specimen database and Threatened and Priority Flora (TPFL) database) (DBCA, 2023b).
- Department of Climate Change, Energy and Environment and Water (DCCEEW) Species Profile and Threats (SPRAT) database, interrogated using the Protected Matters Search Tool, for matters of national environmental significance (MNES) (DCCEEW, 2023).
- Index of Biodiversity Surveys for Assessments (IBSA) database search for flora and vegetation survey reports relevant to the Desktop Study Area.
- Tronox – Iluka Resources Ltd significant flora database, a jointly managed database containing significant flora records, covering a large portion of the northern Sandplains region and Northern Swan Coastal Plain sub-region (current to 16 June 2021) (Iluka, 2021).

A number of previous flora and vegetation surveys have been undertaken within the Desktop Study Area on behalf of Tronox (Umwelt, 2021, 2023; Woodman Environmental, 2006, 2009b, 2009a, 2014, 2015, 2016, 2017, 2018, 2019, 2021). The associated reports were reviewed as part of the Desktop Assessment. As noted above, an IBSA database search was additionally undertaken to identify external reports relevant to the Desktop Study Area.

3.2 Personnel and Licensing

Table 3.1 lists the personnel involved in the flora and vegetation survey. The Project Manager has extensive previous experience (> 10 years) in conducting similar flora surveys in the Swan Coastal Plain and Northern Sandplains regions, including within the Tronox Jurien tenements. All plant material was collected under the Flora Taking (Biological Assessment) licences and Authorisation to Take or Disturb Threatened Species pursuant to the BC Act sections 40, 274 and 275, as listed in **Table 3.1**.

Table 3.1 Personnel and Licensing Information

Personnel	Flora Collecting Permit (BC Act)	Role
David Coultas Bsc (Environmental Biology) (Hons)	FB62000051-2 TFL 131-2122	Project Manager Field Survey Plant Identifications
Tom Jones Bsc (Botany and Zoology)	FB62000537	Field Survey

3.3 Field Survey Methods

3.3.1 Survey Timing

The field survey was undertaken on the 29th of August 2023. The timing of the survey was considered to be an appropriate time for the Survey Area (particularly given the climatic conditions experienced prior to the survey being conducted (see **Section 2.1**)), as most taxa of the region flower at this time. This includes the majority of significant taxa which require flowering material for identification that are likely to occur in the Survey Area (**Section 5.1.4**). The timing of the field survey is considered to align with the recommended timing for primary flora and vegetation surveys in the South-West botanical province as per Table 3 of the *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016b), given the climatic conditions experienced prior to the survey being conducted.

3.3.2 Sample Sites

The Survey Area was accessed via foot transects. One relevé was surveyed in the Survey Area; this relevé surveyed an area within a radius of approximately 10 m around a central point. The following information was recorded at the relevé:

- Personnel.
- Date.
- GPS (Global Positioning System) coordinates at centre of relevé.
- Site photograph.
- Topography.
- Soil colour and type (including the presence of any rock outcropping and surface stones).
- Vegetation condition (as per EPA Technical Guidance (2016b) for the South West and Interzone Botanical Provinces; scale presented in **Section 3.6**).
- Approximate time since fire.
- Percentage foliage cover and average height for the majority of vascular plant taxa.

Sampling locations, as well as all traverses in the Survey Area (track logs), are presented in **Figure 3.1**.

3.3.3 Vegetation and Flora Notes

Notes on vegetation pattern boundaries and distribution were also taken while traversing the Survey Area. These notes included a GPS location at the point where the notes were taken and a brief description of the vegetation, including dominant and characteristic taxa, and vegetation condition. The notes were used to aid in describing and mapping vegetation in areas that were not sampled via relevés. Additional flora taxa (significant, opportunistic and introduced taxa) were also recorded opportunistically in the Survey Area whilst conducting vegetation mapping notes and traversing between note and relevé locations.

It should be noted that some vegetation mapping notes were taken outside the Survey Area, as shown in **Figure 3.1**. These were taken specifically to provide context for the definition and mapping of significant vegetation in the Survey Area, as discussed in **Section 5.2.7**.

3.3.4 Targeted Survey of Significant Flora and Vegetation

Systematic targeted survey for significant flora taxa and vegetation was undertaken as part of this survey over all suitable habitat in the Survey Area. All taxa and communities identified by the desktop assessment as potentially occurring within the Survey Area were considered to be detectable and identifiable during the survey, and therefore all such taxa and vegetation were targeted (**Section 5.1.4**). Information relating to identifying characteristics, flowering period and habitat of these taxa, and relating to dominant taxa, soil and landform characteristics for significant vegetation, was provided to all field team members prior to undertaking targeted survey. All suitable habitat for significant flora taxa within the Survey Area was transected on foot, in a grid pattern at maximum 10 m intervals. If populations of known significant flora taxa were identified, a representative collection of material was made, and the abundance and spatial distribution of individuals within each population was recorded using a standard handheld GPS. Targeted survey transects (as track logs) are presented in **Figure 3.1**.

FIGURE 3.1
Survey Track Logs and
Relevé and Vegetation
Mapping Note Locations

Legend

- Survey Area
- Road
- Watercourse
- Property Boundary
- Nature Reserve
- Track Log
- Relevé
- Vegetation Mapping Note



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3.3.5 Introduced Flora

Locations of introduced flora taxa were recorded opportunistically whilst conducting vegetation mapping notes and relevés. Attention to the presence of introduced flora taxa was also paid while conducting targeted searching for significant flora and vegetation. Records were made with particular emphasis given to WoNS and Declared Pests.

3.4 Plant Collection and Identification

Specimens of any unknown taxa encountered during the field survey were collected and pressed for later identification, as per Western Australian Herbarium guidelines (WA Herbarium, 2020). Plant identifications were undertaken by a Principal Botanist with extensive previous experience (> 10 years) in plant identifications for flora of the Swan Coastal Plain (**Section 3.2**). The identification of all taxa (including significant taxa) used the most up to date information available (including taxonomic keys published in books, journals and online, comparison with herbarium specimens, and consultation with taxonomic experts). External experts of particular families or genera were consulted for any specimens considered to be difficult to identify or of taxonomic interest, including botanists at the WA Herbarium.

Taxon nomenclature generally follows FloraBase (WA Herbarium, 1998-) with all names checked against the current DBCA Max database to ensure their validity. However, in cases where names of plant taxa have been published recently in scientific literature but have not yet been adopted on FloraBase due to time constraints, nomenclature in the published literature is followed. The conservation status of each taxon was checked against FloraBase, which provides the most up-to-date information regarding the conservation status of flora taxa in WA.

As per Section 7.2 of EPA (2016b), specimens of interest, including significant flora taxa, taxa representing range extensions, potential new taxa, and key species in new occurrences of TECs and PECs will be sent to the WA Herbarium for consideration for vouchering as soon as practicable. However, this process is via donation, and the WA Herbarium may not voucher all specimens, in accordance with its own requirements. The specimen vouchering will be supported by completed Threatened and Priority Flora Report Forms (TPFRFs) submitted to DBCA (Species and Communities Branch) in the case of listed significant flora (i.e. Threatened and Priority flora taxa).

3.5 Vegetation Definition, Mapping and Description

Vegetation in the Survey Area was mapped and described using structural vegetation classification as described in Section 8.1 of the EPA Technical Guidance (EPA, 2016b). Vegetation community descriptions have been adapted from the National Vegetation Information System (NVIS) Australian Vegetation Attribute Manual Version 6.0 (Executive Steering Committee for Australian Vegetation Information (ESCAVI), 2003), as stipulated by (EPA, 2016b). This model follows nationally agreed guidelines to describe and represent vegetation types, so that comparable and consistent data are produced nation-wide.

It should be noted that this report describes VTs at the NVIS Sub-Association level, rather than the Association level as recommended by EPA (2016b) for vegetation described at this scale. The Sub-Association level is considered more appropriate for the vegetation of the Survey Area, as often the vegetation possessed one or more additional strata to the traditional three-stratum classification system used at the Association level.

Relevé data was used in conjunction with aerial photograph interpretation and field notes taken during the survey to develop VT polygon boundaries. These polygon boundaries were then digitised using Geographic Information System (GIS) software.

3.6 Vegetation Condition Mapping

Vegetation condition within the Survey Area was described using the vegetation condition scale presented in EPA (2016b) for the South West and Interzone Botanical Provinces, as presented in **Table 3.2**. Notes on vegetation condition were taken during the field survey during foot traverses undertaken within the Survey Area. Vegetation condition category polygon boundaries were developed using this information in conjunction with introduced flora taxa location data, and were digitised using GIS software as for vegetation mapping polygon boundaries.

Table 3.2 Vegetation Condition Scale for the South-West and Interzone Botanical Provinces (EPA, 2016b)

Condition Rating	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.
Very Good	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees and shrubs.

3.7 Significant Flora and Vegetation

3.7.1 Significant Flora

As per (EPA, 2016a), flora taxa may be significant for a range of reasons, including, but not limited to the following:

- Identified as a Threatened or Priority species (formally listed significant taxa – includes taxa listed under both State and Commonwealth legislation and classified as Priority by DBCA).

- Locally endemic or associated with a restricted habitat type (e.g. surface water or groundwater dependent ecosystems (GDEs)).
- A new species or having anomalous features that indicate a potential new species.
- Representative of the range of a species (particularly at the extremes of range, recently discovered range extensions, or isolated outliers of the main range).
- An unusual species, including restricted subspecies, varieties or naturally occurring hybrids.
- Having a relictual status, being representative of taxonomic groups that no longer occur widely in the broader landscape.

Significant flora taxa recorded within the Survey Area are outlined in **Section 5.2.2**, with reference to the above categories. Point locations, individuals and populations of significant flora known from the Survey Area are also presented in this section. Note that a population in the context of this survey is defined as a discrete group of individuals of a taxon separated by more than 500 m from the nearest discrete group of individuals (DBCA, 2017); however, this definition can only be tentatively applied if the intervening 500 m has not been surveyed. Conservation codes for Western Australian flora are presented on the DBCA Threatened species and communities website (DBCA, 2020).

3.7.2 Significant Vegetation

As per (EPA, 2016a), vegetation may be significant for a range of reasons, including, but not limited to the following:

- Being identified as a TEC or PEC (formally listed significant vegetation – includes vegetation listed under Commonwealth or State legislation, or classified as a PEC by DBCA).
- Having restricted distribution.
- Having a degree of historical impact from threatening processes.
- Playing a role as a refuge.
- Providing an important function required to maintain ecological integrity of a significant ecosystem.

The vegetation of the Survey Area was manually compared to TEC/PEC descriptions to determine whether any vegetation may represent a TEC or PEC; specifically, comparisons of dominant taxa, soils, topography and geographical distribution of VTs were made to those of any relevant TEC or PEC. A similar process was followed for TECs listed under the EPBC Act, with comparisons made to the appropriate listing and conservation advice for any TECs likely to occur in the Survey Area.

