Alcoa of Australia Limited

PINJARRA ALUMINA REFINERY REVISED PROPOSAL

Offset Area Management Plan

Proposed Offset Conservation Area POCA001 - Jarrahdale

EPA No. 2253
EPBC No. 2022/09204

DRAFT

February 2025

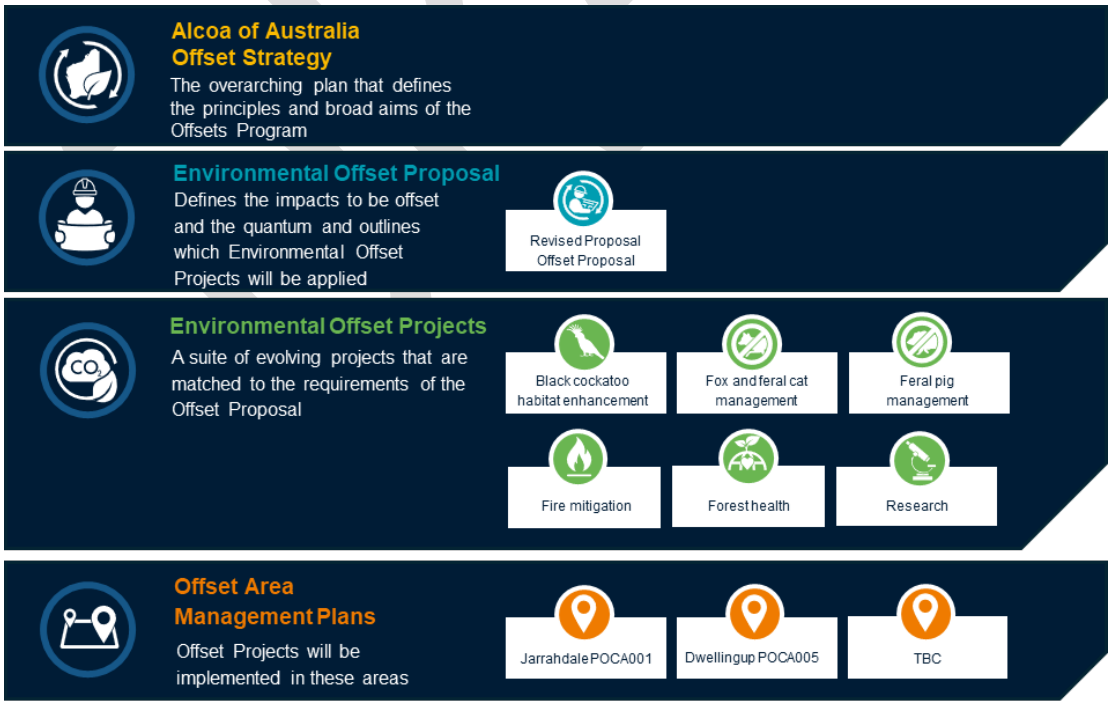
Version	Description	Prepared	Date	Checked	Approved	Date
A	Issued for Internal Review	BL	15/1/2025	KM	-	16/01/2025
B	Issued for Review	BL	22/1/2025	KM	-	23/1/2025
C	Issued for Approval	BL	7/2/2025	AB	-	5/3/2025
1	Issued for use	BL	6/3/2025	AB	KM	7/2/2025

Executive Summary

Alcoa of Australia Limited (Alcoa) began operations in the south-west of Western Australia (WA) in 1963. A State Agreement, between Alcoa and the WA Government, permits Alcoa to mine bauxite within Mineral Lease 1SA (ML1SA).

Alcoa are modernising its approvals framework to a more contemporary process. The Pinjarra Alumina Refinery Revised Proposal (the Proposal) has been referred to the WA Environmental Protection Authority (EPA) under Part IV s38 of the *Environmental Protection Act 1986* (EP Act) (assessment number is 2253). The Huntly Bauxite Mine Transition (assessment number is 2022/09204) has been referred to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Myara North and Holyoke Development Envelopes are being assessed as an accredited assessment under the WA EP Act. An environmental impact assessment has been undertaken and documented in an Environment Review Document (Alcoa, 2025b).

As part of the regulatory assessment process, Alcoa has prepared an Environmental Offset Proposal (Alcoa, 2025a) for the Proposal. The Environmental Offset Proposal outlines the significant residual impact, the proposed offset quantum to counterbalance the significant residual impact, the on-ground conservation actions to be implemented (detailed in Environmental Offset Project Plans) and the location(s) for the on-ground conservation actions to be implemented. The offset locations are referred to as Proposal Offset Conservation Areas (POCAs) and described in Offset Area Management Plan(s). The Environmental Offset document framework, provided in ES Figure 1-1, shows how the offset documents are organised.



ES Figure 1-1: Environmental Offset Document Framework

This Offset Area Management Plan has been prepared to support the environmental assessment of the Proposal by detailing the Jarrahdale POCA.

The Jarrahdale POCA is based on the area bound by Alcoa's Jarrahdale Mining Avoidance Zone (MAZ) in the Shire of Serpentine-Jarrahdale, approximately 500 m east of the Jarrahdale township and around 50 km south-east of Perth.

The POCA is 2,715 hectares, primarily State Forest, mostly native vegetation with some small streams and surrounds private properties. The area was selected as a proposed offset conservation area as Alcoa has made a commitment to not mine in the area, the area is known to contain high environmental values, and contains similar vegetation and habitat types and structure, and is close to the impact area as well as adjoining conservation areas (the Serpentine National Park).

The POCA will contribute towards the offset outcomes in the Environmental Offset Proposal and targets in Environmental Offset Project Plans through protection and enhancement of remnant vegetation that provides habitat for black cockatoos, chuditch, woylie and quokka. The POCA contains approximately:

- 2,536 hectares of forest red-tailed black cockatoo habitat including foraging, potential roosting and potential breeding habitat
- 2,343 hectares of Carnaby's cockatoo foraging habitat, including foraging, potential roosting and potential breeding habitat
- 2,343 hectares of Baudin's cockatoo foraging habitat, including foraging, potential roosting and potential breeding habitat
- 2,685 hectares of chuditch habitat, including 323 hectares of dense riparian vegetation and 2,362 hectares of open upland vegetation
- 2,684 hectares of woylie habitat, including 323 hectares of dense riparian vegetation and 2,360 hectares of open upland vegetation
- 2,684 hectares of quokka habitat, including 323 hectares of habitat critical to the survival of quokka and 2,360 hectares of open upland vegetation that may be used opportunistically by quokka.

Conservation actions within the POCA are expected to be delivered for the long-term (over the offset period). The aim is to maintain or improve the habitat for each species such that the health and condition of the habitat is self-sufficient and requires minimal management and intervention when it reverts to the landowner (the WA Government) and/or land manager (currently the Department of Biodiversity, Conservation and Attractions (DBCA)).

Alcoa will continue to consult with the stakeholders in the development of this area for conservation and as an offset. Alcoa is seeking to have an in principle agreement (informal or formal) with the WA Government to use the area as an offset in Q2 2025. Following agreement, Alcoa will undertake the Baseline survey. The results from the Baseline survey can be used to finalise this Plan, including confirmation of management areas and spatial mapping of monitoring locations. If the Proposal is approved, Alcoa plans to commence on-ground management and conservation actions in Q2 2026.

DRAFT

Delivery of management actions may be undertaken by different environmental practitioners, consultants or specialists. Alcoa and delivery partners will enter into legally binding agreements; however, Alcoa will remain responsible for ensuring the conservation actions are implemented in a safe manner in accordance with any agreements with the landowner.

