Appendix 19 Alcoa Huntly-Myara Targeted Flora Survey

Alcoa Huntly-Myara
Targeted Flora Survey

Report to Alcoa of Australia Limited

20 March 2024

Document Status				
Revision No.	Author	Review / Approved for Issue	Approved for Issue to Name	Date
1	Kaylin Geelhoed	Clinton van den Bergh	Sarah Boys	23/02/2024
2	Kaylin Geelhoed	Carmel Winton	Sarah Boys	20/03/2024
3				

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Executive Summary

Alcoa commissioned Biologic Environmental Survey to undertake targeted Threatened and Priority flora searches, and to record any Weeds of National Significance, declared or invasive weed species, within the Huntly Mine and Myara region. The Survey Area is located 63 km southeast of Perth, within the Northern Jarrah Forest IBRA subregion, and covers an area of approximately 110 ha.

The targeted flora surveys were completed over two field trips, 9 to 13 October 2023 and 29 November to 1 December 2023, totalling 25 person days. The field survey involved botanists walking grid lines 10 to 20 m apart while searching for significant flora and significant weed species within the Survey Area.

No Threatened flora taxa were recorded by this survey. Four Priority listed flora taxa were recorded from the Survey Area, which included:

- *Acacia horridula* (P3) (21 individuals from eight locations);
- *Thysanotus anceps* (P3) (nine individuals from nine locations);
- *Senecio leucoglossus* (P4) (819 individuals from 162 locations); and
- *Stylidium ireneae* (P4) (two individuals from one location).

Some minor constraints were encountered during the field survey, including disturbances that may have affected results (dust covering and potentially concealing significant flora in areas along haul roads) and access restrictions within the Survey Area (clearing works restricting access to some areas).

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1 Introduction

1.1 Background

Alcoa of Australia Limited's (Alcoa) Western Australian (WA) mining operations comprise the Huntly and Willowdale bauxite mines. They are located in Alcoa's Mining Lease 1SA (ML1SA) (Figure 1.1), 63 kilometres (km) southeast of Perth, within the Northern Jarrah Forest (NJF) Interim Biogeographic Regionalisation for Australia (IBRA) subregion. Alcoa has approval to mine within the ML1SA subject to submitting draft five-year mine plans and associated environmental management programs known as the Mining and Management Program (MMP). The MMP is submitted to the State's Mining and Management Program Liaison Group (MMPLG) on an annual basis.

Alcoa has committed to undertaking pre-clearance ecological surveys for the Huntly Mine, Myara region and Willowdale Mine, Larego region as part of its MMP assessment by the MMPLG. These surveys will be based on conceptual clearing alignments which will be submitted as part of the MMP and will be used to:

- Amend the conceptual alignment to avoid significant flora and vegetation
- Create management plans to ensure any identified Weeds of National Significance (WoNS) or declared and invasive weeds are not spread
- Inform translocation and environmental management plans as required
- Assist Alcoa in preparing MMP submission to MMPLG.

Alcoa commissioned Biologic Environmental Survey Pty Ltd (Biologic) to undertake targeted Threatened and Priority flora searches, and to record any Weeds of National Significance (WoNS), declared or invasive weed species, within the Huntly Mine and Myara region, hereby referred to as the Survey Area (Figure 1.1). The Survey Area covers approximately 110 hectares (ha).

1.2 Scope and Objectives

The overarching objective of the targeted flora survey was to search for and record the occurrence of all Threatened and Priority flora species, Weeds of National Significance (WoNS), or declared or invasive weed species that occur within the Survey Area. The purpose of this survey is to meet the commitment made by Alcoa to undertake pre-clearance ecological surveys for the Huntly Mine, Myara region and Willowdale Mine, Larego region as part its MMP assessment by the MMPLG.

412000 414000 416000 418000

6410000 6408000 6406000

LEGEND

Survey Area

Local Road

Scale 1:23,800

0 0.5 1 Km

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 23/02/2024

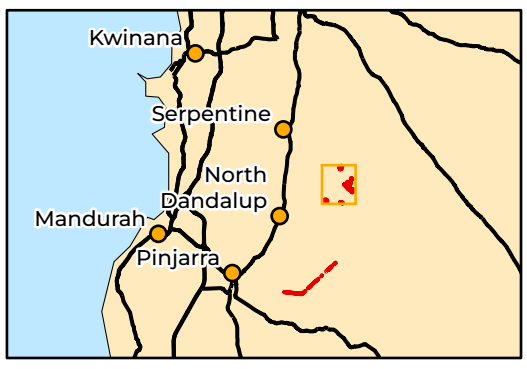

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Figure 1.1a: Survey Area and regional context

410000 412000 414000 416000

6394000 6392000 6390000 6388000

LEGEND

Survey Area

Local Road

Scale 1:23,800

0 0.5 1 Km

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 23/02/2024

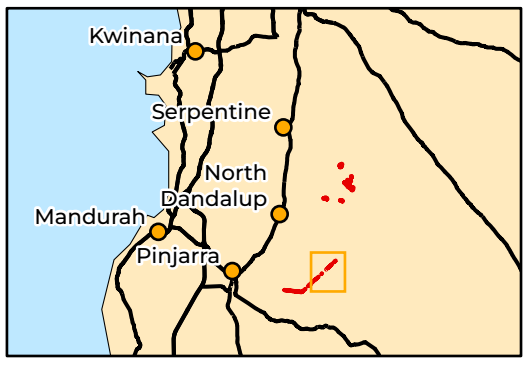

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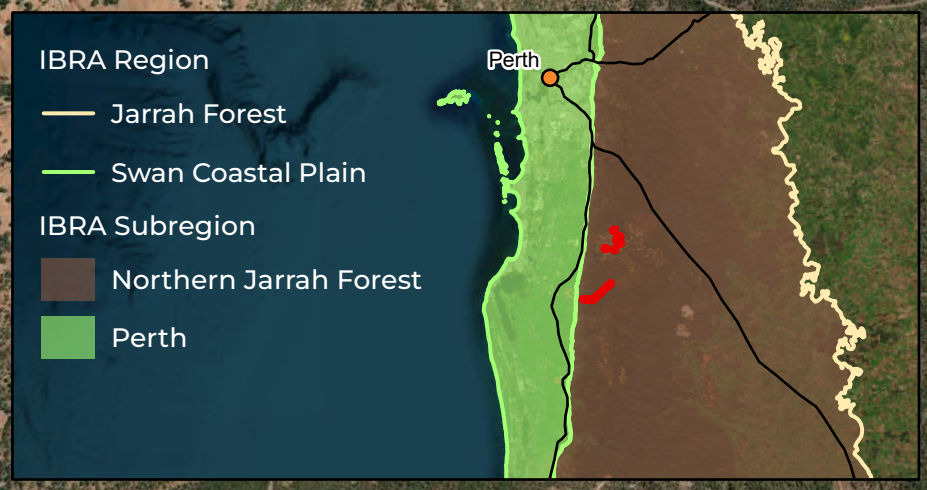
Figure 1.1b: Survey Area and regional context

404000 406000 408000

6390000 6388000 6386000 6384000

IBRA Region
Jarrah Forest
Swan Coastal Plain
IBRA Subregion
Northern Jarrah Forest
Perth



Del Park Rd
North Spur Rd
Scarp Rd
Grey Rd

LEGEND
Survey Area
Local Road

Scale 1:23,800
0 0.5 1 Km
Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 23/02/2024

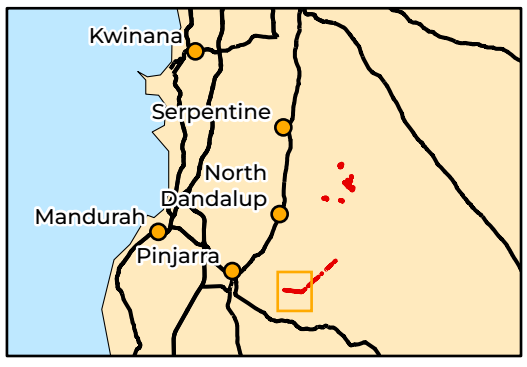


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Figure 1.1c: Survey Area and regional context

As per the scope of works, Biologic undertook;

- A review previous flora and vegetation studies of the region;
- A desktop study to determine the likelihood of finding threatened and priority species during different flowering seasons;
- Targeted flora surveys in 10 or 20 m traverses in a grid pattern to identify threatened and priority species presence or absence, while also recording:
  - Other conservation significant flora species when identified; and
  - Any WoNS, declared and invasive weeds to be managed; and
- Prepare a report that meets Environmental Protection Authority (EPA) Guidance for submission to the MMPLG as part of the MMP submission.

1.3 Compliance

Significant flora and vegetation is protected at a state and commonwealth level and legislated by the following parliamentary acts:

- WA Biodiversity Conservation Act 2016 (BC Act);
- WA Environmental Protection Act 1986 (EP Act); and
- Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

The EPA outline guidance for biological surveys in WA. All aspects of botanical assessments at Biologic are compliant with the following technical guidance statements at the level of Environmental Impact Assessment (EIA):

- EPA Technical Guidance for Flora and Vegetation Surveys for EIA (EPA, 2016b);
- Environmental Factor Guidelines for flora and vegetation (EPA, 2016a); and
- Draft Survey Guidelines for Australia's threatened orchids. Guidelines for detecting orchids listed as 'Threatened' under the *Environment Protection and Biodiversity Conservation Act 1999* (DoE, 2014).

1.3.1 Legislation

Within Western Australia (WA), native flora is protected under the BC Act and at a national level under the EPBC Act. Any action that has the potential to impact on native flora needs to be approved by relevant state and/ or commonwealth departments as dictated by the state EP Act. These codes, jurisdiction and level of protection are detailed in Appendix A.

1.3.2 Introduced Flora

Introduced flora can pose a threat to native vegetation and biodiversity. The Commonwealth of Australia, in collaboration with the states and territories, has identified 32 WoNS based on an assessment process that prioritises these weeds according to their invasiveness, potential for spread, and environmental, social, and economic impacts. A list of 20 WoNS was endorsed in 1999, and a further 12 were added in 2012 (DoEE, 2019).

A database of Declared Pests (DP) is kept by the Department of Primary Industries and Regional Development (DPIRD). This database falls under State jurisdiction, legislated by the *Biosecurity and Agriculture Management Act 2007* (BAM Act). Some introduced flora taxa may be classified within categories that have legal control or management requirements (Appendix A). These requirements must be met by the landholder.

2 Desktop Assessment

2.1 Methods

A desktop assessment, comprising database searches and a review of information provided by Alcoa, was undertaken prior to the field survey. The purpose of the desktop assessment was to identify significant flora and vegetation values, and introduced flora taxa, occurring, or potentially occurring, in the Survey Area.

2.1.1 Database Searches

Database searches were undertaken to generate a list of significant vascular flora taxa previously recorded within, and near the Survey Area, including introduced flora taxa. Table 2.1 outlines the databases interrogated that formed the desktop assessment. Searches were mostly conducted with a 20 km radius of the Survey Area. DBCA database search results were provided to Biologic by Alcoa. The Western Australian Organism List (WAOL) database (DPIRD, 2023) was buffered to the two Local Government Authorities (LGAs) occurring across the Survey Area (Shire of Murray and Shire of Serpentine-Jarrahdale).

Table 2.1: Details of database searches conducted.