The remaining significant vegetation criteria other than “being identified as a TEC and PEC” were applied to VTs mapped in the Survey Area to determine whether a VT was significant in a local or regional context. However, in a regional context, limited information is available for comparison with VTs in the Survey Area. Significant vegetation is discussed further in **Section 5.2.7**. Definitions, categories and criteria for TECs and PECs in WA are presented on the DBCA Threatened species and communities website (DBCA, 2013).

4.0 Limitations

Table 4.1 presents an assessment of potential limitations of the flora and vegetation survey of the Survey Area in accordance with (EPA, 2016b).

Table 4.1 Limitations of the Flora and Vegetation Survey

Limitation	Limitation of Survey	Comment
Effort and Extent	No	<p>A reconnaissance and targeted survey was undertaken in late August 2023, within what was considered to be the peak flowering season in the Swan Coastal Plain bioregion in 2023. It is considered that the survey being conducted in the peak flowering season only is appropriate, as it is likely that most taxa that flower outside the peak flowering season were identifiable during the survey.</p> <p>Relevés were established in each vegetation pattern identified in the Survey Area. Mapping of vegetation boundaries was undertaken using a combination of aerial photography and information collected during traverses between relevés.</p> <p>Targeted survey for significant flora taxa and significant vegetation identified as part of the desktop assessment was conducted over all suitable habitat within the Survey Area.</p> <p>No constraints prevented appropriate sampling techniques (relevé establishment, foot transects) being employed. Most areas were relatively easy to access; data reliability is therefore considered to be relatively high.</p>
Competency/experience of the team carrying out the survey	No	<p>The project, field and identifications manager has extensive experience (> 10 years) in conducting flora and vegetation surveys and plant identifications within the Swan Coastal Plain bioregion, and provided mentoring and oversight of less experienced personnel.</p> <p>Information relating to identifying characteristics, flowering period and habitat of significant flora taxa identified by the desktop assessment as potentially occurring in the Survey Area was provided to all field team members prior to undertaking the field survey, and all field personnel observed in situ locations of significant flora taxa known to occur in the Survey Area prior to surveys commencing.</p> <p>Relevant taxonomic experts at the WA Herbarium were consulted for identifications if required.</p>
Proportion of flora identified, recorded and/or collected	No	<p>The reconnaissance survey was not intended to provide a full census of the flora of the Survey Area. All dominant vascular groups that were present in the Survey Area were sampled. A high proportion of perennial vascular taxa were recorded based on the intensity and method of survey, and almost all could be positively identified. A high proportion of annual vascular taxa were recorded based on the timing, intensity and method of survey. Unknown vascular taxa were collected, with specimens identified at the WA Herbarium.</p>

Limitation	Limitation of Survey	Comment
Sources of information e.g. previously available information (whether historic or recent) as distinct from new data	No	Reasonable contextual information on the Survey Area was available from various sources, including reports from previous surveys conducted in close proximity to the Survey Area (Umwelt, 2021, 2023; Woodman Environmental, 2006, 2009b, 2009a, 2014, 2015, 2016, 2017, 2018, 2021). Other sources of information used included government databases (e.g. DBCA, DCCEEW), and general sources pertaining to the climate, flora and vegetation of the region.
Timing/weather/season/ cycle	No	A reconnaissance and targeted survey was undertaken in late August 2023, within what was considered to be the peak flowering season in the Swan Coastal Plain bioregion in 2023. The 2023 peak flowering period appeared to be reasonable, although below-average rainfall received from May–August may have affected the abundance of annual taxa. The timing of the field survey allowed for the positive identification of all significant taxa considered likely to occur in the Survey Area.
Disturbances (e.g. fire, flood, accidental human intervention etc.), which affected results of survey	No	There was evidence of some impact to vegetation composition and structure in parts of the Survey Area as a result of human activities, including clearing and invasion by introduced (weed) taxa. However, these disturbances are not considered to have affected the results of the survey, with the remnant vegetation able to be compared to known vegetation types, including formally described significant vegetation.
Remoteness and/or access problems	No	There were no impediments to foot access of the entire Survey Area.

5.0 Results and Discussion

5.1 Desktop Assessment

5.1.1 Regional Vegetation

As previously mentioned, the Survey Area is located within the Swan Coastal Plain IBRA region, specifically within the SWA02 Perth IBRA subregion (DAWE, 2021). The vegetation of the SWA02 Perth IBRA subregion is dominated by Banksia or Tuart on sandy soils, paperbark (*Melaleuca* spp.) in swampy areas, and *Casuarina obesa* on outwash plains (Mitchell et al., 2002).

The vegetation of WA as it was presumed to have existed prior to European settlement has been mapped at a scale of 1:250,000 as vegetation system associations (VSAs), with the Pre-European Vegetation spatial database created (Beard et al., 2013; DPIRD, 2019). The Survey Area intersects one vegetation system association, as summarised in **Table 5.1** and presented in **Figure 5.1**. **Table 5.1** also presents the current extent of each VSA in relation to its pre-European extent within the SWA02 Perth IBRA subregion, and the percentage of the current extent of each VSA currently protected for conservation (as a proportion of the current extent) within the SWA02 Perth IBRA subregion (DBCA, 2019). Note that as per DBCA (2019), protected areas in this context are considered to be any areas within International Union for Conservation of Nature (IUCN) categories I to IV.

The VSA present in the Survey Area has almost 70 % of its pre-European extent remaining in the subregion, with the proportion of its current extent protected for conservation being approximately 10 % (**Table 5.1**).

Table 5.1 Vegetation System Associations Occurring in the Survey Area

Vegetation System Association [^]	Description [*]	Current Extent (ha) [*]	Percentage of Pre-European Extent Remaining [*]	Percentage of Current Extent Protected for Conservation [*]
Bassendean_1030	Low woodland; <i>Banksia attenuata</i> and <i>Banksia menziesii</i>	80,190.7	69.1 %	9.6 %

[^] Source: Pre-European Vegetation spatial dataset (DPIRD-006)(DPIRD, 2019).

^{*} Source: 2018 DBCA Statewide Vegetation Statistics report (DBCA, 2019).

FIGURE 5.1

Vegetation System Associations of the Survey Area

Legend

Survey Area

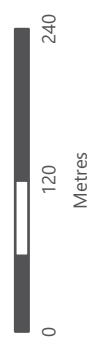
Road

Property Boundary

Vegetation System Association

BASSENDEAN_1030

JURIEAN_1029



Scale 1:6,000 at A4
GDA2020 MGA Zone 50

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5.1.2 Local Flora and Vegetation Surveys

Umwelt (including as Woodman Environmental) has previously undertaken numerous flora and vegetation surveys within the Desktop Study Area (Umwelt, 2021, 2023; Woodman Environmental, 2006, 2009b, 2009a, 2014, 2015, 2016, 2017, 2018, 2019, 2021), primarily for proposed exploration drill lines.

Collectively, these surveys have recorded seven significant flora taxa (see **Section 5.1.4**). These surveys have also recorded two significant vegetation types, being the 'Banksia Woodlands of the Swan Coastal Plain ecological community' (Endangered – Commonwealth, P3 PEC – WA), and vegetation on potential ferricrete (ironstone) ridges (not formally listed – discussed in survey reports only). The latter vegetation type is currently considered to be significant as a precaution; ferricrete substrates in other areas of the Swan Coastal Plain bioregion host plant assemblages that are significant in a conservation context, with several ferricrete soil associations in the south-west of WA listed as TECs, at both state and federal level.

The IBSA database search for relevant flora and vegetation survey reports returned only one search result, from Ecology and Heritage Partners (2017). The Study Area for this survey included a 21,661 ha area located within the Badgingarra Wind Farm site. No significant vegetation or taxa were recorded by this survey (Ecology and Heritage Partners, 2017).

5.1.3 Significant Vegetation

The DBCA Threatened and Priority Ecological Communities Database search returned occurrences (in the form of buffer polygons) of one significant vegetation type within the Desktop Study Area and Survey Area, being the 'Banksia Woodlands of the Swan Coastal Plain ecological community'. These occurrences are presented in **Figure 5.2**. It should be noted that the buffer polygons provided by the search represent polygons that were created by DBCA by overlaying broad-scale vegetation mapping over remnant vegetation polygons. Ground-truthing has not been undertaken to confirm occurrences in this dataset in most cases, and they are therefore considered to be indicative only, with on-ground assessment required to determine the actual extent of the TEC (if present at all).

The search of DCCEEW's SPRAT Database (DCCEEW, 2023) returned two TECs that are 'likely to occur' within the Desktop Study Area, being the 'Banksia Woodlands of the Swan Coastal Plain ecological community' and the 'Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain' TEC (Critically Endangered). Results of this search are presented in **Appendix A**.

As noted in **Section 5.1.2**, the 'Banksia Woodlands of the Swan Coastal Plain ecological community' has been confirmed as occurring within the Desktop Study Area during previous surveys for Tronox. Additionally, one further vegetation community considered to represent significant vegetation (although not formally listed), being vegetation on potential ferricrete (ironstone) ridges, has also been recorded in the Desktop Study Area.

FIGURE 5.2

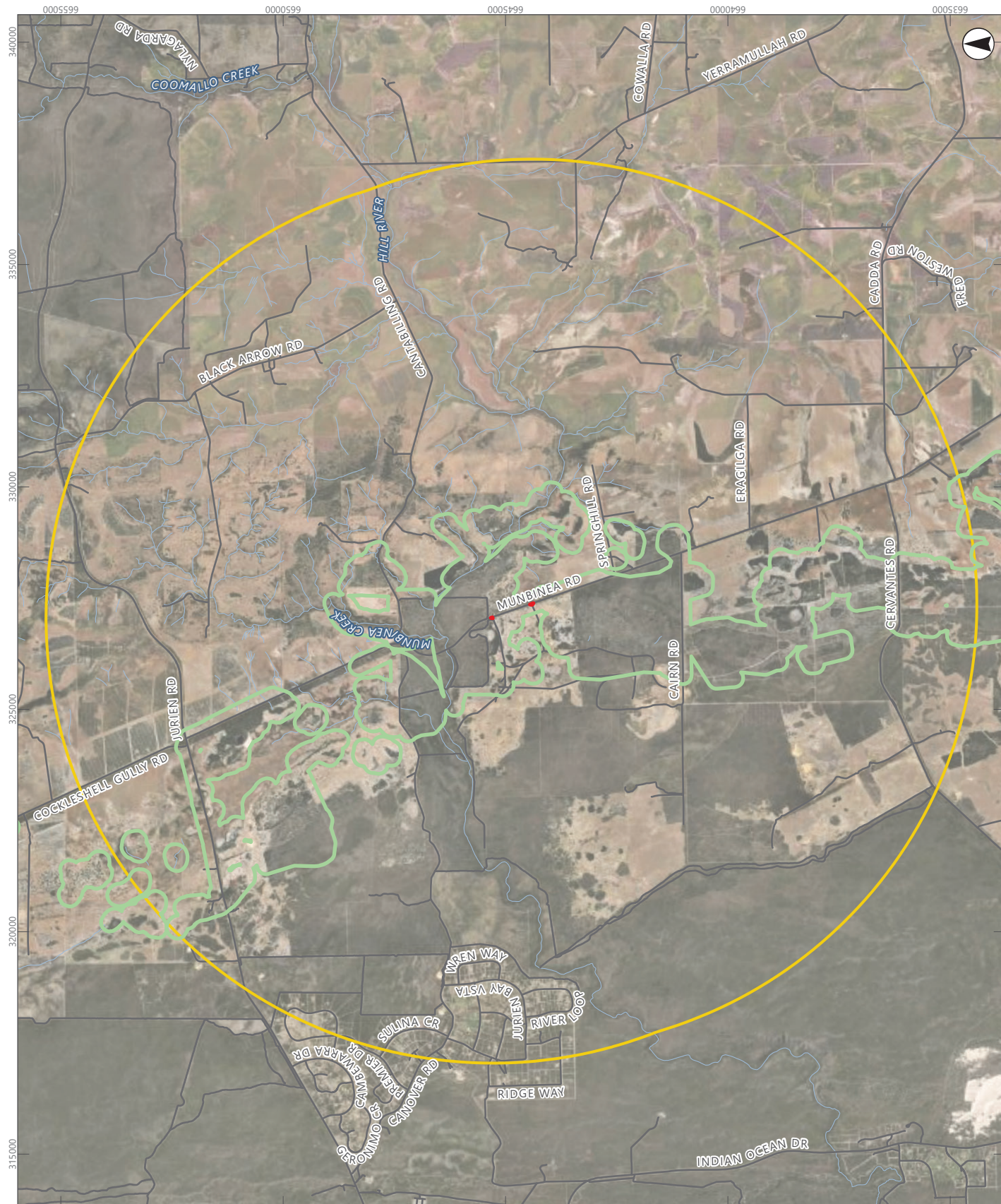
DBCA Threatened and Priority Ecological Communities Database Interrogation Results for the Desktop Study Area