DRAFT

Table Of Contents

1. Context, scope and rationale 11
1.1 Pinjarra Alumina Refinery Revised Proposal 11
1.2 Background 12
1.3 Purpose and scope 12
1.4 Proposal overview 12
1.5 Summary of the Significant Residual Impacts 13
2. Proposed Offset Conservation Area 16
2.1 Identification 16
2.2 Location 16
2.3 Description 17
2.4 Land tenure and conservation areas 20
2.5 Environmental values 20
2.6 Flora 20
2.7 Vegetation 23
2.8 Fauna 34
2.9 Ecological and/or habitat features 43
2.10 Ecological linkages 43
2.11 Social 44
2.12 Heritage 44
3. Contribution to Offset Proposal outcomes 45
4. Indicative conservation actions 46
4.1 Protection mechanism 46
4.2 Post-mining rehabilitation 46
4.3 Baseline habitat assessment 47
4.4 Habitat management areas 47
4.5 Alcoa freehold land 48
4.6 Deliverables and milestones 54
4.7 Monitoring program 54
4.8 Key risks and management strategies 57
4.9 Adaptive management and continual improvement 57
5. Governance arrangements 59
5.1 Agreements 59
5.2 Responsibilities 59

DRAFT

5.3 Financial commitments 59
6. Stakeholder consultation 60
7. Key offset concepts 66
8. References 71

Table Index

Table 1-1: Proposal Details 13
Table 2-1: Vegetation complexes within the POCA 25
Table 2-2: Vegetation Mapping 27
Table 2-3: Fauna Habitat Types 37
Table 2-4: Species recorded in the POCA (GHD, 2021) 39
Table 4-1: Indicative conservation actions by habitat management zones 48
Table 4-2: Vegetation and habitat within the Alcoa freehold land parcel 51
Table 4-3: Indicative Schedule 54
Table 4-4: Risk Management 58
Table 6-1: Key Stakeholders 60
Table 6-2: Stakeholder Consultation on the POCA 62
Table 7-1: Principles in the WA Environmental Offset Guidelines 66

Figure Index

Figure 1-1: Environmental Offset Document Framework 11
Figure 1-2: Proposal Areas (overview) 15
Figure 2-1: Proposed Offset Conservation Area Location 18
Figure 2-2: Proposed Offset Conservation Area Site Layout 19
Figure 2-3: Mattiske 2021 Flora and Vegetation Survey 22
Figure 2-4: Havel Vegetation mapping 30
Figure 2-5: Vegetation condition 31
Figure 2-6: Dieback mapping 32
Figure 2-7: Fire mapping 33
Figure 2-8: GHD (2021) Survey - Fauna habitats and records 41
Figure 2-9: GHD (2021) Survey – Black Cockatoo Nesting Trees 42
Figure 4-1: Habitat Management Zones 52
Figure 4-2: Alcoa Freehold Land Havel Vegetation Mapping 53
Figure 4-3: Monitoring locations 56

DRAFT

Acronyms

Abbreviation	Definition
BC Act	*Biodiversity Conservation Act 2016* (WA)
Black cockatoo(s)	Carnaby's cockatoo (*Zanda latirostris*), Baudin's cockatoo (*Zanda baudinii*) and forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*)
DBCA	Department of Biodiversity, Conservation and Attractions
DBH	Diameter at breast height
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEMIRS	Department of Energy, Mines, Industry Regulation and Safety
DWER	Department of Water and Environmental Regulation
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
EP Act	*Environmental Protection Act 1986* (WA)
EPA (WA)	Environmental Protection Authority
ERD	Environmental Review Document
IBRA	Interim Biogeographic Regionalisation for Australia.
ha	hectares
km	kilometers
m	meters
ML1SA	Mineral Lease 1SA
MNES	Matters of National Environmental Significance
NJF	Northern Jarrah Forest
POCA	Proposed offset conservation area
RPZ	Reservoir Protection Zone
SRI	Significant residual impact
WA	Western Australia

Definitions

Term	Definition
Black cockatoo(s)	Carnaby's cockatoo (*Zanda latirostris*[1]), Baudin's cockatoo (*Zanda baudinii*[1]) and forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*).
Black cockatoo known nesting tree	Trees (live or dead but still standing) which contain a hollow where black cockatoo breeding has been recorded or which demonstrates evidence of breeding (i.e. showing evidence of use through scratches, chew marks or feathers).
Black cockatoo potential nesting trees	Trees that have a suitable DBH to develop a nest hollow, but do not currently have hollows. Trees suitable to develop a nest hollow in the future are 300 mm DBH for wandoo, or 500 mm DBH for other tree species (e.g. jarrah or marri).
Black cockatoo suitable nest hollow	Any hollow with dimensions suitable for use for nesting by black cockatoos or assessed by a suitably experienced field ecologist based on hollow size, shape, and entry angle, irrespective of signs of use for breeding.
Black cockatoo suitable nesting tree	Trees with suitable nesting hollows present, although no evidence of use.
Foraging habitat	As in DAWE (2022), plant species known to support foraging within the range of each of the species.
Night roosting habitat	Night roosting habitat: Habitat that contains one, or a group of, known or potential roosting trees: - Known roosting tree: A tree (generally the tallest), native or introduced known to be used for night roosting or which demonstrates evidence of roosting. Usually close to an important water source and within an area of high-quality foraging habitat. During the breeding season, male black cockatoos roost in the vicinity of the nesting trees, therefore a breeding area may also be considered to be night roosting habitat. Roosting habitat is not always evident and can be discovered during surveys. - Potential roosting tree: A tall tree of any species within close proximity to water.

[1] The scientific name of the Carnaby's cockatoo has changed from *Calyptorhynchus latirostris* to *Zanda latirostris* and the Baudin's cockatoo from *Calyptorhynchus baudinii* to *Zanda baudinii*.

Term	Definition
Northern Jarrah Forest	Northern Jarrah Forest Interim Biogeographic Regionalisation for Australia[2] (IBRA) sub-region (JF01)
Offset period	20 years
On-ground management	This includes revegetation (re-establishment of native vegetation in degraded areas) and rehabilitation (repair of ecosystem processes and management of weeds, disease or feral animals). The objective of on-ground management actions is tangible improvement to environmental values in the offset area.
Post-mining rehabilitation	In relation to an area that has been disturbed, includes: (a) stabilisation of the area; and (b) restoration of the landforms of the area to a state that is as close as practicable to their original undisturbed state; and (c) the return of the native vegetation of the area to a state that is as close as practicable to its original undisturbed state.
Subject Matter Expert (SME)	A person who has accumulated great knowledge in WA's threatened species and this level of knowledge is demonstrated by the person's degree, licensure, and/or through years of professional experience with the subject.
Suitably experienced field ecologist	A person who has relevant professional qualifications and at least three (3) years of work experience designing and implementing surveys for black cockatoos using relevant protocols, standards, methods and/or literature.
Environmental Offset Document Framework	
Environmental Offset Strategy	Alcoa's overarching approach to delivering environmental offsets. It demonstrates that Alcoa can offset the environmental impacts from its operations with a high degree of confidence in a positive outcome.
Environmental Offset Program	Alcoa's suite of offset activities and measures to be developed, managed and implemented to offset environmental impacts from its operations.

[2] The Interim Biogeographic Regionalisation for Australia classifies Australia's landscapes into 89 large geographically distinct bioregions based on common climate, geology, landform, native vegetation and species information.