Provider	Database	Reference	Parameters
Western Australian Herbarium	WAH specimen database	DBCA (2023b) (provided by Alcoa)	Buffer of 20 km from the Survey Area polygon
DBCA	Threatened and Priority Flora		Buffer of 20 km from the Survey Area polygon
Department of Climate Change, Energy, the Environment and Water (DCCEEW)	EPBC Act Protected Matters Search Tool	DCCEEW (2023)	Buffer of 20 km from the Survey Area polygon
Atlas of Living Australia (ALA)	ALA species occurrence search	ALA (2023)	Circle of radius 20 km centres on the coordinates: -32.553033 E, 116.132749 S
Department of Primary Industries and Regional Development (DPIRD)	Declared Plants Database - WAOL	DPIRD (2023)	Shire of Murray and Shire of Serpentine-Jarrahdale

2.1.2 Assessment of Occurrence

2.1.2.1 Alcoa Assessment

Alcoa provided Biologic with a detailed Threatened and Priority flora likelihood risk assessment for the entirety of Alcoa operations in the NJF. Two-hundred and thirty-three Threatened and Priority flora taxa were assessed on their likelihood of occurring, or possibly occurring, within Alcoa's mining locations. Alcoa have used an internal process and decision matrix to determine the likelihood of a species occurring within the separate mining

locations (i.e., Myara, Larego). A number of different parameters were used to determine the likelihood of a species, giving each taxa a High, Moderate, or Low rating.

2.1.2.2 Biologic Assessment

The Biologic assessment of occurrence is a condensed version of Alcoa's likelihood of occurrence assessment, combined with our desktop assessment. Biologic's assessment of occurrence has been completed for the Survey Area only and not the entire Alcoa operations. To condense the list of significant taxa, non-Northern Jarrah Forest taxa (based on the landscape category) and taxa whose distribution did not overlap the Survey Area (based on the distribution category and Myara region) were excluded. One hundred and sixty-one taxa (161) were excluded from the Alcoa assessment, leaving a shortened list of 72 significant taxa for the Biologic assessment (Appendix B). The condensed list of 72 taxa from the Alcoa assessment were also identified from the Biologic desktop assessment. The Biologic desktop assessment did not include any additional significant flora taxa. Following the review of the Alcoa assessment of occurrence and Biologic's desktop assessment, each significant flora taxon was ranked using the following definitions presented in the decision matrix (Table 2.2).

Table 2.2: Assessment of occurrence decision matrix

		Habitat Categories (within the Survey Area)			
		Core/ critical habitat present	Suitable habitat present/ within known distribution	Marginal habitat present/ adjacent to known distribution	No suitable habitat present/ outside of known distribution
Species records/ Occurrence Categories	Recorded in the Survey Area	Confirmed	Confirmed	Confirmed	Confirmed
	Recorded within <2km	Highly Likely	Likely	Possible	Possible
	Recorded within 2–5 km	Likely	Possible	Possible	Unlikely
	Recorded within 5–20 km	Possible	Possible	Unlikely	Unlikely
	Recorded >20 km	Possible	Unlikely	Unlikely	Highly Unlikely
	Taxa considered locally/regionally extinct	Unlikely	Unlikely	Highly Unlikely	Highly Unlikely

2.2 Results

2.2.1 Significant Flora

The Biologic desktop assessment identified 72 significant flora taxa (Figure 2.1, Appendix B). No existing records of significant flora occur within the survey area. Sixteen significant taxa were considered Highly Likely, Likely, or Possible to occur in the Survey Area (Table 2.3), with the following composition:

- Highly Likely:
  - *Acacia horridula* (P3), *Calothamnus graniticus* subsp. *leptophyllus* (P4), *Pimelea rara* (P4), and *Senecio leucoglossus* (P4).
- Likely:
  - *Hibbertia hortiorum* (P1), *Thysanotus anceps* (P3), *Grevillea pimeleoides* (P4), and *Stylidium ireneae* (P4).
- Possible:
  - *Anthocercis gracilis* (T), *Hibbertia acrotoma* (P1), *Bossiaea modesta* (P2), *Tetratheca phoenix* (P2), *Cyathochaeta teretifolia* (P3), *Acacia oncinophylla* subsp. *patulifolia* (P4), *Cyanothamnus tenuis* (P4), and *Eucalyptus* ×*graniticola* (P4).

The remaining taxa were considered either Unlikely (41 taxa) or Highly Unlikely (15 taxa) to occur (Appendix B). Of the 72 taxa assessed for likelihood, 11 are listed as Threatened under the BC Act, with one considered Possible to occur within the Survey Area (Table 2.3). The Assessment of Occurrence was reviewed following the completion of the Spring targeted field surveys. This is discussed further in Section 3.3.

Three taxa identified during the desktop assessment were only identified during the review of Alcoa's Threatened and Priority flora likelihood risk assessment. As such, these taxa do not have associated latitudes and longitudes, and were not able to be mapped on Figure 2.1.

2.2.2 Introduced Flora

The desktop assessment identified 50 significant environmental weeds that may potentially occur within the Survey Area. All 50 of these taxa are listed as DPs, while 29 are listed as WoNS (Appendix C). The list of significant weeds includes numerous *Opuntia, Cylindropuntia* and *Rubus* species that are grouped together in the WoNS listing.

400000
440000
480000
6440000
6400000
6360000
Canning
Bickley
Carmel
Pickering Brook
North Fremantle
Gosnells
Fremantle
Corbett
Karragullen
Jandakot
Kelmscott
Clarence
Bedfordale
Mandogalup
Wungong
Kwinana
Byford
Brookton Hwy
Rockingham
Ennis Av
Kwinana Fwy
Westdale
Safety Bay
Jarrahdale
Karnup
Port Kennedy
Peelhurst
Keysbrook
Singleton
Furnissdale
Yunderup
Wandering
Dwellingup
Forrest Hwy
Coolup
Dwarda
Ranford
Boddington
Pinjarra Williams Rd
Lake Clifton
Hamel
Waroona
Yalup Brook
Waterous
Wagerup
Cookernup
South Western Hwy
Myalup
Wokalup
Harvey

LEGEND

Survey Area

State Road

Rail

Scale 1:400,000

0 5 10 15 Km

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 26/02/2024

Perth
Kwinana
Mandurah
Bunbury

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Figure 2.1: Significant flora records from the desktop assessment

Significant Flora

T

- *Andersonia* sp. Saxatilis (F. and J. Hort 3324)
- *Andersonia gracilis*
- *Austrostipa jacobsiana*
- *Banksia mimica*
- *Caladenia huegelii*
- *Calytrix breviseta* subsp. *breviseta*
- *Conospermum undulatum*
- *Darwinia apiculata*
- *Diuris drummondii*
- *Diuris micrantha*
- *Diuris purdiei*
- *Drakaea elastica*
- *Drakaea micrantha*
- *Eleocharis keigheryi*
- *Eucalyptus ×balanites*
- *Goodenia arthrotricha*
- *Grevillea curviloba*
- *Grevillea flexuosa*
- *Grevillea thelemanniana*
- *Lasiopetalum pterocarpum*
- *Lepidosperma rostratum*
- *Morelotia australiensis*
- *Synaphea* sp. Fairbridge Farm (D. Papenfus 696)
- *Synaphea* sp. Pinjarra (R. Davis 6578)
- *Synaphea* sp. Pinjarra Plain (A.S. George 17182)
- *Synaphea* sp. Serpentine (G.R. Brand 103)
- *Synaphea stenoloba*
- *Thelymitra magnifica*
- *Thelymitra stellata*
- *Tribonanthes purpurea*
- *Verticordia fimbrilepis* subsp. *fimbrilepis*
- *Verticordia plumosa* var. *ananeotes*

P1

- *Acacia lasiocarpa* var. *bracteolata* long peduncle variant (G.J. Keighery 5026)
- *Anthotium* sp. Darling Range (F. Hort and B. Hort 2431)
- *Boronia juncea* subsp. *juncea*
- *Caladenia uliginosa* subsp. *patulens*
- *Calytrix simplex* subsp. *simplex*
- *Darwinia hortiorum*
- *Deyeuxia inaequalis*
- *Drosera oreopodion*
- *Eriochilus glareosus*
- *Gastrolobium* sp. Prostrate Boddington (M. Hislop 2130)
- *Grevillea bipinnatifida* subsp. *pagna*
- *Hibbertia acrotoma*
- *Hibbertia ambita*
- *Hibbertia hortiorum*
- *Hibbertia polyancistra*
- *Isopogon* sp. Canning Reservoir (M.D. Tindale 121 and B.R. Maslin)
- *Levenhookia preissii*
- *Netrostylis* sp. Nannup (P.A. Jurjevich 1133)
- *Paracaleana gracilicordata*
- *Paracaleana granitica*
- *Ptilotus sericostachyus* subsp. *roseus*
- *Senecio gilbertii*
- *Stachystemon exilis*
- *Synaphea odocoileops*
- *Thysanotus formosus*
- *Xanthoparmelia darlingensis*
- *Xanthoparmelia sammyi*

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P2

- *Acacia benthamii*
- *Amanita wadulawitu*
- *Andersonia* sp. Blepharifolia (F. and J. Hort 1919)
- *Banksia recurvistylis*
- *Bossiaea modesta*
- *Calectasia grandiflora*
- *Cardamine paucijuga*
- *Craspedia* sp. Waterloo (G.J. Keighery 13724)
- *Diuris brevis*
- *Euphrasia scabra*
- *Gonocarpus keigheryi*
- *Grevillea ornithopoda*
- *Haloragis aculeolata*
- *Johnsonia pubescens* subsp. *cygnorum*
- *Lepyrodia curvescens*
- *Melaleuca viminalis*
- *Millotia tenuifolia* var. *laevis*
- *Netrostylis* sp. Chandala (G.J. Keighery 17055)
- *Paracaleana ferricola*
- *Phyllangium palustre*
- *Poranthera moorokatta*
- *Pterostylis frenchii*
- *Schizaea rupestris*
- *Stenanthemum sublineare*
- *Stylidium korijekup*
- *Tetratheca phoenix*
- *Thelymitra variegata*
- *Thysanotus* sp. Badgingarra (E.A. Griffin 2511)

P3

- *Acacia drummondii* subsp. *affinis*
- *Acacia horridula*
- *Acacia oncinophylla* subsp. *oncinophylla*
- *Actinotus repens*
- *Allocasuarina grevilleoides*
- *Amanita carneiphylla*
- *Amanita drummondii*
- *Amanita fibrillopes*
- *Amanita kalamundae*
- *Amanita preissii*
- *Amanita wadjukiorum*
- *Andersonia* sp. Audax (F. Hort, B. Hort and J. Hort 3179)
- *Angianthus drummondii*
- *Asteridea gracilis*
- *Babingtonia urbana*
- *Banksia kippistiana* var. *paenepeccata*
- *Banksia subpinnatifida* var. *imberbis*
- *Beaufortia purpurea*
- *Blennospora doliiformis*
- *Boronia capitata* subsp. *gracilis*
- *Byblis gigantea*
- *Carex tereticaulis*
- *Chamaescilla gibsonii*
- *Chordifex gracilior*
- *Cyathochaeta teretifolia*
- *Dampiera triloba*
- *Dicrastylis reticulata*
- *Dillwynia dillwynioides*
- *Eryngium pinnatifidum* subsp. Palustre (G.J. Keighery 13459)
- *Eryngium*sp. Ferox (G.J. Keighery 16034)
- *Gastrolobium* sp. Asperum (F. Hort 2864)
- *Gonocarpus pycnostachyus*
- *Goodenia katabudjar*
- *Grevillea dissectifolia*
- *Grevillea prominens*
- *Hakea oldfieldii*
- *Halgania corymbosa*
- *Hemigenia microphylla*
- *Isopogon autumnalis*
- *Jacksonia gracillima*
- *Lasiopetalum glutinosum* subsp. *glutinosum*
- *Lasiopetalum membranaceum*
- *Lepyrodia heleocharoides*
- *Loxocarya magna*
- *Meionectes tenuifolia*
- *Myriophyllum echinatum*
- *Netrostylis* sp. Blackwood River (A.R. Annels 3043)
- *Olearia strigosa*
- *Petrophile filifolia* subsp. *laxa*
- *Pithocarpa corymbulosa*
- *Schoenus benthamii*
- *Schoenus capillifolius*
- *Schoenus pennisetis*
- *Schoenus* sp. Waroona (G.J. Keighery 12235)
- *Stackhousia* sp. Red-blotched corolla (A. Markey 911)
- *Stylidium aceratum*
- *Stylidium marradongense*
- *Stylidium paludicola*
- *Stylidium roseonanum*
- *Stylidium trudgenii*
- *Styphelia filifolia*
- *Synaphea pandurata*
- *Tetratheca parvifolia*
- *Tetratheca pilifera*
- *Tetratheca similis*
- *Thysanotus anceps*
- *Thysanotus cymosus*
- *Xanthoparmelia subimitatrix*