Legend

- Desktop Study Area
- Survey Area
- Road
- Watercourse

Threatened Ecological Communities

- Banksia Woodlands of the Swan
- Coastal Plain ecological community (WA – P3, EPBC – Endangered)



Scale 1:120,000 at A4
GDA2020 MGA Zone 50

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5.1.4 Significant Flora Taxa

The search of DBCA’s significant flora databases returned records of 39 significant flora taxa that have records within the Desktop Study Area (DBCA, 2023b), as listed in **Table 5.2**. This includes six Threatened and 33 Priority taxa.

The search of DCCEEW’S SPRAT Database (DCCEEW, 2023) returned 21 Threatened taxa (or habitat for such taxa) that either ‘may’, are ‘known’, or are ‘likely’ to occur within the Desktop Study Area, as listed in **Table 5.2**. The full results of this search are presented in **Appendix A**.

As noted in **Section 5.1.2**, seven significant flora taxa (all Priority taxa) have been recorded in the Desktop Study Area during previous surveys for Tronox, as listed in **Table 5.2**. These are *Banksia dallanneyi* subsp. *pollostata* (P3), *Hensmania stoniella* (P3), *Isopogon panduratus* subsp. *palustris* (P3), *Persoonia rudis* (P3), *Platysace ramosissima* (P3), *Poranthera asybosca* (P1) and *Schoenus griffinianus* (P4) (Umwelt, 2023; Woodman Environmental, 2006, 2009b, 2009a, 2014, 2015, 2016, 2017, 2018, 2019, 2021).

A summary of significant flora taxa known to occur, or potentially occurring, within the Desktop Study Area is presented in **Table 5.2**. This list has been compiled from the results of the desktop searches (including DBCA and DCCEEW databases), the Tronox – Iluka Resources Ltd significant flora database, and previous survey reports (outlined in **Section 5.1.2**). A total of 58 significant flora taxa are known to occur within the vicinity (approximately 10 km) of the Survey Area, including 21 Threatened taxa (listed under the EPBC Act and/or BC Act) and 37 DBCA-classified Priority taxa. The locations of these taxa (where available) are presented in **Figure 5.3**. No records of significant flora taxa were identified within the Survey Area itself.

Table 5.2 Significant Flora Known or Potentially Occurring within the Desktop Study Area

Taxon	Status (WA)	Habitat (WA Herbarium, 1998-)	Flowering Period (WA Herbarium, 1998-)	Source
<i>Acacia forrestiana</i>	T	Lateritic gravelly soils, clay loam over sandstone. Gullies, hills, breakaways.	November – December	DCCEEW
<i>Acacia plicata</i>	P3	Gravelly soils with <i>Eucalyptus wandoo</i> .	August – October	DBCA
<i>Acacia retrorsa</i>	P2	Grey or brown sand and sandy loam with lateritic gravel in gullies or on slopes.	August – September	DBCA
<i>Andersonia gracilis</i>	T	White/grey sand, sandy clay, gravelly loam. Winter-wet areas, near swamps.	August – November	DCCEEW
<i>Andersonia</i> sp. <i>Mysosma</i> (E.A. Griffin 2213)	P2	Grey sand on hills, breakaways and slopes with laterite.	September – November	DBCA
<i>Anigozanthos viridis</i> subsp. <i>terraspectans</i>	T	Grey sand, clay loam. Winter-wet depressions.	August – September	DCCEEW
<i>Banksia dallanneyi</i> subsp. <i>pollostata</i>	P3	Grey/yellow sand. Flats, lateritic rises.	August – September	Tronox

Taxon	Status (WA)	Habitat (WA Herbarium, 1998-)	Flowering Period (WA Herbarium, 1998-)	Source
<i>Banksia fraseri</i> var. <i>crebra</i>	P3	Grey or brown lateritic sandy clay on lateritic sandplains and low lateritic hills.	July – August	DBCA
<i>Banksia mimica</i>	T	White or grey sand over laterite, sandy loam.	September – January	DCCEEW
<i>Caladenia hoffmanii</i>	T	Clay, loam, laterite, granite. Rocky outcrops and hillsides, ridges, swamps and gullies.	August – October	DCCEEW
<i>Drakaea elastica</i>	T	Grey sand on margins of winter-wet areas	October-November (leaves visible May – August)	DCCEEW
<i>Dampiera tephrea</i>	P3	Variable, often near rivers or on limestone, occasionally laterite.	August – October	DBCA
<i>Drosera allantostigma</i>	P1	Sand or loam in low heath or along margins of winter-wet areas.	November – December	DBCA
<i>Drosera rubricalyx</i>	P2	Winter-wet sandy clay on slopes	August – September	DBCA
<i>Eucalyptus angularis</i>	P2	Slopes and breakaways of lateritic hills.	Unknown	DBCA
<i>Eucalyptus argutifolia</i>	T	Coastal limestone		DCCEEW
<i>Eucalyptus foecunda</i> subsp. <i>foecunda</i>	P4	White sand on dunes over limestone or limestone hills/ridges.	February – March, July	DBCA
<i>Eucalyptus johnsoniana</i>	T	White/grey sand with lateritic gravel. Sandplains, lateritic breakaways.	July – May	DCCEEW
<i>Eucalyptus leprophloia</i>	T	White or grey sand over laterite on valley slopes.	July – November	DBCA DCCEEW
<i>Eucalyptus pendens</i>	P4	Sand over laterite on hilltops and breakaways.	August – November	DBCA
<i>Eucalyptus pruiniramis</i>	T	Skeletal soils over sandstone or laterite. Rocky hillslopes.	December – February	DCCEEW
<i>Eucalyptus suberea</i>	T	White, grey or brown shallow sand over laterite on or near lateritic breakaways.	November – March	DBCA DCCEEW
<i>Eucalyptus x balanites</i>	T	White sand over laterite	October - February	DCCEEW
<i>Eucalyptus x lateritica</i>	T	White or grey sand over laterite on breakaways and mesas.	August – October	DBCA DCCEEW
<i>Grevillea batrachioides</i>	T	Sandy loam. Sandstone outcrops.	October	DCCEEW

Taxon	Status (WA)	Habitat (WA Herbarium, 1998-)	Flowering Period (WA Herbarium, 1998-)	Source
<i>Grevillea cooljarloo</i>	P1	Grey or white sand or sandy clay in low flats and winter-wet areas, with nearest record occurring in <i>Eucalyptus</i> wandoo woodland.	June – November	DBCA
<i>Grevillea humifusa</i>	T	Brown gravelly loam over laterite on slopes.	May, September – November	DBCA DCCEEW
<i>Grevillea rudis</i>	P4	White, grey, yellow or red sand, usually with gravel over laterite on hills.	April – January	DBCA
<i>Grevillea saccata</i>	P4	Sand, usually with gravel and over laterite.	April – November	DBCA
<i>Haemodorum loratum</i>	P3	Grey or yellow gravelly sand on low plains or slopes.	November	DBCA
<i>Hakea megalosperma</i>	T	White or grey gravelly sand or loam over laterite on slopes and hilltops.	April – June	DBCA DCCEEW
<i>Hakea neurophylla</i>	P4	Brown or brown gravelly sand or loam on slopes or lateritic hills.	August	DBCA
<i>Hemiandra gardneri</i>	T	Grey or yellow sand, clayey sand. Sandplains.	August – November	DCCEEW
<i>Hemiandra</i> sp. Watheroo (S. Hancocks 4)	P4	White / grey sand on sandplains and hillslopes often over laterite.	October – November	DBCA
<i>Hensmania stoniella</i>	P3	White, grey or lateritic sand, often in winter-wet areas.	September – November	DBCA Tronox
<i>Isopogon panduratus</i> subsp. <i>palustris</i>	P3	Winter-wet heath in sandy soils.	June – August	Tronox
<i>Lepyrodia curvescens</i>	P2	Grey sand or clay on slopes, flats or in winter-wet areas.	September – November	DBCA
<i>Paracaleana dixonii</i>	T	Non-calcareous sand, often near laterite	Late October - November	DCCEEW
<i>Patersonia spirifolia</i>	T	Sand over laterite. Low hills.	October – November	DCCEEW
<i>Persoonia rudis</i>	P3	White, grey or yellow sand, often over laterite.	September – January	Tronox
<i>Phlebocarya pilosissima</i> subsp. <i>pilosissima</i>	P3	White or grey sand with lateritic gravel in upland areas.	August – October	DBCA
<i>Phlebocarya pilosissima</i> subsp. <i>teretifolia</i>	P2	White, grey or brown sand over laterite or limestone in upland areas.	August – October	DBCA
<i>Platysace ramosissima</i>	P3	Yellow, brown or grey sandy soils on flats or low rises.	October – November	DBCA Tronox
<i>Poranthera asybosca</i>	P1	Grey/white sandy soil.	October	Tronox