Term	Definition
Environmental Offset Proposal	States the environmental outcomes to be achieved through conservation actions to offset environmental impacts.
Environmental Offset Project Plan	Provide a detailed description of the conservation actions, the indicators and monitoring program to be used to measure the performance of the conservation actions towards the project targets.
Offset Area Management Plans	Provide a detailed description of the proposed offset conservation area; the area in which the environmental offset projects (conservation actions) will be implemented.
Conservation actions	As used in Alcoa's environmental offset documents, includes any activities, actions or offset measures that contribute to environmental outcomes or the ongoing viability or recovery of a species or ecosystem.

1. Context, scope and rationale

Alcoa of Australia Limited (Alcoa) has been operating in the Northern Jarrah Forest (NJF) for over 60 years with its operations approved under robust statutory processes. Alcoa are modernising its approvals framework to a more contemporary process.

1.1 Pinjarra Alumina Refinery Revised Proposal

The Pinjarra Alumina Refinery Revised Proposal (the Proposal) has been referred to the WA Environmental Protection Authority (EPA) under Part IV s38 of the *Environmental Protection Act 1986* (EP Act) (assessment number is 2253). The Huntly Bauxite Mine Transition (assessment number is 2022/09204) has been referred to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) under *the Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Myara North and Holyoke Development Envelopes are being assessed as an accredited assessment under the WA EP Act.

To support the assessment process, Alcoa has prepared an Environmental Offset Proposal (Alcoa, 2025a). The Environmental Offset Proposal outlines the significant residual impact, the proposed offset quantum to counterbalance the significant residual impact, the on-ground conservation actions to be implemented (detailed in Environmental Offset Project Plans) and the location(s) for the on-ground conservation actions to be implemented. The offset locations are referred to as Proposal Offset Conservation Areas (POCAs) and described in Offset Area Management Plan(s). The Environmental Offset document framework, provided in Figure 1-1 shows how the offset documents are organised.

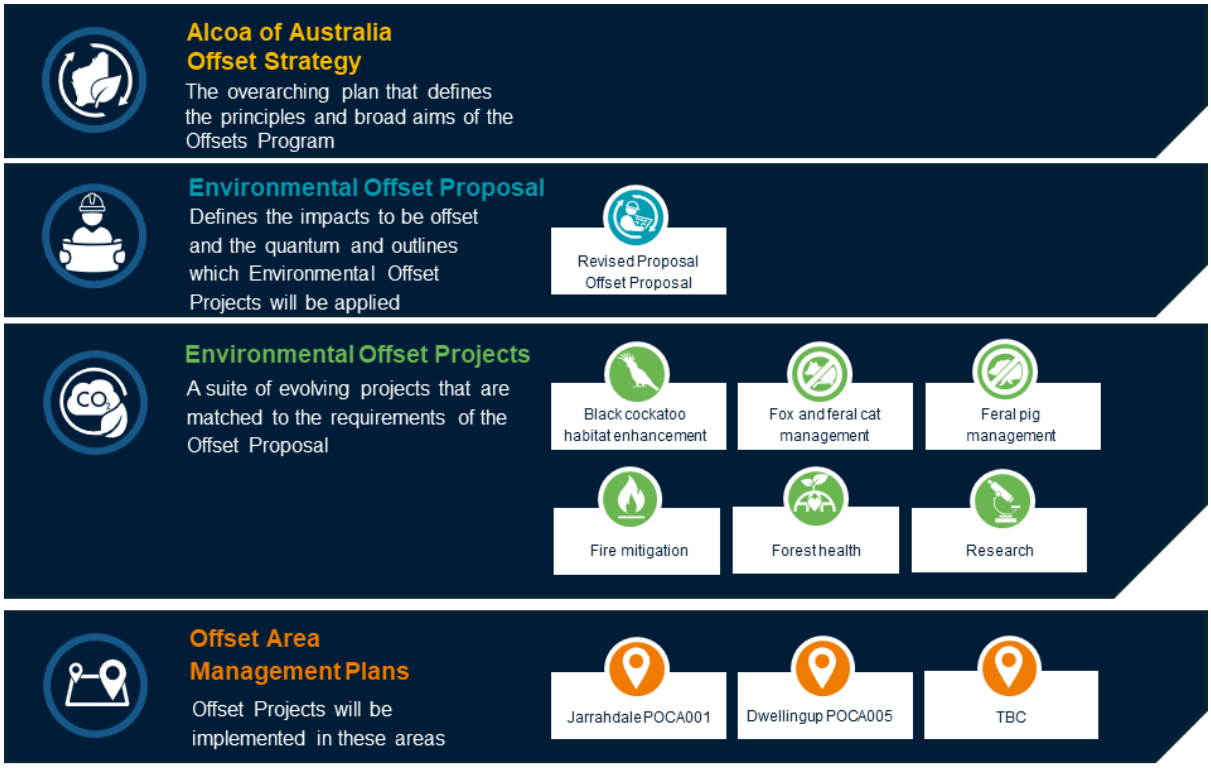


Figure 1-1: Environmental Offset Document Framework

This Offset Area Management Plan has been prepared to support the environmental approval assessment by the WA EPA and DCCEEW by demonstrating that if the Proposal is implemented, the significant residual impacts to threatened fauna species can be offset.

1.2 Background

Even after strict adherence to the mitigation hierarchy[3], clearing vegetation within State Forest may result in significant residual impacts through loss of habitat for threatened fauna species.

Under the WA environmental offset framework, environmental offsets are required to provide environmental benefits which counterbalance the significant residual environmental impacts of a proposal. In the context of the EPBC Act Environmental Offset Policy, environmental offsets are a mechanism to address significant residual impacts on nationally significant fauna, flora, habitats or places.

1.3 Purpose and scope

The purpose of this Offset Area Management Plan (the Plan) is to outline the environmental values within the POCA and spatially show areas where environmental offset projects will be implemented and monitored.

This draft Plan is limited to a draft for consultation. It has been prepared in accordance with the *Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans* (EPA 2024) the Commonwealth's Environmental Offset Policy (DSEWPC 2012a) and *Environmental Management Plan Guidelines* (DCCEEW 2024a). This draft will be finalised following consultation with the EPA, DCCEEW, Department of Biodiversity, Conservation and Attractions (DBCA), stakeholders and the public.

1.4 Proposal overview

Alcoa is proposing to increase production at the Pinjarra Refinery by 5 per cent from 5.00 Mtpa to 5.25 Mtpa; and transition the Huntly Mine, located within Mineral Lease 1SA, to the proposed Myara North and Holyoake mine regions and re-enter the O'Neil mine region, for the purpose of mining bauxite for the Pinjarra Alumina Refinery and the Kwinana Alumina Refinery[4] (the Proposal).

The Proposal is in the Peel region of WA, approximately 100 km south-east of Perth. The Proposal is located within a 23,900 hectare (ha) Mine Development Envelope (DE) and will require the clearing of up to 7,500 ha of native vegetation.

Full details of the Proposal is in the Environment Review Document (ERD) (Alcoa, 2025a). The Proposal is summarised in Table 1-1 and shown Figure 1-2.

[3] The WA Environmental Offsets Guidelines (GoWA 2014) define the mitigation hierarchy as avoid, minimise, rehabilitate and offset. The EPBC Act Environmental Offsets Policy (DSEWPC 2012) defines the offsets mitigation hierarchy as avoid, mitigate and offset.
[4] The Kwinana Refinery was curtailed in 2024 but will reopen within the lifespan of this Proposal subject to market conditions.