P4

- *Acacia alata* var. *platyptera*
- *Acacia cuneifolia*
- *Acacia flagelliformis*
- *Acacia oncinophylla* subsp. *patulifolia*
- *Acacia semitrullata*
- *Aponogeton hexatepalus*
- *Banksia insulanemorecincta*
- *Caladenia integra*
- *Caladenia speciosa*
- *Calothamnus accedens*
- *Calothamnus graniticus* subsp. *leptophyllus*
- *Chorizema ulotropis*
- *Conostylis pauciflora* subsp. *pauciflora*
- *Cyanothamnus tenuis*
- *Darwinia* sp. Dryandra (G.J. Keighery 9295)
- *Darwinia thymoides* subsp. St Ronans (J.J. Alford and G.J. Keighery 64)
- *Dodonaea hackettiana*
- *Drosera occidentalis*
- *Eucalyptus exilis*
- *Eucalyptus rudis* subsp. *cratyantha*
- *Eucalyptus* x *graniticola*
- *Goodenia verreauxii*
- *Grevillea pimeleoides*
- *Grevillea saccata*
- *Hemigenia platyphylla*
- *Jacksonia sericea*
- *Kennedia beckxiana*
- *Lasiopetalum bracteatum*
- *Lasiopetalum cardiophyllum*
- *Microtis quadrata*
- *Ornduffia submersa*
- *Parsonsia diaphanophleba*
- *Pimelea rara*
- *Rumex drummondii*
- *Schoenus natans*
- *Senecio leucoglossus*
- *Stylidium ireneae*
- *Stylidium longitubum*
- *Stylidium striatum*
- *Thysanotus glaucus*
- *Tripterococcus* sp. Brachylobus (A.S. George 14234)
- *Trithuria australis*
- *Verticordia lindleyi* subsp. *lindleyi*

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Table 2.3: Summary of the assessment of occurrence

Taxa (Conservation Status)	Alcoa Myara rating	Source	Proximity from Survey Area
Highly Likely			
Acacia horridula (P3)	High	A, B, D	0.4 km SE
Calothamnus graniticus subsp. *leptophyllus* (P4)	High	A, B	0.03 km NNW
Pimelea rara (P4)	High	A, B, D	0.4 km NNE
Senecio leucoglossus (P4)	High	A, B, D	1.1 km WSW
Likely			
Hibbertia hortiorum (P1)	High	A, B, D	0.8 km S
Thysanotus anceps (P3)	High	A, B	4.4 km SE
Grevillea pimeleoides (P4)	High	A, B, D	0.9 km WNW
Stylidium ireneae (P4)	High	A, B, D	0.4 km WSW
Possible			
Hibbertia acrotoma (P1)	High	A, B	1 km WSW
Bossiaea modesta (P2)	Moderate	A, B	6.1 km SE
Tetratheca phoenix (P2)	High	A, B, D	3 km ENE
Cyathochaeta teretifolia (P3)	High	A, B, D	1.6 km WNW
Acacia oncinophylla subsp. *patulifolia* (P4)	High	A, B	4.4 km S
Cyanothamnus tenuis (P4)	High	A, B, D	0.4 km WSW
Eucalyptus x *graniticola*	Moderate	A, B	1.7 km S
Anthocercis gracilis (T)	High	A, B, C	0.9 km WSW

Source key: A = Alcoa likelihood assessment, B = DBCA (TPFL &/or WAH) (DBCA, 2023b), C = Protected Matters Search Tool (EPBC) (DCCEEW, 2023), D = Atlas of Living Australia (ALA) (ALA, 2023).

3 Field Survey

3.1 Methods

3.1.1 Survey Timing & Personnel

Two field surveys were conducted at the Survey Area, totalling 25 person days from four personnel. Project roles and licences are listed in Table 3.1. The field survey dates, and effort are as follows:

- Targeted Trip 1: 9-13 October 2023 (16 person days)
- Targeted Trip 2: 29 November – 1 December 2023 (9 person days).

Table 3.1: Project team & licences

Biologic Personnel	Project Involvement	Licencing	Experience
Principal Botanist			
Clinton van den Bergh	Project management support, reviewer for quality assurance	-	19 yrs
Ryonen Butcher	Field team lead; taxonomic support. Field Survey: Trip 1: 9-13 October 2023 Trip 2: 29 November – 1 December 2023	FB62000405 TFL 145-2122	26 yrs
Senior Botanist			
Julie Fielder	Field Survey: Trip 1: 9-13 October 2023 Trip 2: 29 November – 1 December 2023	FB62000476	>20 yrs
Rachel Meissner	Specimen identification lead	-	27 yrs
Botanist			
Kaylin Geelhoed	Field survey lead; reporting lead; data management. Field Survey: Trip 1: 9-13 October 2023 Trip 2: 29 November – 1 December 2023	FB62000238-2	6 yrs
Darcy Reith	Field Survey: Trip 1: 9-13 October 2023	FB62000359 TFL 2223-0092	6 yrs

3.1.2 Weather & Climate

Long-term average (LTA) climate data and monthly temperature and rainfall data was drawn from the Bureau of Meteorology (BoM) Karnet weather station (station 9111, located ~6 km north), however, monthly rainfall data at this station was inconsistent, missing several days of rainfall data during most months. Therefore, monthly rainfall data was also drawn from the Mount Solus weather station (station 9260, located ~9 km east), which has consistent data.

Daytime climatic conditions during the field survey were fine and dry, with a maximum temperature of 27.4°C during Trip 1, and 33°C during Trip 2. Maximum temperatures experienced during the field survey were hotter than the long-term average (LTA) for both October (Trip 1 – 20.9°C) and November (Trip 2 – 24.5°C) (BoM, 2024). Weather conditions did not present any survey limitations. In the three months prior to the survey, total rainfall was observed at 120.4 mm which is less than the equivalent total of the long term average for the same time of year; 149.2 mm (BoM, 2024).

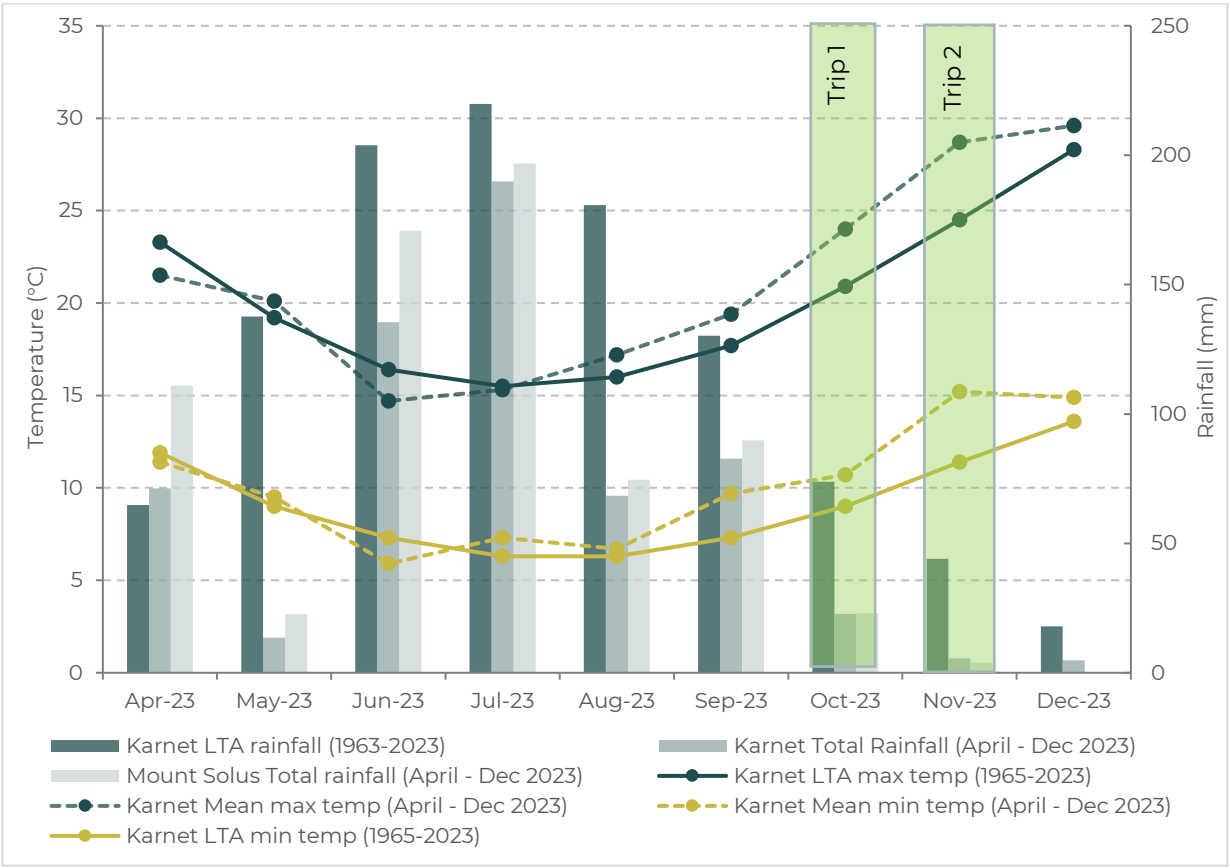


Figure 3.1: Long term and current climatic data for the Survey Area (BoM Station #009111 and #009260)(BoM, 2024) with approximate survey timing shown in shaded box.

3.1.3 Targeted Flora Survey

The targeted field survey involved botanists walking grid lines approximately 10 to 20 m apart searching for significant flora and significant weeds within the Survey Area (Figure 3.2). The key species that were targeted include those that are known to occur in the Survey Area, and those that are considered to be highly likely, likely, or possible to occur following the assessment of occurrence (Table 2.3).

Where a significant flora species was identified in the field, searches were conducted within a minimum radius of 10 m from the given specimen, to document the number of individual plants and the spatial extent of the population. Where possible, the entire population was traversed to determine the extent and size of the population. Depending on the number and density of individuals, coordinates were either recorded per plant, or for a number of individuals within a 10 m radius. The following information was recorded as part of each search:

- GPS track logs of search effort;
- number, condition, and reproductive status of individuals in each population if present;
- coordinates of either each plant (if few) or the extent of the population (if many) using a GPS; and
- photographs of individuals and of the broad vegetation community and habitat.

Threatened and Priority Flora Report Forms (TPRFs) will be completed and submitted to the Department of Biodiversity, Conservation and Attractions (DBCA), as required under the flora collecting permits. Conservation significant flora specimens will be vouchered with the Western Australian Herbarium (WAH) where required and appropriate.