Taxon	Status (WA)	Habitat (WA Herbarium, 1998-)	Flowering Period (WA Herbarium, 1998-)	Source
<i>Schoenus griffinianus</i>	P4	White or grey sand, sometimes associated with laterite, on flats or low plains.	September – October	DBCA Tronox
<i>Stylidium inversiflorum</i>	P4	White or grey sand over laterite on plains or slopes.	September – November	DBCA
<i>Stylidium periscelanthum</i>	P3	Winter-wet clay soils on flats and slopes of low hills (usually granitic).	September – October	DBCA
<i>Stylidium torticarpum</i>	P3	White, grey or brown sandy clay or clay loam over laterite on plains, slopes or near breakaways.	September – November	DBCA
<i>Styphelia carolineae</i>	P2	White sand over laterite in dense, species-rich heath.	May – July	DBCA
<i>Synaphea endothrix</i>	P3	Gravelly loam or sand on lateritic rises.	July – October	DBCA
<i>Synaphea lesueurensis</i>	P2	Grey or brown gravelly sand or loam over laterite on slopes.	August – October	DBCA
<i>Synaphea xela</i>	P2	White or brown gravelly sand or loam over laterite on slopes.	August	DBCA
<i>Tetradlea angulata</i>	P3	White, grey or brown gravelly sand or loam over laterite on slopes or hilltops.	September – December	DBCA
<i>Tetradlea nephelioides</i>	T	White-grey sand, yellow-brown clayey sand, gravel, laterite. Outcrops, undulating hills, ridges.	July – January	DCCEEW
<i>Thelymitra stellata</i>	T	Sand, gravel, lateritic loam.	September – November	DBCA DCCEEW
<i>Thysanotus glaucus</i>	P4	White, grey or yellow sand and sandy gravel on plains or slopes.	October – March	DBCA
<i>Thysanotus vernalis</i>	P3	Grey or brown sandy loam or sand often over laterite on uplands hillslopes.	September – October	DBCA
<i>Xanthosia tomentosa</i>	P4	White, grey or brown gravelly sand or clayey sand over laterite on plains or slopes.	September – December	DBCA

FIGURE 5.3

**LEGEND: Significant Flora
Records of the Desktop
Study Area**

**Legend
Significant Flora**

● Apl	<i>Acacia plicata</i> (P3)	● HspW	<i>Hemiandra</i> sp. Watheroo (S. Hancock's 4) (P4)
● Are	<i>Acacia retrorsa</i> (P2)	● Hst	<i>Hensmania stoniella</i> (P3)
● AspM	<i>Andersonia</i> sp. Mysosma (E.A. Griffin 2213) (P2)	● Ipap	<i>Isopogon panduratus</i> subsp. <i>palustris</i> (P3)
● Bdap	<i>Banksia dallanneyi</i> subsp. <i>pollosta</i> (P3)	● Lcu	<i>Lepyrodia curvescens</i> (P2)
● Bfrc	<i>Banksia fraseri</i> var. <i>crebra</i> (P3)	● Pru	<i>Persoonia rudis</i> (P3)
● Dtep	<i>Dampiera tephrea</i> (P3)	● Ppip	<i>Phlebocarya pilosissima</i> subsp. <i>pilosissima</i> (P3)
● Dal	<i>Drosera allantostigma</i> (P1)	● Ppit	<i>Phlebocarya pilosissima</i> subsp. <i>teretifolia</i> (P2)
● Dru	<i>Drosera rubricalyx</i> (P2)	● Pra	<i>Platysace ramosissima</i> (P3)
● Ean	<i>Eucalyptus angularis</i> (P2)	● Pas	<i>Poranthera asybosca</i> (P1)
● Ear	<i>Eucalyptus argutifolia</i> (T)	● Sgr	<i>Schoenus griffinianus</i> (P4)
● Effe	<i>Eucalyptus foecunda</i> subsp. <i>foecunda</i> (P4)	● Shy	<i>Stylidium hymenocraspedum</i> (P3)
● Ele	<i>Eucalyptus leprophloia</i> (T)	● Sinv	<i>Stylidium inversiflorum</i> (P4)
● Epe	<i>Eucalyptus pendens</i> (P4)	● Sper	<i>Stylidium periscelanthum</i> (P3)
● Esu	<i>Eucalyptus suberea</i> (T)	● Sto	<i>Stylidium torticarpum</i> (P3)
● Elat	<i>Eucalyptus x lateritica</i> (T)	● Scaro	<i>Styphelia carolineae</i> (P2)
● Gcoo	<i>Grevillea cooljarloo</i> (P1)	● Send	<i>Synaphea endoathrix</i> (P3)
● Ghu	<i>Grevillea humifusa</i> (T)	● Sles	<i>Synaphea lesueurensis</i> (P2)
● Grud	<i>Grevillea rudis</i> (P4)	● Sxe	<i>Synaphea xela</i> (P2)
● Gsa	<i>Grevillea saccata</i> (P4)	● Tag	<i>Tetradlea angulata</i> (P3)
● Hlor	<i>Haemodorum loratum</i> (P3)	● Tst	<i>Thelymitra stellata</i> (T)
● Hime	<i>Hakea megalosperma</i> (T)	● Tgl	<i>Thysanotus glaucus</i> (P4)
● Hne	<i>Hakea neurophylla</i> (P4)	● Tve	<i>Thysanotus vernalis</i> (P3)
		● Xto	<i>Xanthosia tomentosa</i> (P4)

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5.2 Field Survey

5.2.1 Vascular Flora Census

A total of 63 discrete vascular flora taxa were recorded during this survey, representing 30 families and 53 genera. The most well-represented families were Proteaceae (10 taxa), Myrtaceae (8 taxa) and Fabaceae (6 taxa). Six of the recorded taxa were introduced. Note that as discussed in **Section 1.3**, this was a reconnaissance assessment and therefore a full census of all vascular flora taxa that occur in the Survey Area was not undertaken.

A full list of taxa recorded in the Survey Area is presented in **Appendix A**, with raw relevé data and parameters presented in **Appendix B**. Vegetation mapping note data are presented in **Appendix C**.

5.2.2 Significant Flora Taxa

No significant flora taxa were identified by the survey.

5.2.3 Likelihood of Occurrence of Further Significant Flora Taxa

A total of 58 listed significant flora taxa were identified as having records or potential habitat within the Desktop Study Area prior to survey (**Section 5.1.4**). None of these taxa were recorded within the Survey Area by the field survey.

Table 5.3 presents an assessment of the likelihood of the taxa occurring in the Survey Area. This assessment considered whether a taxon was identifiable at the time of survey, the known range of the taxon, and proximity of known records to the Survey Area, when determining the potential for a taxon to occur in the Survey Area. Suitable habitat has been determined using details recorded at known locations. However, for many of the taxa known from the general vicinity of the Survey Area, suitable habitat is difficult to define, as available habitat information is often vague or very broad and difficult to interpret; for example an area described as a plain with red-brown clay loam could feasibly occur almost anywhere in WA. Therefore, a precautionary approach has been adopted when assessing whether suitable habitat for a species is present in the Survey Area.

It is considered that 53 taxa in **Table 5.3** were identifiable during the survey, either because the survey periods coincided with the taxon's flowering period, or the taxon can be detected and identified reliably when in fruit or sterile. The five taxa that were not identifiable at the time of the survey are considered unlikely to occur in the Survey Area, as it is considered that there is no suitable habitat for these taxa present in the Survey Area.

Table 5.3 Likelihood of Occurrence of Further Significant Flora Taxa in the Survey Area

Taxon	Status (WA)	Habitat (WA Herbarium, 1998-)	Flowering Period (WA Herbarium, 1998-)	Identifiable During Survey	Likelihood of Occurrence in Survey Area
<i>Acacia forrestiana</i>	T	Lateritic gravelly soils, clay loam over sandstone. Gullies, hills, breakaways.	November – December	Yes	Unlikely – habitat not present in Survey Area
<i>Acacia plicata</i>	P3	Gravelly soils with <i>Eucalyptus wandoo</i> .	August – October	Yes	Unlikely – habitat not present in Survey Area
<i>Acacia retrorsa</i>	P2	Grey or brown sand and sandy loam with lateritic gravel in gullies or on slopes.	August – September	Yes	Unlikely – habitat not present in Survey Area
<i>Andersonia gracilis</i>	T	White/grey sand, sandy clay, gravelly loam. Winter-wet areas, near swamps.	August – November	Yes	Unlikely – habitat not present in Survey Area
<i>Andersonia</i> sp. <i>Mysosma</i> (E.A. Griffin 2213)	P2	Grey sand on hills, breakaways and slopes with laterite.	September – November	Yes	Unlikely – habitat not present in Survey Area
<i>Anigozanthos viridis</i> subsp. <i>terrasspectans</i>	T	Grey sand, clay loam. Winter-wet depressions.	October – November	Yes	Unlikely – habitat not present in Survey Area
<i>Banksia dallanneyi</i> subsp. <i>pollostata</i>	P3	Grey/yellow sand. Flats, lateritic rises.	August – September	Yes	Unlikely – suitable habitat potentially present, however not detected during targeted survey.
<i>Banksia fraseri</i> var. <i>crebra</i>	P3	Grey or brown lateritic sandy clay on lateritic sandplains and low lateritic hills.	July – August	Yes	Unlikely – habitat not present in Survey Area
<i>Banksia mimica</i>	T	White or grey sand over laterite, sandy loam.	September – January	Yes	Unlikely – suitable habitat potentially present, however not detected during targeted survey, and known range much further south (nearest location ca. 100 km south)
<i>Caladenia hoffmannii</i>	T	Clay, loam, laterite, granite. Rocky outcrops and hillsides, ridges, swamps and gullies.	August – October	Yes	Unlikely – habitat not present in Survey Area

Taxon	Status (WA)	Habitat (WA Herbarium, 1998-)	Flowering Period (WA Herbarium, 1998-)	Identifiable During Survey	Likelihood of Occurrence in Survey Area
<i>Drakaea elastica</i>	T	Grey sand on margins of winter-wet areas.	October-November (leaves visible May – August)	Yes	Unlikely – habitat not present in Survey Area
<i>Dampiera tephrea</i>	P3	Variable, often near rivers or on limestone, occasionally laterite.	August – October	Yes	Unlikely – habitat not present in Survey Area
<i>Drosera allantostigma</i>	P1	Sand or loam in low heath or along margins of winter-wet areas.	November – December	No	Unlikely – habitat not present in Survey Area
<i>Drosera rubricalyx</i>	P2	Winter-wet sandy clay on slopes.	August – September	Yes	Unlikely – habitat not present in Survey Area
<i>Eucalyptus angularis</i>	P2	Slopes and breakaways of lateritic hills.	Unknown	Yes	Unlikely – habitat not present in Survey Area
<i>Eucalyptus argutifolia</i>	T	Coastal limestone	March - April	Yes	Unlikely – habitat not present in Survey Area
<i>Eucalyptus foecunda</i> subsp. <i>foecunda</i>	P4	White sand on dunes over limestone or limestone hills/ridges.	February – March, July	Yes	Unlikely – habitat not present in Survey Area
<i>Eucalyptus johnsoniana</i>	T	White/grey sand with lateritic gravel. Sandplains, lateritic breakaways.	July – May	Yes	Unlikely – habitat not present in Survey Area
<i>Eucalyptus leprophloia</i>	T	White or grey sand over laterite on valley slopes.	July – November	Yes	Unlikely – habitat not present in Survey Area
<i>Eucalyptus pendens</i>	P4	Sand over laterite on hilltops and breakaways.	August – November	Yes	Unlikely – habitat not present in Survey Area
<i>Eucalyptus pruiniramis</i>	T	Skeletal soils over sandstone or laterite. Rocky hillslopes.	December – February	Yes	Unlikely – habitat not present in Survey Area
<i>Eucalyptus suberea</i>	T	White, grey or brown shallow sand over laterite on or near lateritic breakaways.	November – March	Yes	Unlikely – habitat not present in Survey Area