Table 1-1: Proposal Details

Item	Details
Proponent	Alcoa of Australia Limited
Proposal Name and Assessment Number EPA Referral	**Pinjarra Alumina Refinery Revised Proposal** Referred February 2020 under Part IV of the EP Act Assessment number 2253 Assessed as a Public Environmental Review (10 weeks)
Proposal Name Proposal Name and Assessment Number EPBC Referral	**Huntly Bauxite Mine Transition** Referred July 2022 under the EPBC Act EPBC number 2022/09204 Myara North and Holyoake elements of the Proposal are being assessed as a Controlled Action under an Accredited Assessment with the Western Australian Government.
Region	Peel
Project Description	Alcoa of Australia Limited is proposing to increase production at the Pinjarra Alumina Refinery by 5 per cent from 5.0 million tonnes per annum (Mtpa) to 5.25 Mtpa and transition the Huntly Bauxite mine to the proposed Myara North and Holyoake mine regions and re-enter the O'Neil mine region (the Proposal). The Proposal is in the Peel region of Western Australia (WA), approximately 100 km south-east of Perth. The Proposal is within a 23,900 hectare (ha) Mine Development Envelope and will require the clearing of up to 7,500 ha of native vegetation.

1.5 Summary of the Significant Residual Impacts

Under the WA Environmental Offsets Guidelines (GoWA 2014) the term significant residual impact (SRI) is used to describe significant impacts to conservation significant species that remain following application of avoidance and mitigation measures and consideration of rehabilitation of areas not required for permanent infrastructure.

Under the *Environment Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy (DSEWPC 2012a) the term "residual significant impacts" (RSI) is used to identify significant impacts on a matter protected (MNES) under national environment law (the EPBC Act) that remain following avoidance and mitigation measures, where a significant impact is an impact which is important, notable, or of consequence, having regard to its context or intensity (DotE 2013). The term significant residual significant impact (SRI) will be used in this document but is to be taken to have the same meaning as residual significant impact (RSI).

The ERD (Alcoa, 2025b) identified environmental offsets should be proposed for significant residual impacts[5] to environmental values as follows.

- 6,572 ha of habitat for forest red-tailed black cockatoo
- 6,591 ha of habitat for Baudin's cockatoo
- 5,843 ha of habitat for Carnaby's cockatoo
- 3,783 ha of habitat for woylies
- 5,282 ha of habitat for chuditch
- 883 ha of habitat for quokkas

The POCA contains habitats for all the above listed threatened species.

[5] These significant residual impacts are based on application of the EPBC Act offset assessment guide.

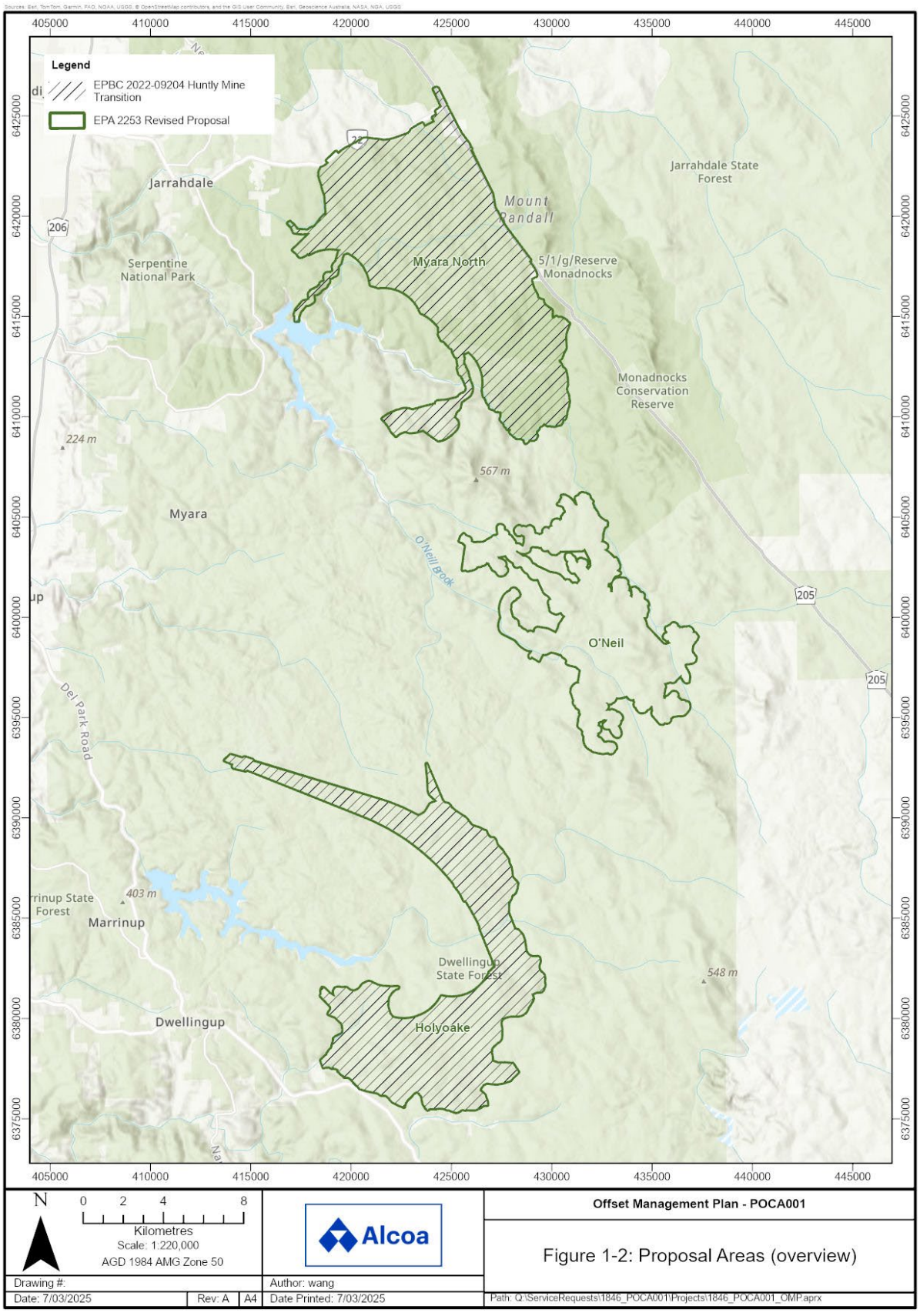


Figure 1-2: Proposal Areas (overview)

2. Proposed Offset Conservation Area

In 2023 Alcoa removed a significant portion from the Myara North Development Envelope (an area proposed for mining under Alcoa's Revised Proposal referred in 2020). This area is referred to as the Jarrahdale Mining Avoidance Zone (MAZ). The 3,700 hectare Jarrahdale MAZ avoided likely impacts to flora and vegetation, terrestrial fauna, inland waters and social surroundings.

The POCA discussed in this Plan has been based on Alcoa's Jarrahdale MAZ, as it has habitat for black cockatoos, chuditch, woylie and quokka.

2.1 Identification

Weerheim (2008) states the identification of key habitat areas is an important step in conservation planning. As part of technical studies completed for the Revised Proposal environmental impact assessment, the northern portion of the Myara North mining region was identified to have populations of quokka and breeding habitat for black cockatoos.

The Jarrahdale MAZ is likely to be a suitable as an offset conservation area. Alcoa has committed to not mining in the MAZ. The MAZ is in the same IBRA subregion, is State Forest, adjoins the Serpentine National Park and has jarrah-marri forest in Good to Very Good condition. The POCA also adjoins areas of Alcoa's Jarrahdale mine post-mining rehabilitation.