3.1.4 Nomenclature & Specimen Identification

Flora nomenclature used in this report is consistent with the WAH's plant census, provided on Florabase (WAH, 1998-). All species names are current at the time of report preparation. Specimens were identified by Senior Botanist, Dr Rachel Meissner, and Principal Botanist, Ryonen Butcher, supported by the Biologic botanical team, using the appropriate taxonomic keys, Western Australian reference herbarium and, where required, relevant taxonomic experts at the WAH. Specimens identified as being of significance (i.e. Threatened, Priority listed), or difficult to identify specimens were submitted to WAH for authoritative identification (accession number 10705).

412000 414000 416000 418000

6410000 6408000 6406000

Kingsbury Dr

LEGEND

Survey Area

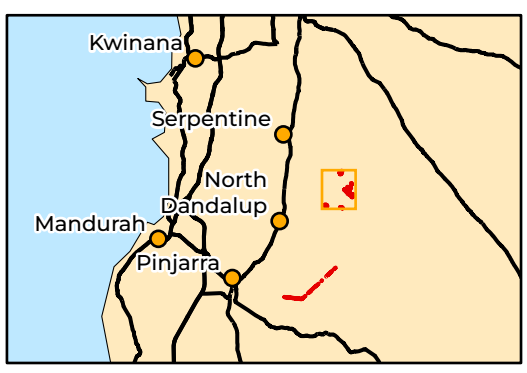
Traverse

Local Road

Scale 1:23,800

0 0.5 1 Km

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 23/02/2024



Biologic

ALCOA
Huntly-Myara
Targeted Flora Survey

Figure 3.2a: Survey effort and traverses of the Survey Area

410000 412000 414000 416000

6394000 6392000 6390000 6388000

LEGEND

Survey Area

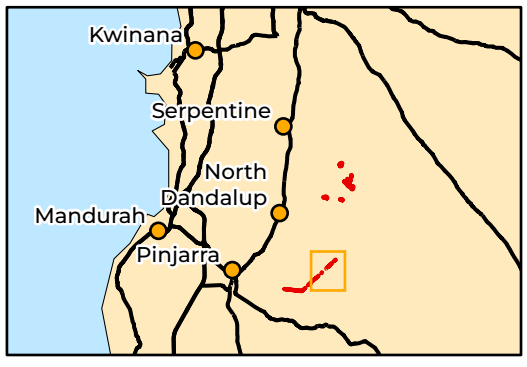
Traverse

Local Road

Scale 1:23,800

0 0.5 1 Km

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 23/02/2024



Biologic

ALCOA
Huntly-Myara
Targeted Flora Survey

Figure 3.2b: Survey effort and traverses of the Survey Area

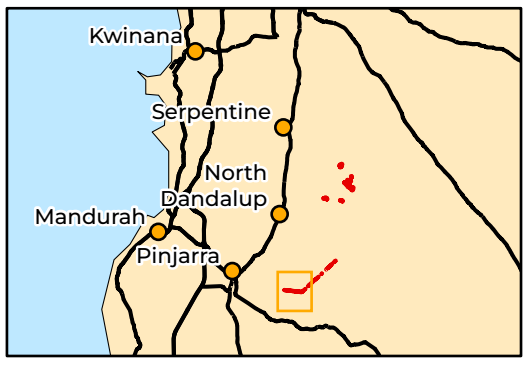
404000
406000
408000
6390000
6388000
6386000
6384000
Del Park Rd
North Spur Rd
Scarp Rd
Grey Rd

LEGEND

Survey Area
Traverse
Local Road

Scale 1:23,800
0 0.5 1 Km

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 23/02/2024



Biologic

ALCOA
Huntly-Myara
Targeted Flora Survey

Figure 3.2c: Survey effort and traverses of the Survey Area

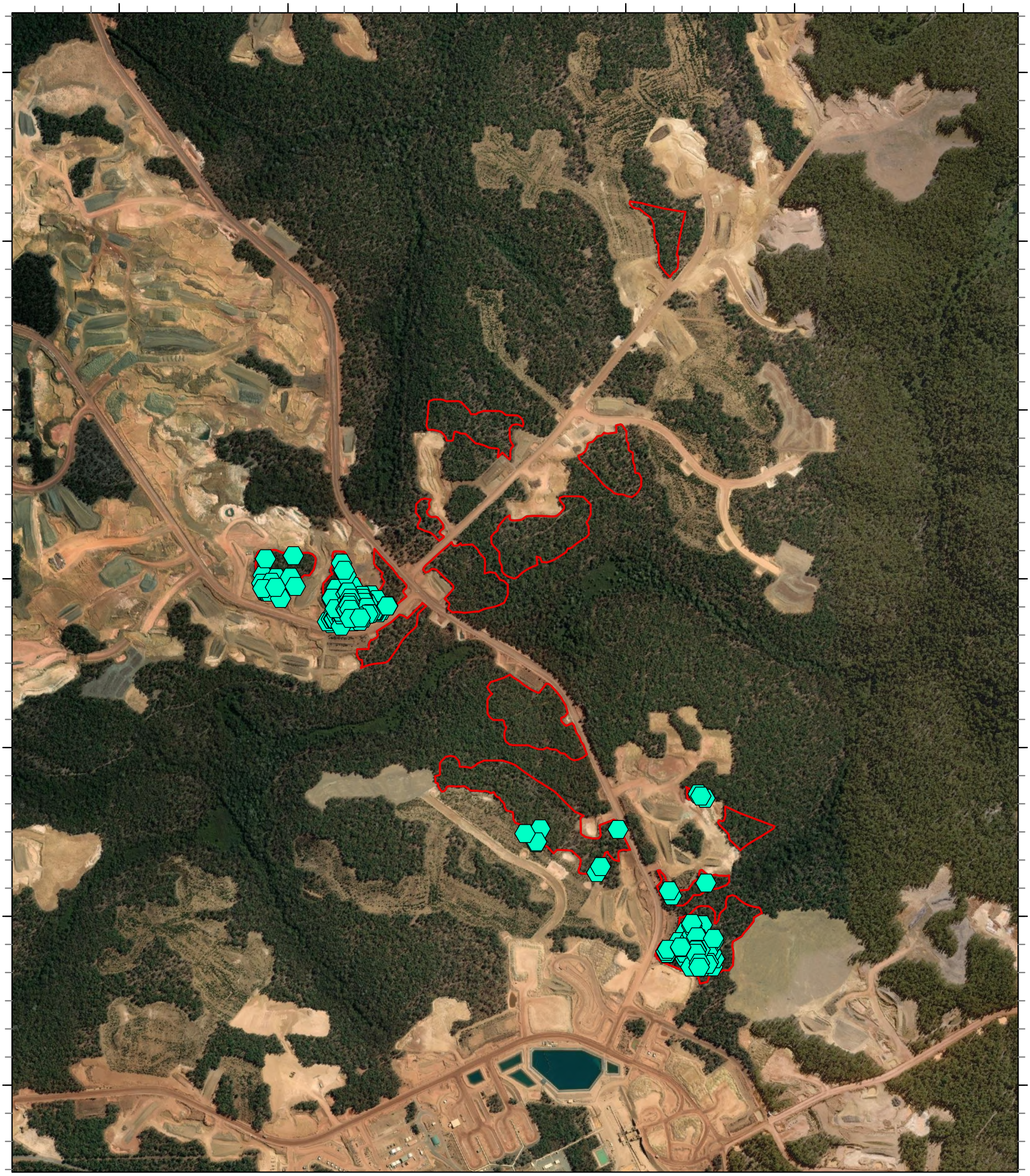
3.1.5 Introduced Flora

While completing the targeted survey, locations of any significant environmental weeds (WoNS and DPs listed under Section 12 and Section 22 of the BAM Act) located in the survey area were recorded. If found, searches within a minimum 20 m radius from the given specimen were conducted to document the number of individual plants and map the spatial extent of the infestation.

3.2 Results

3.2.1 Significant Flora

Four significant flora taxa were recorded from the Survey Area during the Spring targeted surveys, *Acacia horridula* (P3), *Thysanotus anceps* (P3), *Senecio leucoglossus* (P4), and *Stylidium ireneae* (P4). Detailed descriptions and a summary of the population density and extent is provided in Table 3.2, while location information is presented in Figure 3.3. Counts of individuals were estimated when the populations were large.