Taxon	Status (WA)	Habitat (WA Herbarium, 1998-)	Flowering Period (WA Herbarium, 1998-)	Identifiable During Survey	Likelihood of Occurrence in Survey Area
<i>Eucalyptus x balanites</i>	T	White sand over laterite.	October - February	Yes	Unlikely – habitat not present in Survey Area
<i>Eucalyptus x lateritica</i>	T	White or grey sand over laterite on breakaways and mesas.	August – October	Yes	Unlikely – habitat not present in Survey Area
<i>Grevillea batrachiooides</i>	T	Sandy loam. Sandstone outcrops.	October	Yes	Unlikely – habitat not present in Survey Area
<i>Grevillea cooljarloo</i>	P1	Grey or white sand or sandy clay in low flats and winter-wet areas, with nearest record occurring in <i>Eucalyptus</i> wandoo woodland.	June – November	Yes	Unlikely – habitat not present in Survey Area
<i>Grevillea humifusa</i>	T	Brown gravelly loam over laterite on slopes.	May, September – November	Yes	Unlikely – habitat not present in Survey Area
<i>Grevillea rudis</i>	P4	White, grey, yellow or red sand, usually with gravel over laterite on hills.	April – January	Yes	Unlikely – habitat not present in Survey Area
<i>Grevillea saccata</i>	P4	Sand, usually with gravel and over laterite.	April – November	Yes	Unlikely – habitat not present in Survey Area
<i>Haemodorum loratum</i>	P3	Grey or yellow gravelly sand on low plains or slopes.	November	Yes	Unlikely – suitable habitat potentially present, however not detected during targeted survey.
<i>Hakea megalosperma</i>	T	White or grey gravelly sand or loam over laterite on slopes and hilltops.	April – June	Yes	Unlikely – habitat not present in Survey Area
<i>Hakea neurophylla</i>	P4	Brown or brown gravelly sand or loam on slopes or lateritic hills.	August	Yes	Unlikely – habitat not present in Survey Area
<i>Hemiandra gardneri</i>	T	Grey or yellow sand, clayey sand. Sandplains.	August – November	Yes	Unlikely – suitable habitat potentially present, however not detected during targeted survey

Taxon	Status (WA)	Habitat (WA Herbarium, 1998-)	Flowering Period (WA Herbarium, 1998-)	Identifiable During Survey	Likelihood of Occurrence in Survey Area
<i>Hemiandra</i> sp. Watheroo (S. Hancock 4)	P4	White / grey sand on sandplains and hillslopes often over laterite.	October – November	Yes	Unlikely – suitable habitat potentially present, however not detected during targeted survey
<i>Hensmania stoniella</i>	P3	White, grey or lateritic sand, often in winter-wet areas.	September – November	Yes	Unlikely – suitable habitat potentially present, however not detected during targeted survey
<i>Isopogon panduratus</i> subsp. <i>palustris</i>	P3	Winter-wet heath in sandy soils.	June – August	Yes	Unlikely – habitat not present in Survey Area
<i>Lepyrodia curvescens</i>	P2	Grey sand or clay on slopes, flats or in winter-wet areas.	September – November	Yes	Unlikely – habitat not present in Survey Area
<i>Paracaleana dixonii</i>	T	Non-calcareous sand, usually near laterite. Kwongan shrubland.	Late October - November	No	Unlikely – habitat not present in Survey Area
<i>Patersonia spirifolia</i>	T	Sand over laterite. Low hills.	October – November	Yes	Unlikely – habitat not present in Survey Area
<i>Persoonia rudis</i>	P3	White, grey or yellow sand, often over laterite.	September – January	Yes	Unlikely – suitable habitat potentially present, however not detected during targeted survey.
<i>Phlebocarya pilosissima</i> subsp. <i>pilosissima</i>	P3	White or grey sand with lateritic gravel in upland areas.	August – October	Yes	Unlikely – habitat not present in Survey Area
<i>Phlebocarya pilosissima</i> subsp. <i>teretifolia</i>	P2	White, grey or brown sand over laterite or limestone in upland areas.	August – October	Yes	Unlikely – habitat not present in Survey Area
<i>Platysace ramosissima</i>	P3	Yellow, brown or grey sandy soils on flats or low rises.	October – November	Yes	Unlikely – suitable habitat potentially present, however not detected during targeted survey
<i>Poranthera asybosca</i>	P1	Grey/white sandy soil.	Limited data – Likely August - October	Yes	Unlikely – suitable habitat potentially present, however not detected during targeted survey
<i>Schoenus griffinianus</i>	P4	White or grey sand, sometimes associated with laterite, on flats or low plains.	September – October	Yes	Unlikely – suitable habitat potentially present, however not detected during targeted survey

Taxon	Status (WA)	Habitat (WA Herbarium, 1998-)	Flowering Period (WA Herbarium, 1998-)	Identifiable During Survey	Likelihood of Occurrence in Survey Area
<i>Stylidium inversiflorum</i>	P4	White or grey sand over laterite on plains or slopes.	September – November	No	Unlikely – habitat not present in Survey Area
<i>Stylidium periscelanthum</i>	P3	Winter-wet clay soils on flats and slopes of low hills (usually granitic).	August – October	Yes	Unlikely – habitat not present in Survey Area
<i>Stylidium torticarpum</i>	P3	White, grey or brown sandy clay or clay loam over laterite on plains, slopes or near breakaways.	September – November	Yes	Unlikely – habitat not present in Survey Area
<i>Styphelia carolineae</i>	P2	White sand over laterite in dense, species-rich heath.	May – July	Yes	Unlikely – habitat not present in Survey Area
<i>Synaphea endoathrix</i>	P3	Gravelly loam or sand on lateritic rises.	July – October	Yes	Unlikely – habitat not present in Survey Area
<i>Synaphea lesueurensis</i>	P2	Grey or brown gravelly sand or loam over laterite on slopes.	August – October	Yes	Unlikely – habitat not present in Survey Area
<i>Synaphea xela</i>	P2	White or brown gravelly sand or loam over laterite on slopes.	August	Yes	Unlikely – habitat not present in Survey Area
<i>Tetradthea angulata</i>	P3	White, grey or brown gravelly sand or loam over laterite on slopes or hilltops.	September – December	Yes	Unlikely – habitat not present in Survey Area
<i>Tetradthea nephelioides</i>	T	White-grey sand, yellow-brown clayey sand, gravel, laterite. Outcrops, undulating hills, ridges.	July – January	Yes	Unlikely – habitat not present in Survey Area
<i>Thelymitra stellata</i>	T	Sand, gravel, lateritic loam.	October – November	No	Unlikely – habitat not present in Survey Area
<i>Thysanotus glaucus</i>	P4	White, grey or yellow sand and sandy gravel on plains or slopes.	October – March	Yes	Unlikely – suitable habitat potentially present, however not detected during targeted survey

Taxon	Status (WA)	Habitat (WA Herbarium, 1998-)	Flowering Period (WA Herbarium, 1998-)	Identifiable During Survey	Likelihood of Occurrence in Survey Area
<i>Thysanotus vernalis</i>	P3	Grey or brown sandy loam or sand often over laterite on upland hillslopes.	September – October	No	Unlikely – habitat not present in Survey Area
<i>Xanthosia tomentosa</i>	P4	White, grey or brown gravelly sand or clayey sand over laterite on plains or slopes.	September – December	Yes	Unlikely – habitat not present in Survey Area

5.2.4 Introduced Flora Taxa

A total of six introduced flora taxa were recorded within the Survey Area during the field survey. **Table 5.4** lists these taxa recorded and comments regarding the significance of these taxa, including ecological impact and invasiveness ratings for each introduced taxon under the Invasive Plant Prioritization Process for the DBCA for the Midwest Region (DBCA, 2014). No Declared Pests (as listed under the BAM Act (DPIRD, 2022b) or WoNS (Weeds Australia, 2023)) were recorded.

Table 5.4 Introduced Flora Taxa Recorded in the Survey Area

Taxon	Common Name	Comments
<i>Briza maxima</i>	Blowfly Grass	Unknown ecological impact and rapid invasiveness – DBCA (2014)
<i>Ehrharta calycina</i>	Perennial Veldt Grass	High ecological impact and rapid invasiveness – DBCA (2014)
<i>Hypochaeris glabra</i>	Smooth Cats-ear	Low ecological impact and rapid invasiveness – DBCA (2014)
<i>Lysimachia arvensis</i>	Pimpernel	Low ecological impact and rapid invasiveness – DBCA (2014)
<i>Pelargonium capitatum</i>	Rose Pelargonium	High ecological impact and moderate invasiveness – DBCA (2014)
<i>Ursinia anthemoides</i>	Ursinia	High ecological impact and rapid invasiveness – DBCA (2014)

5.2.5 Vegetation Types

One VT was described and mapped within the Survey Area via structural vegetation classification. **Table 5.5** presents a description of the VT. VT mapping is presented in **Figure 5.4**. **Appendix C** presents the vegetation mapping note (VMN) data recorded in the Survey Area.

5.2.6 Other Areas Described

Areas where natural vegetation has been completely removed have been mapped as ‘Cleared Land’ (C) (where discernible at 1:10,000 scale). This includes permanent tracks and road verge A total of 0.07 ha of ‘Cleared Land’ was mapped (46 % of Survey Area) (**Figure 5.4**).