The POCA is close to the impact area and thus may provide opportunities for refuge for species moving outside of the mining footprint. As the area has threatening processes, conservation actions can help to improve the habitat for threatened species as they move into the area. Threats include proximity to urban areas, feral predators and climate change.

The POCA is near the Jarrahdale township, providing opportunities for the local community to be involved in conservation actions and to benefit from additional management of the forest. Proximity to townsites is likely to provide cost efficiencies in implementing conservation actions.

Given the high environmental values, proximity to the impacts and Alcoa's commitment not to conduct mining in the area, Alcoa consider this to be suitable as an offset conservation area.

2.2 Location

The POCA is in the Shire of Serpentine-Jarrahdale, approximately 500 m east of the Jarrahdale township and around 50 km south-east of Perth. The north-eastern corner of the POCA is around the intersection of Jarrahdale Road and Kingsbury Drive, extending out towards Frollett Road. Further east the POCA has two smaller areas along Jarrahdale Road, out towards the Albany Highway. The location of the POCA is in Figure 2-1.

The POCA is within the government Perth Hills district; and the government defined forest blocks Mundlimup, Serpentine and Chandler. The POCA is within the Regional Forest Agreement area (DBCA-081), the 2024-2033 Forest Management Plan planning area

(DBCA-080), the Northern Jarrah Forest IBRA subregion and Alcoa's mineral lease area (ML1SA).

2.3 Description

The Jarrahdale MAZ overlays land tenure that represent a potential constraint to an environmental offset. Areas of land tenure including private properties[6], main roads and the Serpentine Pipehead reservoir protection zone (RPZ) have been excluded from the spatial area used to define the POCA. Thus, the POCA is spatially limited to areas of State Forest and/or Alcoa freehold land.

The POCA is 2,715 hectares, approximately 2,647 hectares of which is State Forest (DBCA-011). The POCA has been separated into four subareas for ease of spatial mapping. Jarrahdale 1a, is 2,078 hectares, and surrounds private properties. Jarrahdale 1a is generally bound by Jarrahdale Road to the north, Kingsbury Drive to the west, the Myara North Development Envelope to the south and east. Jarrahdale 1b is 281 hectares and generally bound by Kingsbury Drive to the east, the Serpentine National Park and Reservoir Protection Zone to the west, Scarp Road to the north and the Myara North Development Envelope to the south, Jarrahdale 2 is 168 hectares and Jarrahdale 3 is 186 hectares, bound by Jarrahdale Road to the south and Alcoa's Jarrahdale mine post-mining rehabilitation areas.

The POCA is mapped by DPIRD as containing mostly native vegetation (97 per cent) (DPIRD-005). Mattiske (2021) mapped vegetated areas within the POCA as predominantly jarrah-marri forest in Good to Very Good condition. Government access roads and tracks criss-cross the area and account for the remaining 3 per cent of the POCA.

The POCA contains small streams (mapped by Alcoa) and waterways mapped by Department of Water and Environmental Regulation (DWER) including a minor, unnamed non-perennial significant stream (DWER-031). Wungong Brook (a minor river, DWER-031) runs along the western boundary of the Jarrahdale 3 area and a non-perennial tributary of Wungong Brook (DWER-031) runs along the western boundary of the Jarrahdale 2 area. The POCA lies to the east of the Serpentine Pipehead Catchment area.

Private landholdings within the Jarrahdale MAZ, have been excluded from the POCA, except for the 6.6 hectare private property owned freehold by Alcoa. This Alcoa land parcel is largely cleared, contains a residence and farm buildings. The private properties excluded from the POCA are either cleared and contain residences, farm buildings and farm dams and appear to be used for orchards or market gardens; or are partially or largely vegetated.

The layout of the POCA is in Figure 2-2.

[6] With the exception of the private property owned freehold by Alcoa.