LEGEND

Survey Area

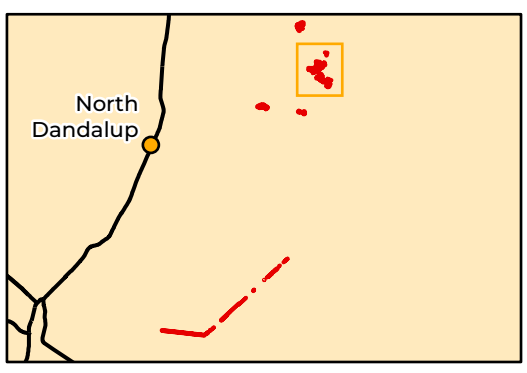
Significant Flora

Senecio leucoglossus - P4

Scale 1:13,000

0 100 200 300 400 Meters

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 26/02/2024



Biologic

ALCOA
Huntly-Myara
Targeted Flora Survey

Figure 3.3a: Significant flora recorded in the Survey Area

413600 414200 414800 415400 416000 416600

6406000 6405400 6404800 6404200 6403600 6403000 6402400

LEGEND

Survey Area

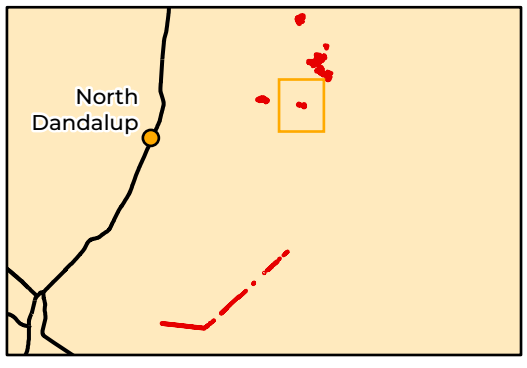
Significant Flora

Thysanotus anceps - P3

Scale 1:13,000

0 100 200 300 400 Meters

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 26/02/2024



Biologic

ALCOA
Huntly-Myara
Targeted Flora Survey

Figure 3.3b: Significant flora recorded in the Survey Area

411200 411800 412400 413000 413600 414200

6393400 6392800 6392200 6391600 6391000 6390400 6389800

LEGEND

Survey Area

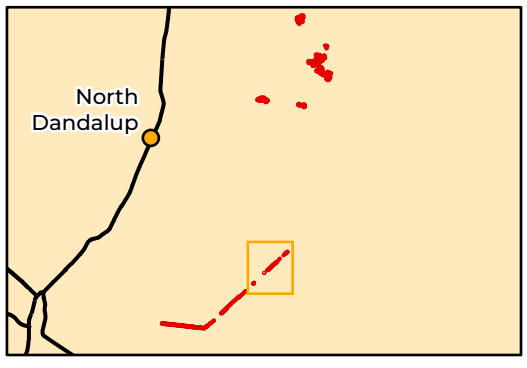
Significant Flora

Thysanotus anceps - P3

Scale 1:13,000

0 100 200 300 400 Meters

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 26/02/2024



Biologic

ALCOA
Huntly-Myara
Targeted Flora Survey

Figure 3.3c: Significant flora recorded in the Survey Area

407600 408200 408800 409400 410000 410600

6389800 6389200 6388600 6388000 6387400 6386800 6386200

Del Park Rd

LEGEND

Survey Area

Local Road

Significant Flora

Acacia horridula - P3

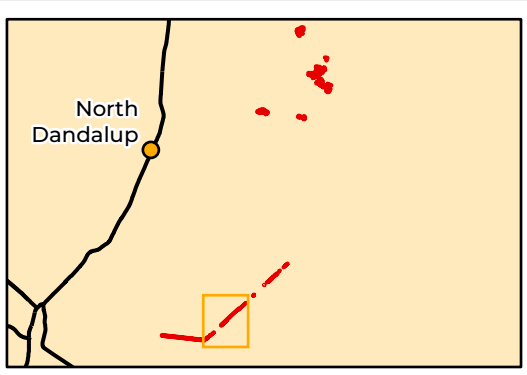
Senecio leucoglossus - P4

Stylidium irenae - P4

Scale 1:13,000

0 100 200 300 400 Meters

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 26/02/2024



Biologic

ALCOA
Huntly-Myara
Targeted Flora Survey

Figure 3.3d: Significant flora recorded in the Survey Area

404600 405200 405800 406400 407000 407600

6388600 6388000 6387400 6386800 6386200 6385600 6385000

North Spur Rd

LEGEND

- Survey Area
- Local Road

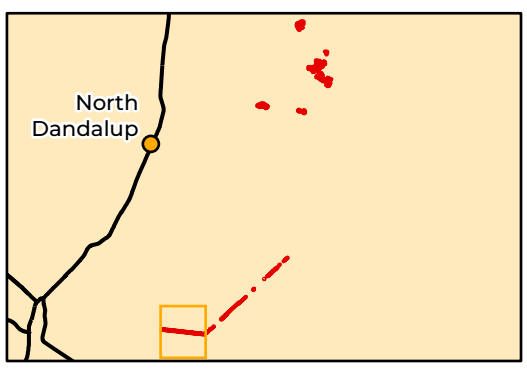
Significant Flora

- *Acacia horridula* - P3
- *Calothamnus graniticus subsp. leptophyllus* - P4

Scale 1:13,000

0 100 200 300 400 Meters

Coordinate System: GDA 1994 MGA Zone 50 Transverse Mercator Created: 26/02/2024



Biologic

ALCOA
Huntly-Myara
Targeted Flora Survey

Figure 3.3e: Significant flora recorded in the Survey Area

Table 3.2 Significant flora recorded in the Survey Area

Description	Habitat	Results of targeted assessment	Representative floristic material / habit and/or habitat
Priority 3			
Acacia horridula A harsh, slender, single stemmed shrub that grows 0.3 – 0.6 m high. The branchlets are normally red-brown, puberulous, with antrorse to patent hairs. (DBCA, 2021). Phyllodes are semi-trullate, often crowded, acuminate, pungent, and glabrous, with a prominent midrib. The inflorescences are simple, with one per axil, and globular heads, while the flowers are pale-yellow or cream and occur from May to August (DBCA, 2021; WAH, 1998-). The pods of *Acacia horridula* are elongated, generally terete, curved, striated, and narrowed at both ends.	*Acacia horridula* is known to occur in sand or gravelly soils over granite, and rocky hillsides of the Jarrah Forest and Swan Coastal Plain IBRA regions. It is often recorded in open *Eucalyptus* woodland vegetation, however, can also be found in dense shrubland (WAH, 1998-).	Twenty-one individuals of *Acacia horridula* were recorded from eight locations within the Survey Area. All records of *Acacia horridula* were recorded from along the conveyor between Banksiadale and Oakley.	 Source: World Wide Wattle (DBCA, 2023d) (left), Biologic photo (right)
Thysanotus anceps A rhizomatous, perennial herb, growing to 0.4 m high. It is generally leafless; however, leaves may be present in young plants only. The stem persists for more than one year, branches monopodially three or four times, is quadrangular and hirsute at the base, then becoming glabrous and flattened above (Brittan, 1987). This taxon produces purple flowers with elliptic petals and six stamens, generally between October to December (Brittan, 1987; WAH, 1998-).	*Thysanotus anceps* is known to occur in white or grey sand, lateritic gravel, and soils. It has been recorded in the Geraldton Sandplains, Jarrah Forrest and Swan Coastal Plain IBRA regions (Brittan, 1987; WAH, 1998-).	Nine individuals of *Thysanotus anceps* were recorded from nine locations within the Survey Area. *Thysanotus anceps* was identified along the conveyor system and in the Myara mining area.	  *Thysanotus anceps* Source: Biologic photo (left), Florabase (WAH, 1998-) (right)
Priority 4			
Senecio leucoglossus An erect, glabrous annual herb, growing to 1 m in height. The leaves are coarsely dentate to pinnatisect, with 2-5 projections per side (Wilson, 2015). The flowers are white and are produced between August and December, and the fruit are dry, indehiscent and achene (WAH, 1998-; Wilson, 2015).	*Senecio leucoglossus* is known to occur in gravelly brown/ grey loam or clayey sand over laterite or granitic soils (WAH, 1998-), often growing on hillsides or slopes, ridges, or amongst granite rocks. It has been recorded from the Jarrah Forest, Swan Coastal Plain and Warren IBRA regions, from Perth to just north of Donnelly River (WAH, 1998-).	Eight hundred and nineteen individuals of *Senecio leucoglossus* were recorded from 162 locations within the Survey Area. Most of the records (~155 locations) occurred in the Myara mining area, while the remaining locations occurred along the conveyor.	  Source: Biologic photo

Description	Habitat	Results of targeted assessment	Representative floristic material / habit and/or habitat
Stylidium ireneae An erect, perennial herb, up to 0.3 m high and forming a small compact bush (Lowrie & Kenneally, 1998). The rosette nodes are situated on the soil surface or are shortly prop-rooted and connected by leafless stolons. The stems are maroon coloured, longitudinally ridged, sparsely glandular-hairy, with a few caducous leaves and a terminal rosette of crowded leaves (Lowrie & Kenneally, 1998). Leaves are oblanceolate-spathulate, lunate in section, minutely mucronate at the apex, and very sparsely hairy or almost glabrous. The inflorescence of this taxon is racemose, while the flowers are pink, and are produced between October and December (Lowrie & Kenneally, 1998; WAH, 1998-).	Stylidium ireneae is known to occur in brown or white loamy sand , often over laterite, and grows in valleys near creek lines, and often with Agonis (Lowrie & Kenneally, 1998; WAH, 1998-). Most records of Stylidium ireneae occur in the Northen Jarrah Forest near Dwellingup, with other records occurring on the Swan Coastal Plain, near Perth, and in the Warren region, near Augusta and Manjimup (WAH, 1998-).	Two individuals of *Stylidium ireneae* were recorded from one location within the Survey Area. The two individuals of *Stylidium ireneae* were recorded along the conveyor system.	  Source: Florabase (WAH, 1998-) (left), Biologic photo (right)

3.2.2 Introduced Flora

No environmentally significant weeds (WoNS or DPs) were recorded during the Spring field surveys. Although weeds were observed throughout the survey area (i.e. **Hypochaeris glabra*, **Taraxacum* sp.), none were identified to be WoNS or DPs for the local region.

3.3 Review of Occurrence Assessment

No significant flora taxa were known to occur within the Survey Area prior to mobilisation. Two Priority 3 taxa (*Acacia horridula* and *Thysanotus anceps*), and two Priority 4 taxa (*Senecio leucoglossus* and *Stylidium ireneae*) were recorded during the field survey, which are now confirmed to occur (Table 3.3, Figure 3.3). The full assessment of occurrence pre and post-survey is presented in Appendix B. A summary of the changes to the Highly Likely, Likely and Possible pre-survey taxa, and the reasoning for the change is presented in Table 3.3.

Of the four taxa previously deemed Highly Likely to occur in the Survey Area (Table 3.3):

- *Acacia horridula* (P3) was confirmed;
- *Senecio leucoglossus* (P4) was confirmed;
- *Calothamnus graniticus* subsp. *leptophyllus* (P4) is now considered Possible; and
- *Pimelea rara* (P4) is now considered Possible.

Of the four taxa considered Likely in the pre-survey assessment, two were confirmed, one is now considered Possible, and one is now considered Unlikely to occur in the Survey Area. The eight taxa considered Possible in the pre-survey assessment are now all considered Unlikely or Highly Unlikely to occur in the survey area (Table 3.3).

Table 3.3: Summary of the review of assessment of occurrence

Taxon	Post-Survey Likelihood	Reasoning
Pre-survey likelihood – Highly Likely		
Acacia horridula (P3)	Confirmed	Recorded during the Spring targeted surveys
Senecio leucoglossus (P4)	Confirmed	
Calothamnus graniticus subsp. *leptophyllus* (P4)	Possible	A known location of this taxa was visited, and a collection was made during the survey, which was confirmed post-survey. This enabled the team to familiarise themselves with this taxon's habit and habitat. Suitable habitat observed when visiting the location was not seen during the surveys, however, is potentially within the greater Myara Survey Area.

Taxon	Post-Survey Likelihood	Reasoning
Pimelea rara (P4)	Possible	Taxon is inconspicuous when not in flower, and the survey was out of season for this taxon (Summer flowering time). Suitable habitat is potentially within the greater Myara Survey Area.
Pre-survey likelihood – Likely		
Thysanotus anceps (P3)	Confirmed	Recorded during the Spring targeted surveys
Stylidium ireneae (P4)	Confirmed	
Hibbertia hortiorum (P1)	Possible	Based on Florabase records, this species occurs within the Huntly-Myara area; however, that collection has been only tentatively identified as *Hibbertia hortiorum* (M. Hislop, WAH, pers. comm.). This species is only subtly distinguished from *H. ovata*, which is morphologically variable across its range. All *Hibbertia* voucher specimens collected during this survey were identified as *H. ovata* at the WAH based on leaf size and indumentum, and sepal indumentum characters. Additional taxonomic work is needed to determine whether the prostrate, mat-forming habit that defines *H. hortiorum* is sufficient to recognise it as different from *H. ovata*.
Grevillea pimeleoides (P4)	Unlikely	Suitable habitat (rocky hillsides, gravelly soils over granite) for this taxon does not appear to occur within the Survey Area.
Pre-survey likelihood – Possible		
Acacia oncinophylla subsp. *patulifolia* (P4)	Unlikely	Suitable habitat (granitic soils) for this taxon does not appear to occur within the Survey Area.
Anthocercis gracilis (T)	Highly Unlikely	Suitable habitat of these taxa does not occur within the Survey Area
Hibbertia acrotoma (P1)	Highly Unlikely	
Bossiaea modesta (P2)	Highly Unlikely	
Tetratheca phoenix (P2)	Highly Unlikely	
Cyathochaeta teretifolia (P3)	Highly Unlikely	
Cyanothamnus tenuis (P4)	Highly Unlikely	
Eucalyptus ×graniticola (P4)	Highly Unlikely	

3.4 Limitations and Constraints

The (EPA, 2016b) outlines several potential limitations to flora surveys. These aspects are assessed and discussed in Table 3.4. No major limitations or constraints were identified for the survey.

Table 3.4: Survey limitations and constraints

Potential limitation or constraint	Constraint	Applicability to this survey
Availability of data and information	No	The Jarrah Forest bioregion has been subjected to numerous biological surveys, with many commissioned by Alcoa, and enough contextual work was available to complete the assessment
Competency/ experience of the survey team, including experience in the bioregion surveyed	No	The field personnel involved in the survey are experienced in undertaking targeted surveys of similar nature, including within the Jarrah Forest bioregion, and with the species of significance targeted during the survey. Both Ryonen Butcher and Julie Fielder have 5+ yrs of experience conducting surveys within the Jarrah Forest bioregion.
Proportion of flora recorded/collected and any identification issues	No	The targeted flora survey was conducted within the guidance for flora and vegetation assessment of WA (EPA, 2016b). All flora encountered was either identified in the field or collected by field staff. All specimens collected and observed in the field were able to be confirmed by Biologic taxonomists or were confirmed by WAH (accession number 10705).
Timing, weather, and season	No	Rainfall was below average but adequate for this level of survey. The field surveys were conducted in the optimal seasonal timing for this bioregion (spring), and for the Southwest botanical province. Surveys could also be conducted across different seasons to capture specific conservation significant flora that flower during other seasons (i.e. *Pimelea rara*, highly likely to occur but only flowers during Summer and is otherwise inconspicuous). However, as the optimal timing for the majority of significant flora likely to be identified in the survey area is spring, the October to December surveys undertaken were during the optimal season and not considered a limitation. Conditions experienced during and prior to both surveys were considered normal of the season and were not considered a limitation.
Disturbance that may have affected results, e.g. fire, flood	Yes – Minor	Dust was a concern during Trip 1 (October) as the Survey Areas visited were situated along a major haul road. Dry conditions and frequent use caused the roads and adjacent bushland to be very dusty, with a thick layer of dust covering approximately 10 m of bushland from the road, which could potentially cover small, juvenile, or inconspicuous significant taxa.