Table 5.5 Summary of VTs Mapped in the Survey Area


VT	Summary	Representative Photograph
1	<p>Description: Low woodland dominated by <i>Banksia attenuata</i>, <i>Banksia prionotes</i> and <i>Banksia menziesii</i> over mid to low open shrubland dominated by <i>Conospermum stoechadis</i> subsp. <i>stoechadis</i>, <i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i>, <i>Daviesia divaricata</i> subsp. <i>divaricata</i>, <i>Leptospermopsis oligandra</i> and <i>Hypocalymma xanthopetalum</i> over low open sedgeland dominated by <i>Ecdiocola monostachya</i> and <i>Mesomelaena pseudostygia</i> on white-grey sand on plains.</p> <p>Area mapped: 0.09 ha (54 % of Survey Area)</p> <p>Sampling: 1 relevé (TJRR01), 4 vegetation mapping notes (VMD01, VMD02, VMD03, VMD07)</p> <p>Significant taxa: No significant taxa recorded</p>	 <p style="text-align: right;">Photo 5.1 VT 1 – Relevé TPRR01</p>

FIGURE 5.4
Vegetation Types of the
Survey Area

Legend

- ▭ Survey Area
- Road
- Property Boundary
- Nature Reserve

Observations

- Relevé
- Vegetation Mapping Note

Vegetation Type

- 1 - Low woodland dominated by *Banksia attenuata*, *Banksia prionotes* and *Banksia menziesii* over mid to low open shrubland dominated by *Conospermum stoechadis* subsp. *stoechadis*, *Hibbertia hypericoides* subsp. *hypericoides*, *Daviesia divaricata* subsp. *divaricata*, *Leptospermopsis oligandra* and *Hypocalymma xanthopetalum* over low open sedgeland dominated by *Ecdiceoalea monostachya* and *Mesomelaena pseudostygia* on white-grey sand on plains
- C - Cleared Land



Scale 1:6,000 at A4
GDA2020 MGA Zone 50

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5.2.7 Significant Vegetation

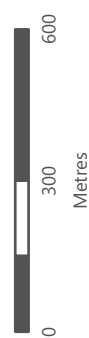
It is considered that the 'Banksia Woodlands of the Swan Coastal Plain ecological community' (Endangered – Commonwealth, P3 PEC – WA) occurs within the Survey Area, and is represented by VT 1, covering a total area of 0.09 ha. VT 1 satisfies the key diagnostic characteristics of the 'Banksia Woodlands of the Swan Coastal Plain ecological community' (DoEE, 2016); most pertinently, it possesses a woodland stratum dominated by *Banksia attenuata*, *Banksia prionotes* and *Banksia menziesii*. Although only small areas of VT 1 were mapped in the Survey Area, additional observations north and south of the Survey Area (**Figure 3.1**) determined that these areas of VT 1 belong to relatively large areas of contiguous vegetation that also satisfy the key diagnostic characteristics of the 'Banksia Woodlands of the Swan Coastal Plain ecological community' TEC, including along the Munbinea Road verge, within Hill River Nature Reserve, and on private property to the south of the Survey Area. These observations were used to define indicative patches of the 'Banksia Woodlands of the Swan Coastal Plain ecological community' that include the areas of VT 1 mapped in the Survey Area (**Figure 5.5**). It should be noted that the indicative patches are likely to be part of even larger patches, however accurate definition of these patches was beyond the scope of this assessment.

In the context of the condition thresholds and patch sizes for the 'Banksia Woodlands of the Swan Coastal Plain ecological community', the northern and southern indicative patches measure approximately 5.0 and 9.6 ha respectively, and contain vegetation that is primarily either in Very Good or Good condition, with some small areas in Degraded condition (e.g. in the Survey Area). As the minimum patch sizes for the Very Good and Good condition categories are 1 and 2 ha respectively, both indicative patches meet the minimum patch size requirements, regardless of whether the Very Good or Good category is applied to the patch.

The extent of the 'Banksia Woodlands of the Swan Coastal Plain ecological community' in the Survey Area, the patches outlined above, and observations made within the patches, are presented in **Figure 5.5**.

FIGURE 5.5
Significant Vegetation of
the Survey Area

- Legend**
- ▭ Survey Area
 - Road
 - Watercourse
 - Property Boundary
 - Nature Reserve
 - Relevé
 - Vegetation Mapping Note
- Significant Vegetation**
- Extent of Banksia Woodlands of the Swan Coastal Plain Ecological Community (Endangered) in Survey Area
 - Approximate Extent of Banksia Woodlands of the Swan Coastal Plain Ecological Community (Endangered) Outside Survey Area



Scale 1:15,000 at A4
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5.2.8 Vegetation Condition

An overview of vegetation condition mapping is presented on **Figure 5.6**. The majority of VT 1 was in Good condition (0.07 ha; 78% of VT 1), with this VT impacted by historical clearing, weeds and edge effects. A small area of this VT was in Degraded condition (0.02 ha; 22% of VT 1); this area appears to have been historically cleared and has re-grown to an extent. Areas mapped as Cleared Land were rated as Completely Degraded (0.07 ha).

FIGURE 5.6

Condition of Vegetation of the Survey Area

Legend

- Survey Area
 - Road
 - Property Boundary
 - Nature Reserve
- Vegetation Condition**
- Good
 - Degraded
 - Completely Degraded



Scale 1:6,000 at A4
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6.0 Conclusions

The Swan Coastal Plain and Northern Sandplains is known to have high diversity of both flora taxa and vegetation types; however, likely because of the small size of the Survey Area and some history of disturbance, only one VT and a small number of flora taxa were observed by this survey.

Targeted searching for all significant flora taxa and vegetation considered to potentially occur within the Survey Area was undertaken across the entirety of the Survey Area within the most appropriate time to survey in the South-West province. No significant flora taxa were identified by the survey, but one significant vegetation community was identified, being the 'Banksia Woodlands of the Swan Coastal Plain ecological community' (Endangered – Commonwealth, Priority 3 – WA). VT 1 is considered to represent this TEC, and it satisfies the key diagnostic characteristics of the 'Banksia Woodlands of the Swan Coastal Plain ecological community'; most pertinently, it possesses a woodland stratum dominated by *Banksia attenuata*, *Banksia prionotes* and *Banksia menziesii*.

There were no survey limitations that are considered to have significantly influenced the results of the current survey. Personnel involved in all aspects of the survey have significant previous experience, or guided less experienced personnel throughout the survey where necessary. Reasonable contextual information for the Survey Area was available prior to the field survey. No constraints prevented appropriate sampling techniques (relevé establishment, foot traverses) being employed. All areas were easy to access on foot. Data reliability is therefore considered to be relatively high. Reference specimens of any unknown taxa encountered during the field survey were collected for later identification. There was evidence of impact to vegetation composition and structure in the Survey Area as a result of human activities, including clearing, introduced taxa and edge effects. However, this disturbance did not significantly affect the results of the survey, with the remnant vegetation able to be compared to known vegetation types, including formally described significant vegetation.

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APPENDIX A

**Results of Search of the Department of
Climate Change, Energy, the Environment and Water
Species Profile and Threats Database (DCCEEW, 2023)**



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: 04-Aug-2023

[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)	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	34
Listed Migratory Species:	11

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:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	15
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	5
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	4
Key Ecological Features (Marine):	None
Biologically Important Areas:	1
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

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
Tuart (<i>Eucalyptus gomphocephala</i>) Woodlands and Forests of the Swan Coastal Plain ecological community	Critically Endangered	Community likely to occur within area	In feature area

Listed Threatened Species

[[Resource Information](#)]

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

Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area	In buffer area only
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
MAMMAL			
Dasyurus geoffroi Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat may occur within area	In feature area
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat may occur within area	In feature area
Parantechinus apicalis Dibbler [313]	Endangered	Species or species habitat may occur within area	In feature area
PLANT			
Acacia forrestiana Forest's Wattle [17235]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Andersonia gracilis Slender Andersonia [14470]	Endangered	Species or species habitat likely to occur within area	In feature area
Anigozanthos viridis subsp. terraspectans Dwarf Green Kangaroo Paw [3435]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Banksia mimica Summer Honeypot [82765]	Endangered	Species or species habitat may occur within area	In buffer area only
Caladenia hoffmanii Hoffman's Spider-orchid [56719]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
<u>Caleana dixonii listed as Paracaleana dixonii</u> Sandplain Duck Orchid [87944]	Endangered	Species or species habitat likely to occur within area	In feature area
<u>Drakaea elastica</u> Glossy-leafed Hammer Orchid, Glossy-leafed Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat may occur within area	In feature area
<u>Eucalyptus argutifolia</u> Yanchep Mallee, Wabbling Hill Mallee [24263]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
<u>Eucalyptus johnsoniana</u> Johnson's Mallee [14516]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<u>Eucalyptus lateritica</u> Laterite Mallee [6271]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
<u>Eucalyptus leprophloia</u> Scaly Butt Mallee, Scaly-butt Mallee [56712]	Endangered	Species or species habitat known to occur within area	In buffer area only
<u>Eucalyptus pruiniramis</u> Midlands Gum, Jingymia Gum [56403]	Endangered	Species or species habitat may occur within area	In buffer area only
<u>Eucalyptus suberea</u> Cork Mallee, Mount Lesueur Mallee [5529]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
<u>Eucalyptus x balanites</u> Cadda Road Mallee, Cadda Mallee [87816]	Endangered	Species or species habitat may occur within area	In feature area
<u>Grevillea batrachioides</u> Mt Lesueur Grevillea [21735]	Endangered	Species or species habitat likely to occur within area	In buffer area only
<u>Grevillea humifusa</u> Spreading Grevillea [61182]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hakea megalosperma Lesueur Hakea [10505]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Hemiandra gardneri Red Snakebush [7945]	Endangered	Species or species habitat likely to occur within area	In feature area
Patersonia spirifolia Spiral-leaved Patersonia [83927]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Tetratheca nephelioides [83217]	Critically Endangered	Species or species habitat likely to occur within area	In buffer area only
Thelymitra stellata Star Sun-orchid [7060]	Endangered	Species or species habitat likely to occur within area	In feature area

REPTILE

Egernia stokesii badia Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink [64483]	Endangered	Species or species habitat may occur within area	In feature area
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SHARK

Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In buffer area only
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Listed Migratory Species

[[Resource Information](#)]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Sterna dougallii Roseate Tern [817]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Migratory Marine Species

Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In buffer area only
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Scientific Name	Threatened Category	Presence Text	Buffer Status
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 may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]		
Commonwealth Land Name	State	Buffer Status
Unknown		
Commonwealth Land - [51994]	WA	In buffer area only

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.

Listed Marine Species

[Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area overfly marine area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Sterna dougallii Roseate Tern [817]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Coomallo	Nature Reserve	WA	In buffer area only
Hill River	Nature Reserve	WA	In feature area
Southern Beekeepers	Nature Reserve	WA	In buffer area only
Unnamed WA33287	Nature Reserve	WA	In buffer area only
Unnamed WA48717	Conservation Park	WA	In buffer area only

EPBC Act Referrals					[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status	

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Jurien East Road Upgrade, 3 km NNE Jurien Bay, WA	2020/8740		Post-Approval	In buffer area only
Not controlled action				
Development of the Badgingarra Wind Farm	2008/4065	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
Referral decision				
Badgingarra Wind Farm	2007/3529	Referral Decision	Completed	In buffer area only

Biologically Important Areas

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Sterna dougallii			
Roseate Tern [817]	Foraging	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 are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