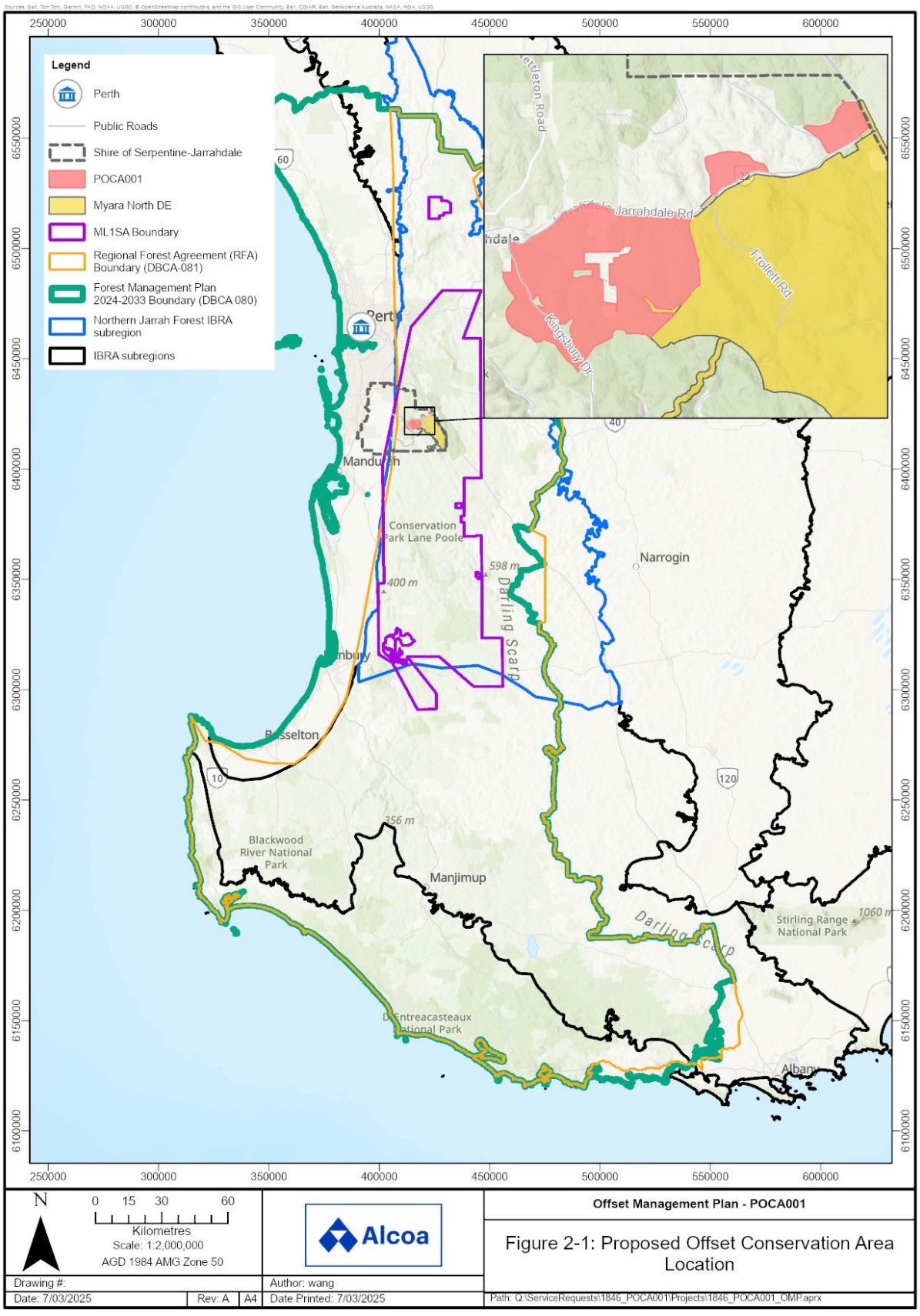


Figure 2-1: Proposed Offset Conservation Area Location

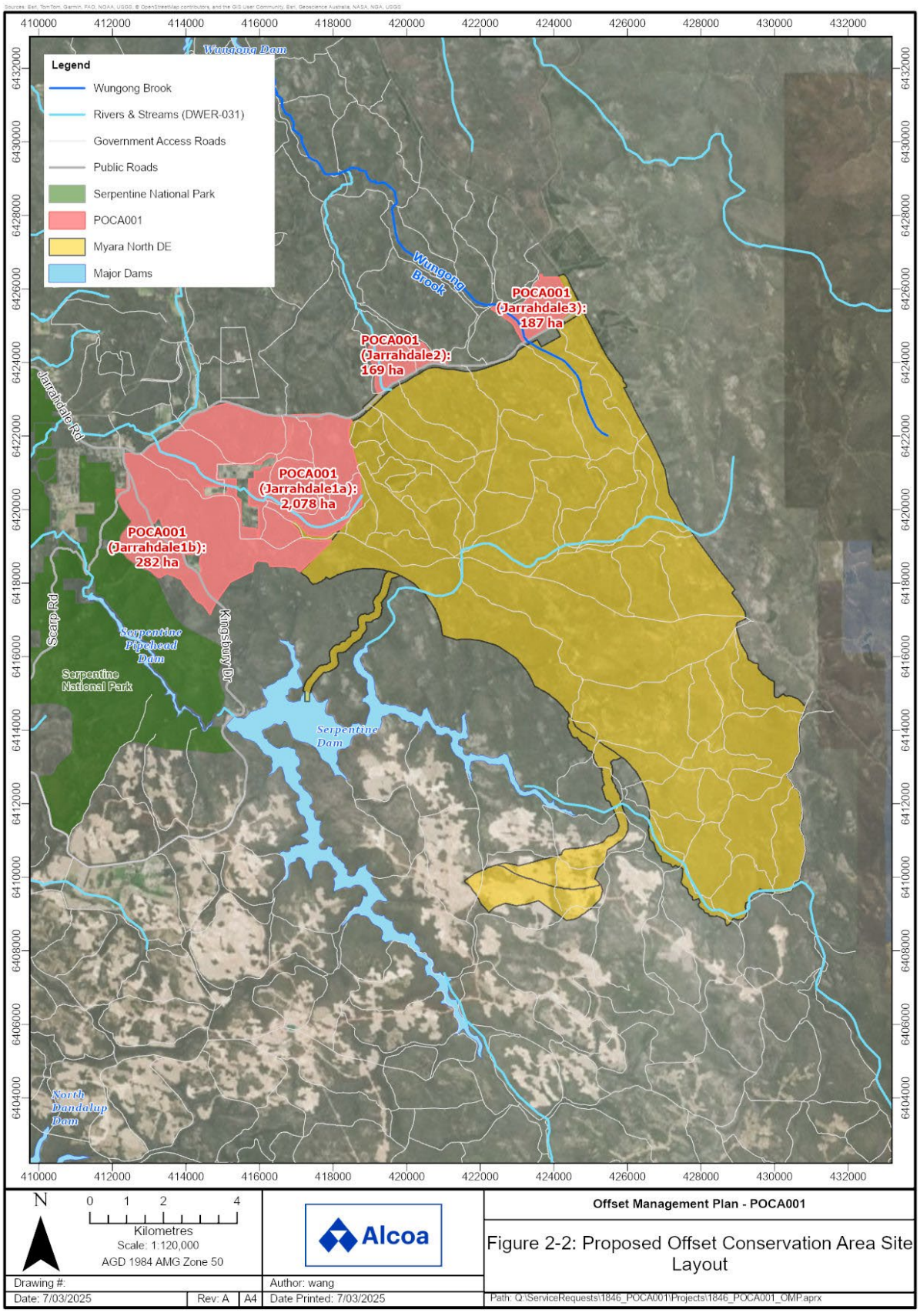


Figure 2-2: Proposed Offset Conservation Area Site Layout

2.4 Land tenure and conservation areas

The POCA consists of Crown Land, vested to the Conservation and Parks Commission to be managed by the DBCA (DBCA-011); and a 6.6 hectare land parcel owned freehold by Alcoa.

The Crown Land legislated purpose is “State Forest”, classified under Section 5(1)(a) of the *Conservation and Land Management Act 1984* (WA) (DBCA-011). State Forests have various functions including timber harvesting, water catchment protection areas and public recreation areas. Native timber harvesting within the Forest Management Planning area ceased from 1 January 2024.

The POCA is within Alcoa’s mineral lease (ML1SA), granted under the *Alumina Refinery Agreement Act 1961*, and gives Alcoa exclusive rights to extract bauxite from within the lease area.

2.5 Environmental values

The indicative environmental values of the POCA have been obtained through desktop analysis, DBCA records and on-ground field flora, vegetation and fauna survey data. Alcoa has a high level of confidence the PCOA contains the environmental values to be offset Alcoa intend to conduct a comprehensive baseline survey to confirm the status and condition of the fauna habitat and species populations in 2025.

2.6 Flora

Alcoa obtained a report from the DCCEEW Protected Matters Search Tool (PMST) (DCCEEW 2024b). A 1 km buffer was applied to the POCA. The report is in Appendix A. The PMST report indicates the POCA may contain flora species and/or their habitat as follows:

- Star Sun-orchid (*Thelymitra stellata*) - may occur within area
- Wing-fruited Lasiopetalum (*Lasiopetalum pterocarpum*) - known to occur within area
- Purdie's Donkey-orchid (*Diuris purdiei*) - likely to occur within area
- Slender Tailflower (*Anthocercis gracilis*) - may occur within area
- Dwarf Bee-orchid (*Diuris micrantha*) - likely to occur within area
- Southern Tetraria (*Morelotia australiensis*) - may occur within area.

Star Sun-orchid, Wing-fruited *Lasiopetalum* and Purdie's Donkey-orchid are listed as Endangered; Slender Tailflower, Dwarf Bee-orchid and Southern *Tetraria* are listed as Vulnerable under the EPBC Act.

Results from the DBCA threatened and priority flora search request (obtained June 2024) contained records for flora species classified as threatened or priority (P1 to P4) flora under the BC Act. No threatened flora has been recorded within, or within 1 km, of the POCA. Five records of the Priority 1 listed flora species Slender-Leafed Duck Orchid (*Paracaleana gracilicordata*) have been mapped in the eastern portion of Jarrahdale 1a. One record of the Prioirty 2 listed flora species *Grevillea ornithopoda* has been recorded in the northern portion of Jarrahdale 1a. Four records of Priority 3 and/or 4 listed flora species occur within Jarrahdale 1a and 1b.

Approximately 39 per cent (1,087 hectares) of the POCA was surveyed by Mattiske (2021). Mattiske found the most abundant flora species within the areas surveyed as *Eucalyptus marginata* (jarrah), *Corymbia calophylla* (marri) and *Allocasuarina fraseriana*, *Banksia grandis*, *Lasiopetalum floribundum*, *Adenanthos barbiger* and *Xanthorrhoea preissii*. No flora species listed as threatened under the EPBC Act or BC Act were identified. No flora species listed as Priority 1 or 2 under the BC Act were identified. *Acacia drummondii* subsp. *affinis* (listed as Priority 3 under the BC Act) were identified across the survey area.