Potential limitation or constraint	Constraint	Applicability to this survey
Appropriate area fully surveyed (effort & extent)	No	Time and access restrictions meant that the team was only able to survey a small proportion of the provided Survey Area. However, any missed areas are to be surveyed during 2024. The areas surveyed during the spring surveys were adequately searched, with the team walking grid lines approximately 10 to 20 m apart. The first day and a half of Trip 1 (October 2023) was spent completing inductions (both online and in-person) and sorting out site access. This resulted in field survey time being three of the five allocated days. Additionally, during Trip 2 (Nov/ Dec 2023), half a day was lost to blast road closures.
Access restrictions within the Survey Area	Yes – Minor	Part of the conveyor Survey Area was not able to be completed due to clearing works taking place along the conveyor corridor. This clearing occurred under powerlines under the clearing act and meant that a small area (~280 m long and 5 m wide) along the conveyor, approximately 5 km southwest of Banksiadale, could not be surveyed. The team noticed the work just before the start of this area and we weren't able to pass by the works to check the other end. As we weren't able to access this section, it was missed during the current survey and will hopefully be assessed during the 2024 surveys. This area was also not shown on any of the figures as the figures only displayed areas that were traversed and searched.
Problems with data and analysis, including sampling bias	No	No limitations with data collection were encountered during the field survey. No statistical analysis was conducted.

4 Conclusion

A targeted flora survey was conducted for the Huntly-Myara Survey Area, located 63 km southeast of Perth, in the Northern Jarrah Forrest IBRA subregion, and covering an area of approximately 110 ha. The surveys occurred in October, November, and December 2023, totalling 25 person days. There were minor constraints that limited the survey (access restrictions and minor disturbances). The survey and reporting have been completed in line with EPA and Alcoa guidelines.

The key outcomes of the survey are as follows:

- Four taxa of significance were recorded during the survey, including:
  - *Acacia horridula* (P3), 21 individuals of from eight locations;
  - *Thysanotus anceps* (P3), nine individuals from nine locations.
  - *Senecio leucoglossus* (P4), 819 individuals from 162 locations;
  - *Stylidium ireneae* (P4), two individuals from one location; and
- No significant environmental weed species (WoNS or DPs) were recorded during the survey.

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Appendix A: State and commonwealth conservation codes

Environment Protection and Biodiversity Conservation Act 1999

Category	Definition
Threatened Fauna and Flora Species	
Extinct (EX)	A native species is eligible to be included in the Extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
Extinct in the Wild (EW)	A native species is eligible to be included in the Extinct in the Wild category at a particular time if, at that time: (a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or (b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
Critically Endangered (CR)	A native species is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered (EN)	A native species is eligible to be included in the endangered category at a particular time if, at that time: (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
Vulnerable (VU)	A native species is eligible to be included in the vulnerable category at a particular time if, at that time: (a) it is not critically endangered or endangered; and (b) it is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
Conservation Dependent (CD)	A native species is eligible to be included in the Conservation Dependent category at a particular time if, at that time: (a) the species is the focus of a specific conservation program the cessation of which would result in the species becoming Vulnerable, Endangered or Critically Endangered; or (b) the following subparagraphs are satisfied (i) the species is a species of fish; (ii) the species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long-term survival in nature are maximised; (iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory; and (iv) cessation of the plan of management would adversely affect the conservation status of the species.

Category	Definition
Threatened Ecological Communities (TEC)	
Critically Endangered	An ecological community is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered	An ecological community is eligible to be included in the endangered category at a particular time if, at that time: (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
Vulnerable	An ecological community is eligible to be included in the vulnerable category at a particular time if, at that time: (a) it is not critically endangered nor endangered; and (b) it is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.

Biodiversity Conservation Act 2016

Category	Definition
Threatened Fauna and Flora Species	
Critically Endangered (CR)	Threatened species considered to be "facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines". Published under schedule 1 of the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.
Endangered (EN)	Threatened species considered to be "facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines". Published under schedule 2 of the *Wildlife Conservation (Rare Flora) Notice 2018* for endangered flora.
Vulnerable (VU)	Threatened species considered to be "facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines". Published under schedule 3 of the Wildlife Conservation (Rare Flora) Notice 2018 for vulnerable flora.
Extinct (EX)	Species where "there is no reasonable doubt that the last member of the species has died", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act). Published as presumed extinct under schedule 4 of the Wildlife Conservation (Rare Flora) Notice 2018 for extinct flora.

Category	Definition
Extinct in the Wild (EW)	Species that "is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act). Currently there are no threatened flora species listed as extinct in the wild.
Threatened Ecological Communities (TEC)	
Critically Endangered (CR)	An ecological community is eligible for listing in the category of critically endangered ecological community at a particular time if, at that time — (a) it is facing an extremely high risk of becoming eligible for listing as a collapsed ecological community in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines; and (b) listing in that category is otherwise in accordance with the ministerial guidelines.
Endangered (EN)	An ecological community is eligible for listing in the category of endangered ecological community at a particular time if, at that time — (a) it is not a critically endangered ecological community; and (b) it is facing a very high risk of becoming eligible for listing as a collapsed ecological community in the near future, as determined in accordance with criteria set out in the ministerial guidelines; and (c) listing in that category is otherwise in accordance with the ministerial guidelines.
Vulnerable (VU)	An ecological community is eligible for listing in the category of vulnerable ecological community at a particular time if, at that time — (a) it is not a critically endangered ecological community or an endangered ecological community; and (b) it is facing a high risk of becoming eligible for listing as a collapsed ecological community in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines; and (c) listing in that category is otherwise in accordance with the ministerial guidelines.
Collapsed	An ecological community is eligible for listing as a collapsed ecological community at a particular time if, at that time — (a) there is no reasonable doubt that the last occurrence of the ecological community has collapsed; or (b) the ecological community has been so extensively modified throughout its range that no occurrence of it is likely to recover — (i) its species composition or structure; or (ii) its species composition and structure.

Department of Biodiversity, Conservation and Attractions Priority Definitions

Category	Definition
Priority Fauna and Flora Species	
Priority 1 (P1)	Poorly-known Species Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural, or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
Priority 2 (P2)	Poorly-known Species Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g., national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
Priority 3 (P3)	Poorly-known Species Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
Priority 4 (P4)	Rare, Near Threatened and other species in need of monitoring (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

Furthermore, any species or ecological communities that may be rare but for which there is insufficient information available to allocate a threatened status under the BC Act, can also be listed as Priority species by the WA Department of Biodiversity, Conservation and Attractions (DBCA).

Significant flora may extend beyond the assigned codes and in line with EPA (2016b) may include:

- Being identified as Threatened, Critically Endangered, Endangered, Vulnerable, Extinct or Extinct in the Wild species (State listed BC Act and/or commonwealth listed EPBC Act);
- Being listed as Priority flora species (DBCA, 2023c);
- Locally endemic or associated with a restricted habitat type (e.g., surface water or groundwater dependent ecosystems);
- New species or anomalous features that indicate a potential new species;
- Range extensions or representative of outer population extent (particularly at the extremes of range, recently discovered range extensions or isolated outliers of the main range);
- Unusual species; restricted subspecies, varieties, naturally occurring hybrids, or complex taxonomic groups; or
- Relictual status, being representative of taxonomic groups that no longer occur widely in the broader landscape.

Significant vegetation may extend beyond the assigned codes and in line with EPA (2016b) may include:

- Being identified as Threatened Ecological Community (TEC), Critically Endangered, Endangered, Vulnerable or Collapsed ecological community (State listed BC Act and/or commonwealth listed EPBC Act)
- Identified as a Priority Ecological Community (PEC) (DBCA, 2023a);
- Restricted or endemic distribution;
- Degree of historical impact from threatening processes (such as mining or agricultural);
- A role as a refuge for significant flora; or
- Providing an important function required to maintain ecological integrity of a significant ecosystem.

Introduced flora

Legal Status Definitions of Listed Plants in Western Australia

Legal status	Definition
Declared Pest, Prohibited – s12	Prohibited organisms are declared pests by virtue of section 22(1) and many only be imported and keep subject to permits
Declared Pest – s22(2)	Declared pests must satisfy any applicable import requirements when imported and may be subject to control keeping requirements
Permitted – s11	Permitted organisms must satisfy applicable import requirements and import permits (where required)
Permitted Requires Permit – r73	Regulation 73 permitted organisms may be subject to restriction under legislation other and the BAM Act (2007)
Unlisted	Unlisted organisms are prohibited in WA
Control Categories	**Definition**
C1 Exclusion	Organisms should be excluded from parts or all of WA
C2 Eradication	Organisms should be eradicated from all or parts of WA
C3 Management	Organisms should have some form of management applied that will alleviate the harmful impact of the organism, reduce the numbers or distribution of the organism, or prevent or contain the spread of the organism
Unassigned	Declared pests that are recognised a having a harmful impact under certain circumstances where their subsequent control requirements are determined by a plan or other legislative arrangements under the Act
Keeping Categories	**Definition**
Prohibited Keeping	Can only be kept under a permit or public display, education, or scientific purposes
Restricted Keeping	Kept under a permit by private individuals due to low risk of becoming a problem for the environment
Exempt Keeping	No permit or conditions are required for keeping. Organism may be subject to restrictions under the Wildlife Conservation Act (1950)