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

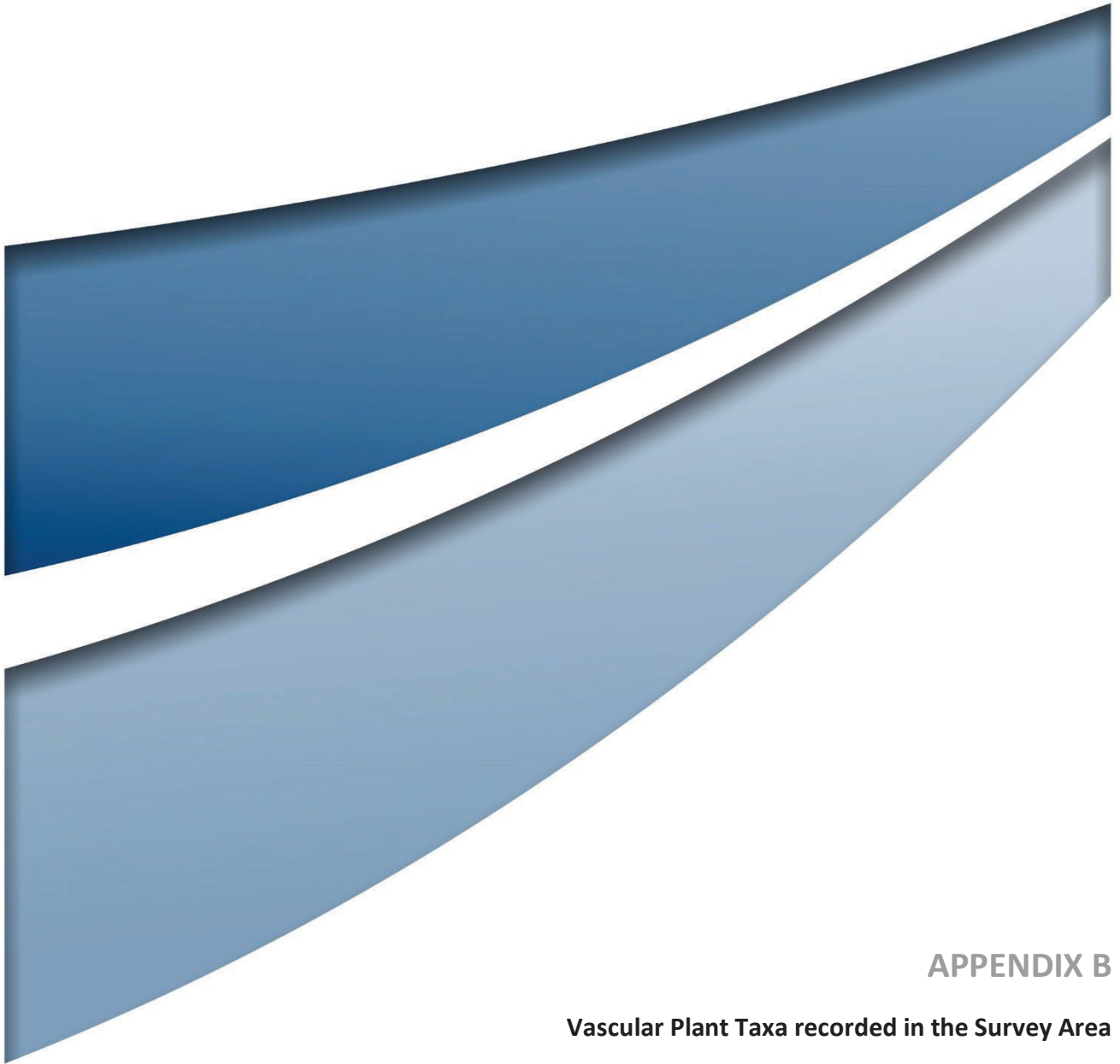
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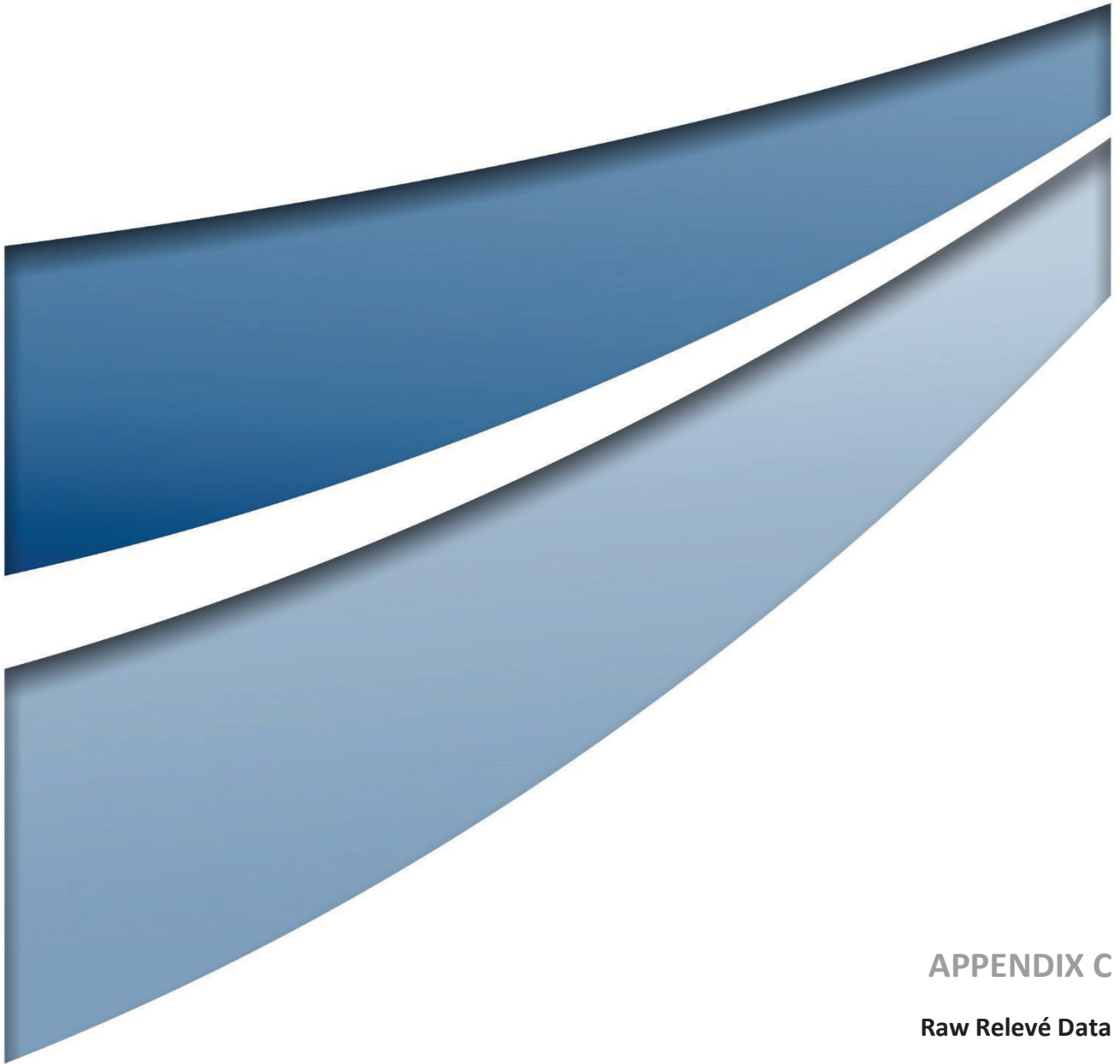
APPENDIX B

Vascular Plant Taxa recorded in the Survey Area

Note: * indicates an introduced taxon

Family	Taxon
Amaranthaceae	<i>Ptilotus polystachyus</i>
Araliaceae	<i>Trachymene pilosa</i>
Asparagaceae	<i>Thysanotus patersonii</i>
Asteraceae	* <i>Hypochaeris glabra</i>
	* <i>Ursinia anthemoides</i>
Casuarinaceae	<i>Allocasuarina humilis</i>
Centrolepidaceae	<i>Centrolepis drummondiana</i>
Colchicaceae	<i>Burchardia congesta</i>
Cyperaceae	<i>Mesomelaena pseudostygia</i>
	<i>Schoenus clandestinus</i>
Dilleniaceae	<i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i>
Droseraceae	<i>Drosera erythrorhiza</i>
	<i>Drosera pallida</i>
Ecdeiocoleaceae	<i>Ecdeiocolea monostachya</i>
Ericaceae	<i>Conostephium preissii</i>
Fabaceae	<i>Acacia cyclops</i>
	<i>Acacia rostelifera</i>
	<i>Acacia stenoptera</i>
	<i>Daviesia divaricata</i> subsp. <i>divaricata</i>
	<i>Gompholobium tomentosum</i>
	<i>Jacksonia hakeoides</i>
Geraniaceae	* <i>Pelargonium capitatum</i>
Goodeniaceae	<i>Dampiera linearis</i>
	<i>Scaevola canescens</i>
Haemodoraceae	<i>Anigozanthos humilis</i> subsp. <i>humilis</i>
	<i>Blancoa canescens</i>
	<i>Conostylis aculeata</i> subsp. <i>breviflora</i>
Hemerocallidaceae	<i>Dianella revoluta</i>
Lauraceae	<i>Cassytha aurea</i>
	<i>Cassytha glabella</i> forma <i>bicallosa</i>
Loranthaceae	<i>Nuytsia floribunda</i>

Family	Taxon
Myrtaceae	<i>Chamelaucium uncinatum</i>
	<i>Eremaea beaufortoides</i>
	<i>Eremaea pauciflora</i>
	<i>Hypocalymma xanthopetalum</i>
	<i>Leptospermopsis oligandra</i>
	<i>Melaleuca leuropoma</i>
	<i>Pileanthus filifolius</i>
	<i>Verticordia densiflora</i>
Orchidaceae	<i>Caladenia flava</i> subsp. <i>flava</i>
	<i>Caladenia longicauda</i>
Poaceae	<i>Austrostipa elegantissima</i>
	* <i>Briza maxima</i>
	* <i>Ehrharta calycina</i>
Primulaceae	* <i>Lysimachia arvensis</i>
Proteaceae	<i>Adenanthos cygnorum</i>
	<i>Banksia attenuata</i>
	<i>Banksia ilicifolia</i>
	<i>Banksia menziesii</i>
	<i>Banksia prionotes</i>
	<i>Banksia telmatiaea</i>
	<i>Conospermum stoechadis</i> subsp. <i>stoechadis</i>
	<i>Hakea trifurcata</i>
	<i>Persoonia comata</i>
	<i>Stirlingia latifolia</i>
Restionaceae	<i>Alexgeorgea nitens</i>
	<i>Lepidobolus preissianus</i>
Rhamnaceae	<i>Stenanthemum notiale</i> subsp. <i>notiale</i>
Rubiaceae	<i>Opercularia vaginata</i>
Rutaceae	<i>Cyanothamnus ramosus</i> subsp. <i>anethifolius</i>
Stylidiaceae	<i>Levenhookia murfetii</i>
	<i>Stylidium rigidulum</i>
Violaceae	<i>Pigea calycina</i>



APPENDIX C

Raw Relevé Data

Site Name: TJRR01
 Site Type: RELEVE
 Survey Date: 29/08/2023
 GPS Location: GDA94 Zone 50 327358.09E 6644425.23N
 Vegetation Type: 1
 Landform Type: Plain
 Slope Class: Gently Inclined (3 degrees)
 Soil Type: Sand
 Soil Colour: Grey/white (other)
 Rock Outcrop: No bedrock exposed
 CF Abundance: 0%
 Vegetation Condition: Southern Vegetation Condition - 4 - Good
 Disturbance: Exotic Weeds, (other) - Mechanical, historic clearing
 Fire: >10 Years
 Habitat: Low woodland over low open shrubland over low open sedgeland.
 Comments: *Banksia telmatiaea* present mostly on eastern side of road, near wetland.