The Mattiske (2021) flora and vegetation survey report is in Appendix B. The survey area and flora species identified by Mattiske (2021) is in Figure 2-3.

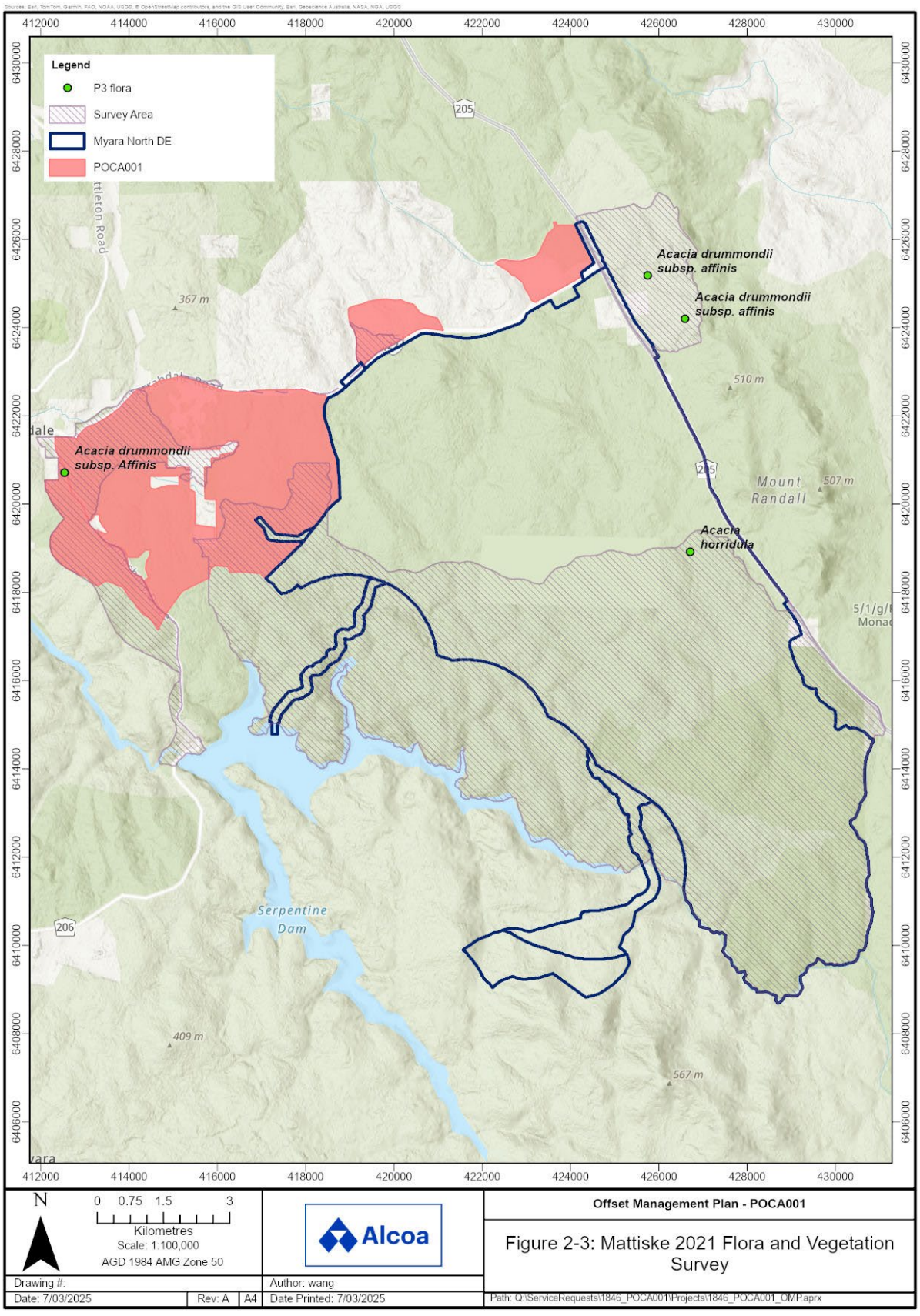


Figure 2-3: Mattiske 2021 Flora and Vegetation Survey

2.7 Vegetation

The PMST report (DCCEEW 2024b) indicates Banksia Woodlands of the Swan Coastal Plain ecological community, listed as Endangered under the EPBC Act, may occur within the 1 km buffer area.

Results from the DBCA threatened and priority ecological communities search request (obtained June 2024) indicates approximately 78 hectares of the Priority 2 listed Litter-dependant invertebrate community has been mapped in Jarrahdale 3. Approximately 2.7 hectares of Priority 3 Granite communities of the Northern Jarrah Forest has been mapped around 25 meters north of the Jarrahdale 1a northern boundary.

The Department of Primary Industries and Regional Development (DPIRD-005) native vegetation mapping shows 2,681 hectares (or 97 per cent) of the POCA is mapped as native vegetation. The dataset indicates 10 per cent (273 hectares) is regrowth above 20 per cent cover and 90 per cent (2,408 hectares) is remnant vegetation.

The pre-European vegetation dataset (DPIRD-006) maps original natural vegetation presumed to have existed prior to European settlement in Western Australia. The Northern Jarrah Forest is mapped as comprising 44 vegetation associations. The POCA is covered by vegetation association 3 - Medium forest, jarrah-marri (DPIRD-006). Vegetation association 3 is widespread across the Northern Jarrah Forest subregion, with the pre-European extent comprising approximately 48 per cent of the subregion. Approximately 80 per cent of the pre- European vegetation extent remains, with approximately 15 per cent of the current extent protected for conservation (Alcoa, 2025b).

The Department of Conservation and Environment [DEC] (1980) defined and described the dominant pre-European vegetation of the Darling System in a series of vegetation complexes, which was updated by Mattiske and Havel (1998) as part of a biodiversity assessment to inform the Regional Forest Agreement. The vegetation complexes provide more detailed definition of vegetation types over the Northern Jarrah Forest subregion than the state-wide mapping of vegetation associations (DBCA-047). DBCA-047 indicates the POCA is predominantly covered by Dwellingup complexes (D1 and D2) (~58 per cent) on the uplands and Yarragil (Y1 and Y2) and Murray (M1) complexes (~32 per cent) on the slopes and valley floors. The remaining area is covered by Goonaping (~8 per cent) and Swamp (~2 per cent) complexes. All vegetation complexes have at least 75 per cent remaining (Alcoa 2023a).

The DBCA (2024) defined old-growth forest as “ecologically mature forest where the effects of unnatural disturbance are now negligible”. Areas of old-growth forest were mapped for the Regional Forest Agreement. According to the DBCA old growth forest dataset (unpublished dataset obtained from the DBCA), there is no old growth forest in the POCA. Mattiske (2021) did not identify any old growth forest during the field surveys.

The timber harvesting dataset (unpublished dataset obtained from the DBCA) indicates around 27 per cent (732 hectares) of the POCA contains mature forest (harvested before 1949), 63 per cent (1,707 hectares) is immature forest (harvested between 1950 and 1999) and 9 per cent (241 hectares) is the establishment to juvenile (harvested 2000 - 2019) phase. The dataset indicates an area of approximately 19 hectares (1 per cent) in the southern portion of Jarrahdale 1a has no record of harvesting, however this is also mapped as containing dieback (unpublished dataset obtained from the DBCA) and being burnt in

2023 (DBCA-060). This means the area may not meet the definition of old-growth forest. Nevertheless, Alcoa will assess vegetation against DBCA's FEM075 *Procedures for the assessment, identification and demarcation of old-growth forest 2017* (DPaW 2017) (or as revised) as part of the baseline survey (see section 4.1). Approximately 19 hectares of the POCA is unmapped for timber harvesting.