Appendix B: Biologic flora assessment of occurrence

Taxon	Source			Habit and Habitat	Habitat within Survey Area	Within Current Known Distribution	Distance to Nearest Record	Source	Likelihood Post-Survey
	DBCA	BC Act	EPBC Act						
Pre-survey likelihood – Highly Likely									
Acacia horridula	P3			Harsh, slender, single-stemmed shrub, 0.3-0.6(-1) m high. Fl. yellow, May to Aug. Gravelly soils over granite, sand. Rocky hillsides.	Yes	Yes	0.4 km SE	A, B, D	Confirmed
Senecio leucoglossus	P4			Erect annual, herb, to 1.3 m high. Fl. white, Aug to Dec. Gravelly lateritic or granitic soils. Granite outcrops, slopes.	Yes	Yes	1.1 km WSW	A, B, D	Confirmed
Calothamnus graniticus subsp. *leptophyllus*	P4			Erect, multi-stemmed shrub, 1-2 m high. Fl. red, Jun to Aug. Clay over granite, lateritic soils. Hillsides.	Yes	Yes	0.03 km NNW	A, B	Possible
Pimelea rara	P4			Shrub, 0.2-0.35 m high. Fl. white, Dec or Jan. Lateritic soils.	Yes	Yes	0.4 km NNE	A, B, D	Possible
Pre-survey likelihood – Likely									
Thysanotus anceps	P3			Rhizomatous, leafless perennial, herb, to 0.4 m high. Fl. purple, Oct to Dec. White or grey sand, lateritic gravel, laterite.	Yes	Yes	4.4 km SE	A, B	Confirmed
Stylidium ireneae	P4			Lax perennial, herb, (0.06-)0.1-0.28 m high, Leaves oblanceolate, 0.4-2 cm long, 1-3 (-5) mm wide, apex subacute to acuminate, margin entire, glandular. Inflorescence racemose. Fl. pink, Oct to Dec. Sandy loam. Valleys near creek lines, woodland, often with Agonis.	Yes	Yes	0.4 km WSW	A, B, D	Confirmed
Hibbertia hortiorum	P1			Prostrate, densely-spreading, mat forming shrubs, to 0.1 m high and 0.6 m wide. Fl. yellow, Sep-Oct. Brown sandy gravels over laterite of jarrah-marri forest. Slopes, roadsides.	Yes	Yes	0.8 km S	A, B, D	Possible
Grevillea pimeleoides	P4			Non-lignotuberous shrub, 0.4-2.4 m high. Fl. yellow-orange, May to Nov. Gravelly soils over granite. Rocky hillsides.	No	Yes	0.9 km WNW	A, B, D	Unlikely
Pre-survey likelihood – Possible									
Acacia oncinophylla subsp. *patulifolia*	P4			Shrub, 0.5-2.5(-3) m high, 'minni-ritchi' bark, phyllodes 4-9 cm long, 3-6 mm wide. Fl. yellow, Aug to Nov or Nov to Dec. Granitic soils, occasionally on laterite.	No	Yes	4.4 km S	A, B	Unlikely
Anthocercis gracilis	T	VU	VU	Erect, spindly shrub, to 0.6(-1) m high. Fl. yellow-green, Sep to Oct. Sandy or loamy soils. Granite outcrops.	No	Yes	0.9 km WSW	A, B, C	Highly Unlikely
Hibbertia acrotoma	P1			Lax, openly-branched, prostrate to spreading shrubs, 0.2 – 0.5 m high, to 0.4 m wide. Fl. yellow, Aug-Sep. Dark brown and/or yellow loam or sandy loam over laterite or granite in moist jarrah-marri forest. Hillsides, steep slopes, and among large granite boulders.	No	No	1 km WSW	A, B	Highly Unlikely
Bossiaea modesta	P2			Slender, trailing & twining shrub. Fl. yellow & red, Oct to Dec. Soils derived from granite. Damp areas close to stream.	No	Yes	6.1 km SE	A, B	Highly Unlikely
Tetratheca phoenix	P2			Few-branched shrub (subshrub), to 0.25 m high. Brown gravelly loam over granite. Mid-upper slopes, often near large rock outcrops.	Possible	Adjacent	3 km ENE	A, B, D	Highly Unlikely
Cyathochaeta teretifolia	P3			Rhizomatous, clumped, robust perennial, grass-like or herb (sedge), to 2 m high, to 1.0 m wide. Fl. brown. Grey sand, sandy clay. Swamps, creek edges.	No	Adjacent	1.6 km WNW	A, B, D	Highly Unlikely

Taxon	Source			Habit and Habitat	Habitat within Survey Area	Within Current Known Distribution	Distance to Nearest Record	Source	Likelihood Post-Survey
	DBCA	BC Act	EPBC Act						
Cyanothamnus tenuis	P4			Procumbent or erect and slender perennial shrub, to 0.5 m high. Fl. blue. Brown sandy clay or loam over granite. Hillsides, amongst granite outcrops.	No	Yes	0.4 km WSW	A, B, D	Highly Unlikely
Eucalyptus x *graniticola*	P4			(Mallee) Erect-stemmed, lignotuberous, to 4 m tall, bark smooth, cream, powdery, sometimes rough–grey and flaky at base. Fl. cream, Sep-Nov. Grows on granite, ocbil surrounded by sloping sheet granite rock as an isolated emergent mallee.	No	Adjacent	1.7 km S	A, B	Highly Unlikely
Pre-survey likelihood – Unlikely									
Morelotia australiensis	T	VU	VU	Rhizomatous, tufted perennial, grass-like or herb (sedge), to 1 m high. Fl. brown, Nov to Dec. Grey/brown sandy clay loam. Flat plains.	Possible	Yes	7.5 km WSW	A, B, C	Unlikely
Millotia tenuifolia var. *laevis*	P2			Ascending to erect annual, herb, 0.02-0.1 m high. Fl. yellow, Sep to Oct. Granite or laterite soils.	Possible	Yes	17.1 km NNW	A, B	Unlikely
Acacia oncinophylla subsp. *oncinophylla*	P3			Shrub, 0.9-2.5 m high, 'minni-ritchi' bark, phyllodes mostly 8-13 cm long, 1-2 mm wide. Fl. yellow, Aug to Oct. Granitic soils.	Possible	Yes	8.4 km SE	A, B	Unlikely
Adenanthos cygnorum subsp. *chamaephyton*	P3			Prostrate, mat-forming, non-lignotuberous shrub, to 0.3 m high. Fl. white-cream-pink-green/green, Jul or Sep to Dec or Jan. Grey sand, lateritic gravel.	Possible	Yes	49 km NNE	A	Unlikely
Asteridea gracilis	P3			Annual, herb, 0.15-0.35 m high. Fl. white-pink, Sep to Dec. Sand, clay, gravelly soils.	Possible	Yes	37.9 km N	A, B	Unlikely
Gastrolobium sp. Asperum (F. Hort 2864)	P3			Erect, spreading, or spindly shrub, to 1 m tall. Fl. yellow, red or orange, Sep. Dry yellow/brown sand, or loam over laterite. Low slopes, flats, along graded boundary tracks.	Possible	No	15 km E	A, B	Unlikely
Lasiopetalum glutinosum subsp. *glutinosum*	P3			Perennial, multi stemmed shrub, 0.5-1.5 m high. Fl. pink/purple. Brown silty clay/sandy loam. Outcrops, slopes, valleys.	Possible	No	4.4 km WNW	A, B	Unlikely
Andersonia sp. Saxatilis (F. & J. Hort 3324)	T	CR		Erect, single stemmed shrub, multi-branching above ground level and dividing into dense terminal branchlets, growing to 1 m high. Flowers white/pink, Sept-Nov. Dry brown sand, or loam. Granite outcrops, slopes.	No	No	12.1 km NE	A, B	Highly Unlikely
Diuris drummondii	T	VU	VU	Tuberous, perennial, herb, 0.5-1.05 m high. Fl. yellow, Nov to Dec or Jan. Low-lying depressions, swamps.	No	No	11.2 km W	A, B	Highly Unlikely
Diuris purdiei	T	EN	EN	Tuberous, perennial, herb, 0.15-0.35 m high. Fl. yellow, Sep to Oct. Grey-black sand, moist. Winter-wet swamps.	No	No	4.7 km WNW	A, B, C	Highly Unlikely
Eleocharis keigheryi	T	VU	VU	Rhizomatous, clumped perennial, grass-like or herb (sedge), to 0.4 m high. Fl. green, Aug to Nov. Clay, sandy loam. Emergent in freshwater: creeks, claypans.	No	No	19 km SSW	A, B	Highly Unlikely
Grevillea flexuosa	T	VU	VU	Irregular few-branched, non-lignotuberous shrub, to 2 m high. Fl. creamy-yellow, Jul to Oct. Red-brown sand with laterite & gravel, sand over granite. Ridgetop plateau & associated breakaways.	No	No	14.5 km NNE	A, B	Highly Unlikely
Lasiopetalum pterocarpum	T	CR	EN	Open, multi-stemmed shrub (with distinctly winged fruit), to 1.2 m high. Fl. pink, Aug to Dec. Dark red-brown loam or clayey sand over granite. On sloping banks near creeklines.	No	No	2.8 km NNW	A, B, C, D	Highly Unlikely

Taxon	Source			Habit and Habitat	Habitat within Survey Area	Within Current Known Distribution	Distance to Nearest Record	Source	Likelihood Post-Survey
	DBCA	BC Act	EPBC Act						
Darwinia hortiorum	P1			Erect to spreading, densely branched, compact, glabrous shrubs, to 0.7 m tall, to 0.8 m wide. Fl. green and red, Sep to Dec. Loam, or loam/clay soil associated with laterite. Jarrah forest, growing in association with large granite outcrops and their drainage lines.	No	No	14.5 km ENE	A, B, D	Highly Unlikely
Paracaleana gracilicordata	P1			Perennial, herb, to 0.07 m high. Fl. green-yellow-purple, Oct to Nov. Growing on moss mats, granite. Outcrops.	No	No	10.9 km N	A, B, D	Highly Unlikely
Paracaleana granitica	P1			Perennial, herb, to 0.07 m high. Fl. green-purple, Oct to Dec. Growing on moss mats, granite. Outcrops.	No	No	6.6 km NNE	A, B, D	Highly Unlikely
Banksia recurvistylis	P2			Non-lignotuberous shrub, to 2 m high and 3 m wide. Single stemmed at base. Fl. pale yellow, Nov to Dec. Lateritic soils. Granite outcrops within jarrah-marri forest.	Possible	No	10.5 km ENE	A, B, D	Highly Unlikely
Grevillea ornithopoda	P2			Slender, erect shrubs, 1-3 m high. Fl. white or cream, Sep-Oct. White/red/brown loam or clay. Riverbanks.	No	Yes	2.6 km SSW	A, B	Highly Unlikely
Lepyrodia curvescens	P2			Dioecious, shortly creeping, tufted rhizomatous, herb, 0.24-0.4 m high, rhizomes on surface or to 1 cm deep. Fl. Sep to Nov. Sand, laterite. Seasonally inundated swampland.	No	Yes	9.1 km SSW	A, B, D	Highly Unlikely
Andersonia sp. Audax (F. Hort, B. Hort & J. Hort 3179)	P3			Erect, spreading, single-stemmed shrub to 1.3m. Fl. white/pink, Oct-Dec. Dry yellow/brown sand, loam, or granitic soils. Granite sheets/outcrops, slopes, drainage lines.	No	No	10.7 km ENE	A, B	Highly Unlikely
Blennospora doliiformis	P3			Erect annual, herb, to 0.15 m high. Fl. yellow, Oct to Nov. Grey or red clay soils over ironstone. Seasonally-wet flats.	No	Yes	19.2 km W	A, B	Highly Unlikely
Dicrastylis reticulata	P3			Woolly shrub, (0.15-)0.6-1.2(-1.5) m high. Fl. white, Sep to Dec. Sandy soils, often over granite. Amongst granite rock, hills, flats.	No	No	15.4 km ENE	A, B, D	Highly Unlikely
Grevillea dissectifolia	P3			Erect, spreading, single stemmed shrubs, 1-2.5 m high. Fl. white, cream or pink, Jun-Nov. White/grey/yellow sand over laterite. Slopes, drainage lines, granite outcrops.	Possible	Yes	8.1 km SE	A, B	Highly Unlikely
Halgania corymbosa	P3			Erect shrub, 0.35-1 m high. Fl. blue-purple, Aug to Nov. Gravelly soils, soils over granite.	Possible	Yes	6.3 km W	A, B	Highly Unlikely
Isopogon autumnalis	P3			Low, open, multistemmed shrub, 0.4-1 m high. Fl. pale yellow. White/grey sand and laterite. Ridge hill shelf, slopes.	No	No	11.2 km WNW	A, B	Highly Unlikely
Lepyrodia heleocharoides	P3			Rhizomatous, slender, tufted perennial, herb (sedge-like), 0.15-0.25 m high. Fl. Dec. Moist peaty sand. Dry or seasonally inundated heath or woodland, swamps.	No	Yes	4.6 km W	A, B	Highly Unlikely
Meionectes tenuifolia	P3			Prostrate, annual semi aquatic herb, erect stems to 0.35 m high. Fl. orange. Red/green trifid and linear leaves. Grey/black loam over granite. Seasonally wet flats, swamps, granite flats.	No	Yes	4.3 km W	A, B	Highly Unlikely
Pithocarpa corymbulosa	P3			Erect to scrambling perennial, herb, 0.5-1 m high. Fl. white, Jan to Apr. Gravelly or sandy loam. Amongst granite outcrops.	No	No	15.6 km NNW	A, B	Highly Unlikely