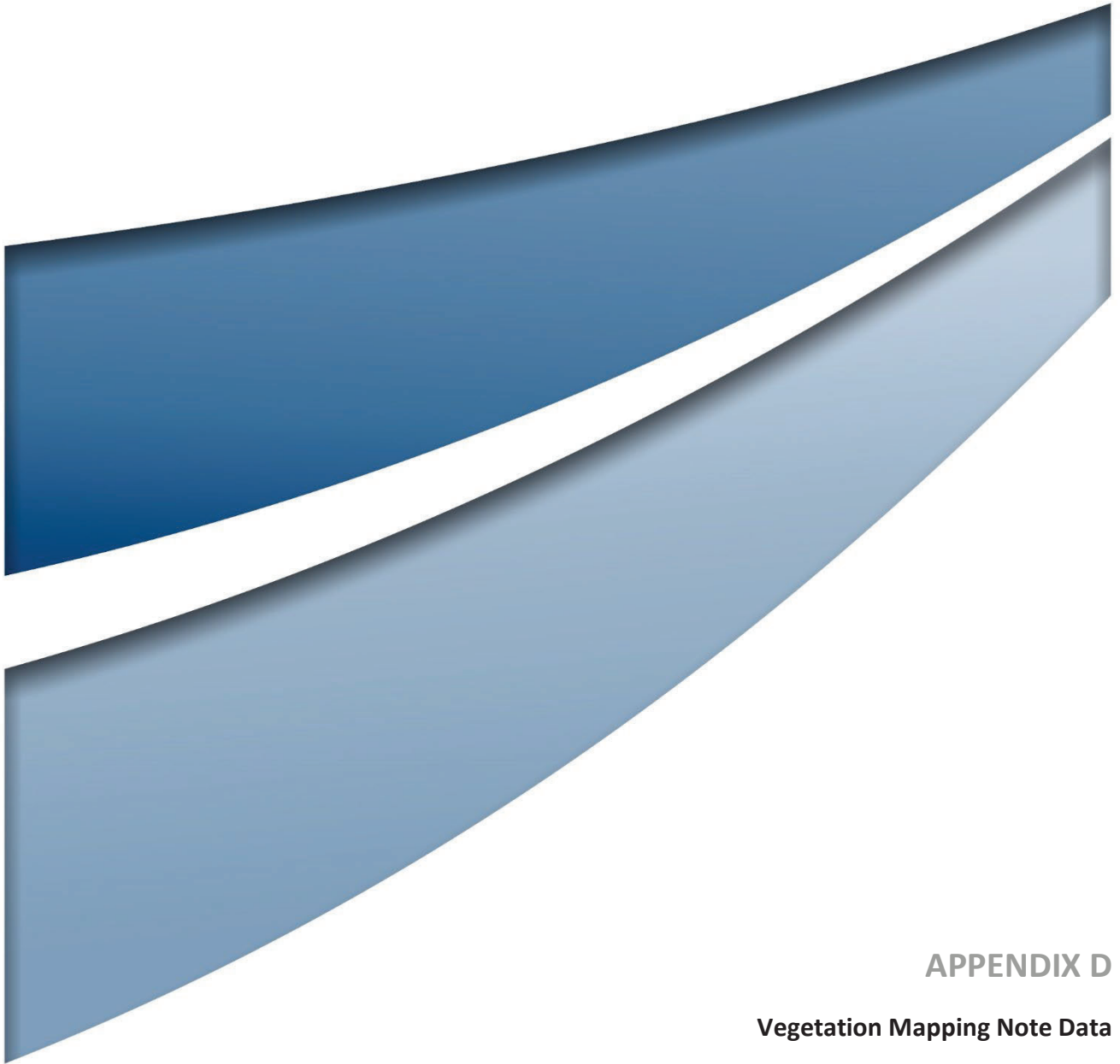
SPECIES LIST

Taxon Name	Avg. Height	Cover Alive
<i>Acacia cyclops</i>	5	3
<i>Alexgeorgea nitens</i>	0.1	0.2
<i>Austrostipa elegantissima</i>	1.5	0.2
<i>Banksia attenuata</i>	5	10
<i>Banksia menziesii</i>	4	1
<i>Banksia prionotes</i>	5	3
<i>Banksia telmatiaea</i>		
<i>Blancoa canescens</i>	0.3	0.1
* <i>Briza maxima</i>	0.3	0.1
<i>Burchardia congesta</i>	0.4	0.1
<i>Caladenia flava</i> subsp. <i>flava</i>	0.1	0.1
<i>Cassytha glabella</i> forma <i>bicallosa</i>		0.1
<i>Centrolepis drummondiana</i>	0.05	0.1
<i>Chamelaucium uncinatum</i>	0.4	0.1
<i>Conospermum stoechadis</i> subsp. <i>stoechadis</i>	1	5
<i>Conostylis aculeata</i> subsp. <i>breviflora</i>	0.2	0.1
<i>Cyanothamnus ramosus</i> subsp. <i>anethifolius</i>	0.5	0.1
<i>Dampiera linearis</i>	0.3	0.1
<i>Daviesia divaricata</i> subsp. <i>divaricata</i>	1.6	0.3
<i>Dianella revoluta</i>	0.5	0.1
<i>Drosera erythrorhiza</i>	0.1	0.2
<i>Drosera pallida</i>		0.1
<i>Ecdeiocola monostachya</i>	0.5	5

<i>*Ehrharta calycina</i>	0.4	0.5
<i>Eremaea beaufortioides</i>	0.2	0.1
<i>Gompholobium tomentosum</i>	0.5	0.1
<i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i>	0.5	1
<i>Hypocalymma xanthopetalum</i>	0.3	0.2
<i>*Hypochaeris glabra</i>	0.1	0.3
<i>Jacksonia hakeoides</i>	0.4	0.1
<i>Lepidobolus preissianus</i>	0.4	0.3
<i>Leptospermopsis oligandra</i>	1.5	2
<i>Levenhookia murfetii</i>	0.1	0.1
<i>Mesomelaena pseudostygia</i>	0.5	5
<i>Opercularia vaginata</i>	0.3	0.2
<i>*Pelargonium capitatum</i>	0.6	0.5
<i>Pigea calycina</i>	0.3	0.1
<i>Pileanthus filifolius</i>	0.6	0.1
<i>Scaevola canescens</i>	0.3	0.1
<i>Schoenus clandestinus</i>	0.1	0.1
<i>Stenanthemum notiale</i> subsp. <i>notiale</i>	0.2	0.1
<i>Stylidium rigidulum</i>	0.1	0.1
<i>Thysanotus patersonii</i>		0.1
<i>Trachymene pilosa</i>	0.1	0.1
<i>*Ursinia anthemoides</i>	0.2	0.1

PHOTOS











APPENDIX D


Vegetation Mapping Note Data


Note: All locations are in GDA94, Zone 50

Note	Date	Easting	Northing	Comment	Photo
VMD01	29/08/2023	327359.69	6644415.72	Degraded strip of vegetation from VMD01 south to track. Dominated by <i>Daviesia divaricata</i> and <i>Acacia rostellifera</i> with scattered natives (<i>Banksia prionotes</i> , <i>Adenanthos cygnorum</i> , <i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i> , <i>Verticordia densiflora</i>) over understorey dominated by weeds (as for TJRR01 plus * <i>Lysimachia arvensis</i>), likely previously cleared and regrown.	
VMD02	29/08/2023	327355.97	6644395.48	As for VMD01. Degraded strip extending north to track. With <i>Banksia attenuata</i> , <i>Hakea trifurcata</i> .	No photo available.
VMD03	29/08/2023	327360.58	6644389.57	Same as TJRR01, but Very Good vegetation condition. Fewer weeds and less physical disturbance. Single <i>Banksia ilicifolia</i> , 5 m height. <i>Eremaea pauciflora</i> , <i>Anigozanthos humilis</i> .	

Note	Date	Easting	Northing	Comment	Photo
VMD04	29/08/2023	327221.87	6644851.91	Vegetation condition Good. Dampier area with <i>Melaleuca preissiana</i> , <i>Banksia attenuata</i> , <i>Banksia menziesii</i> still present although fewer, plus <i>Eucalyptus tottiana</i> . Still <i>Banksia</i> woodland. Wetland without <i>Banksia</i> woodland on eastern side of road into private property.	
VMD05	29/08/2023	327237.25	6644804.26	Vegetation condition Very Good. Historical disturbance, few weeds. Similar to TJRR01.	
VMD06	29/08/2023	327108.25	6645187.15	Change to <i>Corymbia calophylla</i> dominated vegetation with <i>Xanthorrhoea</i> sp., <i>Allocasuarina</i> sp. and <i>Acacia</i> sp.	No photo available.

Note	Date	Easting	Northing	Comment	Photo
VMD07	29/08/2023	327053.48	6645317.33	Same as TJRR01. Slightly more <i>Banksia prionotes</i> , slightly more <i>Ehrharta calycina</i> , no <i>Pelargonium capitatum</i> . Historic clearing. Additional species: <i>Eremaea pauciflora</i> , <i>Anigozanthos humilis</i> subsp. <i>humilis</i> , <i>Stirlingia latifolia</i> , <i>Hakea trifurcata</i> , <i>Nuytsia floribunda</i> , <i>Allocasuarina humilis</i> , <i>Conostephium preissii</i> , <i>Cassytha aurea</i> , <i>Persoonia comata</i> , <i>Acacia stenoptera</i> , <i>Caladenia longicauda</i> , <i>Ptilotus polystachyus</i> . Good vegetation condition.	
VMD08	29/08/2023	327060.9	6645279.97	Yellow-brown sandy loam. Not <i>Banksia</i> woodland, edge of <i>Corymbia calophylla</i> community. <i>Allocasuarina humilis</i> , <i>Leptospermopsis oligandra</i> , <i>Daviesia divaricata</i> , <i>Melaleuca leuropoma</i> , <i>Petrophile macrostachya</i> , <i>Eremaea beaufortioides</i> , <i>Conospermum stoechadis</i> subsp. <i>stoechadis</i> , <i>Alexgeorgea nitens</i> , <i>Mesomelaena pseudostygia</i> , <i>Hypolaena exsulca</i> , <i>Anigozanthos pulcherrimus</i> , <i>Banksia dallanneyi</i> subsp. <i>dallanneyi</i> . Good vegetation condition.	

Note	Date	Easting	Northing	Comment	Photo
VMD09	29/08/2023	326962.38	6645402.14	<p>Survey Area Banksia woodland connects to this large patch of Banksia woodland in Hill River Nature Reserve. <i>Banksia prionotes</i> and <i>Banksia attenuata</i> with <i>Eucalyptus todiana</i>. Very Good/Excellent vegetation condition.</p>	

Note	Date	Easting	Northing	Comment	Photo
VMD10	29/08/2023	327467.96	6644138.04	Patch of wetland edge vegetation. <i>Banksia prionotes</i> still present, mapping south of VMD10 returns to Banksia woodland per TJRR01. Very Good vegetation condition.	

Note	Date	Easting	Northing	Comment	Photo
VMD11	29/08/2023	327666.91	6643532.3	Still Banksia woodland (as per TJRR01), continues south and west into private property (at least Good, possibly Very Good vegetation condition).	