Taxon	Source			Habit and Habitat	Habitat within Survey Area	Within Current Known Distribution	Distance to Nearest Record	Source	Likelihood Post-Survey
	DBCA	BC Act	EPBC Act						
Stackhousia sp. Red-blotched corolla (A. Markey 911)	P3			Erect, perennial shrub. Fl. yellow/cream. Brown/white sandy clay over laterite/granite. Lowlands, slopes, edges of granite.	Possible	Adjacent	5.8 km WSW	A, B	Highly Unlikely
Synaphea pandurata	P3			Clumped shrub (subshrub), 0.2-0.55 m high. Yellow-grey, yellow-brown, yellow-red sands and sandy loams, dark brown loam, laterite gravel, granite. In undulating areas.	Possible	No	15.3 km NE	A, B, D	Highly Unlikely
Tetratheca pilifera	P3			Spreading shrub, 0.1-0.3 m high. Fl. purple, Aug to Oct. Gravelly soils	Possible	Yes	7.8 km S	A, B, D	Highly Unlikely
Tetratheca similis	P3			Spreading shrub, to 0.3 m high. Fl. pink, Aug to Sep. Sandy clay with lateritic boulders.	Possible	No	19.3 km E	A, B	Highly Unlikely
Caladenia speciosa	P4			Tuberous, perennial, herb, 0.35-0.6 m high. Fl. white-pink, Sep to Oct. White, grey or black sand.	No	Yes	10.7 km W	A, B, D	Highly Unlikely
Chorizema ulotropis	P4			Sprawling, open, semi-prostrate shrub, to 0.45 m high. Fl. orange-yellow, Jul to Sep. Moist to dry soils, white sand with gravel, laterite, granite. Outcrops, winter damp to dry areas, flats.	Possible	Yes	8.2 km SE	A, B	Highly Unlikely
Drosera occidentalis	P4			Fibrous-rooted, rosetted perennial, herb, to 0.025 m high. Fl. pink/white, Oct to Dec or Jan. Grey clayey sand. Flats, winter wet depressions.	No	Yes	8.2 km SSW	A, B, D	Highly Unlikely
Hemigenia platyphylla	P4			Spreading shrub, 0.2-1.5 m high. Fl. blue-purple, Sep to Nov. Sandy & loamy soils. Granite rocks, slopes	Possible	No	8.5 km NNE	A, B, D	Highly Unlikely
Microtis quadrata	P4			Tuberous, perennial, herb, to 0.4 m high. Fl. cream-white, Dec or Jan. Brown/grey sand or clay over laterite. Winter-wet swamps, drainage lines.	No	Yes	11.2 km WNW	A, B	Highly Unlikely
Ornduffia submersa	P4			Aquatic, floating herb. Fl. cream/white/yellow, Sep-Oct. Grey/brown clay. Ephemeral creeks, wetlands, open depressions.	No	Yes	11 km W	A, B	Highly Unlikely
Parsonsia diaphanophleba	P4			Woody climber, to 10 m high. Fl. white/cream & pink, Jan to Feb or Apr to Jun or Sep. Alluvial soils. Along rivers.	No	Adjacent	6.2 km NNW	A, B, D	Highly Unlikely
Schoenus natans	P4			Aquatic annual, grass-like or herb (sedge), 0.3 m high. Fl. brown, Oct. Winter-wet depressions.	No	Yes	5.8 km SW	A, B	Highly Unlikely
Trithuria australis	P4			Small, annual, reddish, aquatic herb. Fl. Oct. Brown or black clay. Swamps, winter-wet flats.	No	Yes	19.1 km SSW	A, B	Highly Unlikely
Pre-survey likelihood – Highly Unlikely									
Diuris micrantha	T	VU	VU	Tuberous, perennial, herb, 0.3-0.6 m high. Fl. yellow & brown, Sep to Oct. Brown loamy clay. Winter-wet swamps, in shallow water.	No	No	29.3 km NW	A, B, C	Highly Unlikely
Tribonanthes purpurea	T	VU	VU	Tuberous, perennial, herb, 0.03-0.04 m high. Fl. pink-purple, Aug. Seasonally wet soils in moss swards & herbfields among granite rocks.	No	No	38.5 km NNE	A, B	Highly Unlikely
Verticordia fimbrilepis subsp. *fimbrilepis*	T	VU	EN	Shrub, 0.3-0.7 m high. Fl. pink-white, Oct to Dec or Jan. Gravelly sandy or clayey soils. Flats, road verges	Possible	No	27.3 km NNE	A, B, C	Highly Unlikely
Calytrix simplex subsp. *simplex*	P1			Shrub, ca 0.2 m high. Fl. purple, Oct to Nov. Shallow soils, red/brown gravel-loam/clay-loam. Granite outcrops, slopes, swamps.	No	Adjacent	24.4 km N	A, B	Highly Unlikely

Taxon	Source			Habit and Habitat	Habitat within Survey Area	Within Current Known Distribution	Distance to Nearest Record	Source	Likelihood Post-Survey
	DBCA	BC Act	EPBC Act						
Isopogon sp. Canning Reservoir (M.D. Tindale 121 & B.R. Maslin)	P1			Erect, spreading, single-stemmed shrub, to 1.2 m high. Fl. cream-pink, Jun. Brown, yellow or grey sand over laterite. Flats and low plains.	No	No	32.6 km NE	A, B	Highly Unlikely
Byblis gigantea	P3			Small, branched perennial, herb (or sub-shrub), to 0.45 m high. Fl. pink-purple/white, Sep to Dec or Jan. Sandy-peat swamps. Seasonally wet areas.	No	Adjacent	21.4 km ENE	A, B, D	Highly Unlikely
Juncus meianthus	P3			Tufted perennial, herb, 0.05-0.2 m high, to 0.4 m wide. Fl. brown, Nov to Dec or Jan. Black sand, sandy clay. Creeks, seepage areas.	No	Yes	57.1 km S	A	Highly Unlikely
Petrophile filifolia subsp. *laxa*	P3			Erect, spreading shrub, to 0.75 m high. White gritty sand, brown, red, yellow, white, or grey sand, brown-yellow sandy clay. Winter-wet sites, flats, slopes, swamps, drainage lines.	No	No	22.7 km ENE	A, B	Highly Unlikely
Thysanotus cymosus	P3			Caespitose perennial, herb (with fibrous roots with ellipsoidal tubers), to 0.3 m high. Fl. purple, Sep to Oct. Clay, granitic or lateritic sand.	Yes	No	27 km E	A, B	Highly Unlikely
Acacia cuneifolia	P4			Erect or straggly shrub, 1-3 m high. Fl. yellow, Jul to Oct. Sand, clay, or loam over granite. Granite outcrops & hills, rocky watercourses.	No	No	21.6 km ENE	A, B	Highly Unlikely
Darwinia thymoides subsp. St Ronans (J.J. Alford & G.J. Keighery 64)	P4			Low, erect, spreading shrub, to 0.4 m tall. Fl. red, Oct-Nov. Dry yellow-brown sand, or loam over laterite. Upper slopes, fringing granite outcrops.	No	No	22.3 km SE	A, B	Highly Unlikely
Eucalyptus exilis	P4			(Whipstick mallee), 2-6 m high, bark smooth. Fl. white, Aug to Oct. Grey sand, gravelly loam. Lateritic ridges.	No	No	28.6 km ENE	A, B	Highly Unlikely
Goodenia verreauxii	P4			Perennial, herb, to 0.5 m high. Fl. yellow, Nov to Dec or Jan. White/grey or yellow sand. Flats.	No	No	27.4 km NNE	A, B	Highly Unlikely
Hydrocotyle lemnoides	P4			Aquatic, floating annual, herb. Fl. purple, Aug to Oct. Swamps.	No	No	44.4 km NE	A	Highly Unlikely
Lasiopetalum bracteatum	P4			Erect, open shrub, 0.4-1.5 m high. Fl. pink-purple, Aug to Nov. Sandy clay, clay, lateritic gravel. Along drainage lines, creeks, gullies, granite outcrops.	No	No	26.5 km ENE	A, B	Highly Unlikely

Source: A = Alcoa likelihood assessment, B = WAH and TPFL databases (DBCA, 2023b), C = Protected Matters Search Tool (DCCEEW, 2023), D = Atlas of Living Australia (ALA, 2023).

Appendix C: Significant weeds identified from the desktop assessment

Family	Taxon	Source		Declared Plant Pests (DPs)	Weeds of National Significance (WoNS)
		ALA	WAOL		
Alismataceae	*Sagittaria platyphylla*		•	Yes	Yes
Apocynaceae	*Calotropis procera*		•	Yes	
	Cryptostegia madagascariensis		•	Yes	
	Gomphocarpus fruticosus	•	•	Yes	
Araceae	*Pistia stratiotes*		•	Yes	
	Zantedeschia aethiopica	•	•	Yes	
Araliaceae	*Hydrocotyle ranunculoides*		•	Yes	
Asparagaceae	*Asparagus asparagoides*		•	Yes	Yes
Asteraceae	*Chondrilla juncea*		•	Yes	
	Onopordum acaulon		•	Yes	
	Silybum marianum		•	Yes	
	Xanthium spinosum		•	Yes	
	Xanthium strumarium		•	Yes	
Boraginaceae	*Echium plantagineum*		•	Yes	
Cactaceae	*Austrocylindropuntia cylindrica*		•	Yes	Yes
	Austrocylindropuntia subulata		•	Yes	Yes
	Cylindropuntia fulgida		•	Yes	Yes
	Cylindropuntia imbricata		•	Yes	Yes
	Cylindropuntia kleiniae		•	Yes	Yes
	Cylindropuntia pallida		•	Yes	Yes
	Cylindropuntia tunicata		•	Yes	Yes
	Opuntia elata		•	Yes	Yes
	Opuntia elatior		•	Yes	Yes
	Opuntia engelmannii		•	Yes	Yes
	Opuntia microdasys		•	Yes	Yes
	Opuntia monacantha		•	Yes	Yes
	Opuntia polyacantha		•	Yes	Yes
	Opuntia puberula		•	Yes	Yes
	Opuntia stricta		•	Yes	Yes
	Opuntia tomentosa		•	Yes	Yes
Euphorbiaceae	*Jatropha gossypifolia*		•	Yes	Yes
Fabaceae	*Alhagi maurorum*		•	Yes	
	Neltuma glandulosa × velutina		•	Yes	Yes
	Parkinsonia aculeata		•	Yes	Yes
	Senna alata		•	Yes	
	Senna obtusifolia		•	Yes	
	Ulex europaeus		•	Yes	Yes
Iridaceae	*Moraea flaccida*		•	Yes	
	Moraea miniata		•	Yes	
Rhamnaceae	*Ziziphus mauritiana*		•	Yes	
Rosaceae	*Rubus anglocandicans*	•	•	Yes	Yes
	Rubus laudatus		•	Yes	Yes
	Rubus rugosus		•	Yes	Yes
	Rubus ulmifolius	•	•	Yes	Yes
Rubiaceae	*Galium aparine*		•	Yes	
	Galium spurium		•	Yes	
Solanaceae	*Solanum elaeagnifolium*		•	Yes	Yes
	Solanum linnaeanum		•	Yes	
Tamaricaceae	*Tamarix aphylla*		•	Yes	Yes
Verbenaceae	*Lantana camara*		•	Yes	Yes