Mattiske (2021) mapped[7] 27 distinct vegetation units within the POCA based on Havel vegetation mapping[8]. Most of the survey area (41.4 per cent) within the POCA was mapped as the following vegetation units:

- **S** (Open Forest of *Eucalyptus marginata Banksia grandis – Allocasuarina fraseriana* with scattered understorey, including *Adenanthos barbiger*, *Leucopogon capitellatus* and *Styphelia tenuiflora* on gravels and sandy-gravels) – 24.5 per cent (664.3 hectares)
- **SP** (Open Forest of *Allocasuarina fraseriana*, *Eucalyptus marginata, Corymbia calophylla, Banksia grandis* with scattered understorey, including *Adenanthos barbiger*, *Grevillea wilsonii* and *Leucopogon capitellatus* on sandy-gravels to gravelly soils) – 8.6 per cent (232.9 hectares)
- **Rehab** (Rehabilitation areas) – 8.3 per cent (225.8 hectares).

Of the vegetation surveyed by Mattiske (2021), 64 hectares (6 per cent) was in Very Good to Excellent condition, 434 hectares (41 per cent) was recorded in Very Good condition, 548 hectares (52 per cent) was recorded as Good condition and 12 hectares (1 per cent) was Completely Degraded. The vegetation mapping is in Table 2-2, Figure 2-4 and Figure 2-5.

The POCA is outside the Forest Disease Risk area (DBCA-024). Glevan (2021) indicates approximately 20 per cent of the POCA is dieback free, 46 per cent is mapped as dieback infested, 3 per cent is uninterpretable and the remaining 32 per cent has not been mapped. The dieback mapping is in Figure 2-6.

The DBCA fire history dataset (DBCA-060) illustrates that portions of the POCA were subject to a spring prescribed burn in 1991, a spring prescribed burn in 2011, a winter prescribed burn in 2017 and a spring prescribed burn in 2021. Most of the POCA has been burnt within the last 5 years. Recent fire mapping is in Figure 2-7.

[7] Mattiske (2021) includes any flora recorded by E. Mattiske and Associates and Mattiske Consulting Pty Ltd (1991-2020) within or adjacent to the survey areas; and historical documentation and vegetation mapping of the Northern Jarrah Forest subregion including E.M. Mattiske and Associates 1991 to 1993 and Mattiske Consulting Pty Ltd (1994 and 2019) reports on flora and vegetation surveys in the Mayra North survey area.
[8] Site-type classification based on Heddle, E.M., Havel, J.J., and Loneragan, O.W., 1980, *Vegetation Complexes of the Darling System, Western Australia*. In: Department of Conservation and Environment (1980) Atlas of Natural Resources Darling System, Western Australia. Department of Conservation and Environment, Perth, 1980.

Table 2-1: Vegetation complexes within the POCA

Vegetation Complex	Description (DBCA-047)	Pre-European Extent (ha)	Current Extent (ha)[9]	Percentage (%) of Pre-European Extent Remaining	Percentage (%) of Current Extent Protected for Conservation	Extent in the POCA (ha)
Dwellingup (D1)	Open forest of *E. marginata* subsp. *marginata-C. calophylla* on lateritic uplands in mainly humid and subhumid zones.	208,491	181,039	86.8	6.7	552.3
Dwellingup (D2)	Open forest of *E. marginata* subsp. *marginata-C. calophylla* on lateritic uplands in subhumid and semiarid zones.	86,128	71,056	82.5	19.4	1,027.5
Goonaping (G)	Mosaic of open forest of *E. marginata* subsp. *marginata* (humid zones) and *E. marginata* subsp. *thalassica* (semiarid to perarid zones) on the sandy-gravels, low woodland of *Banksia attenuata* on the drier sandier sites (humid to perarid zones) with some *Banksia menziesii* (northern arid and perarid zones) and low open woodland of *Melaleuca preissiana-Banksia littoralis* on the moister sandy soils (humid to perarid zones).	27,467	21,835	79.5	50.6	208
Murray 1 (My1)	Open forest of *E. marginata* subsp. *marginata-C. calophylla-E.* patens on valley slopes to woodland of *E. rudis-Melaleuca rhaphiophylla* on the valley floors in humid and subhumid zones.	68,695	52,296	76.1	15.2	12.8
Swamp (S)	Mosaic of low open woodland of *Melaleuca preissiana-Banksia littoralis,* closed scrub of *Myrtaceae* spp., closed heath of *Myrtaceae* spp. and sedgelands of *Baumea* and *Leptocarpus* spp. on seasonally wet or moist sand, peat and clay soils on valley floors in all climatic zones.	53,658	40,613	75.7	21.8	67.6

[9] GoWA, 2019c

Vegetation Complex	Description (DBCA-047)	Pre-European Extent (ha)	Current Extent (ha)[9]	Percentage (%) of Pre-European Extent Remaining	Percentage (%) of Current Extent Protected for Conservation	Extent in the POCA (ha)
Yarragil 1 (Yg1)	Open forest of *E. marginata* subsp. *marginata-C. calophylla* on slopes with mixtures of *E. patens* and *E. megacarpa* on the valley floors in humid and subhumid zones.	80,203	64,927	81.0	8.9	4.5
Yarragil (Yg2)	Open forest of *E. marginata* subsp. *thalassica-C.* calophylla on slopes, woodland of *E. patens-E. rudis* with *Hakea prostrata* and *Melaleuca viminea* on valley floors in subhumid and semiarid zones.	50,259	46,475	92.5	10.5	842.3

Table 2-2: Vegetation Mapping

Vegetation Unit Code	Vegetation Description (Mattiske, 2021)	Area (ha)	Per cent of survey area
S	Open Forest of *Eucalyptus marginata Banksia grandis – Allocasuarina fraseriana* with scattered understorey, including *Adenanthos barbiger, Leucopogon capitellatus* and *Styphelia tenuiflora* on gravels and sandy-gravels	664.3	24.5%
SP	Open Forest of *Allocasuarina fraseriana Eucalyptus marginata Corymbia calophylla Banksia grandis* with scattered understorey, including *Adenanthos barbiger, Grevillea wilsonii* and *Leucopogon capitellatus* on sandy-gravels to gravelly soils	232.9	8.6%
Rehab	Rehabilitation Areas	225.8	8.3%
PS	Open Forest of *Allocasuarina fraseriana Eucalyptus marginata Corymbia calophylla Banksia grandis* with scattered understorey, including *Adenanthos barbiger, Leucopogon capitellatus* on gravels and sandy gravels	214.9	7.9%
SW	Open Forest of *Eucalyptus marginata Corymbia calophylla – Banksia grandis* with scattered understorey, including *Adenanthos barbiger, Hypocalymma angustifolium* and *Styphelia tenuiflora* on seasonally moister sandy-gravelly soils	192.1	7.1%
ST	Open Forest of *Eucalyptus marginata Corymbia calophylla* with scattered understorey, including *Leucopogon capitellatus, Leucopogon verticillatus, Pteridium esculentum, Lasiopetalum floribundum* and *Styphelia tenuiflora* on sandy-gravelly soils	188.8	7.0%
TS	Open Forest of *Eucalyptus marginata Corymbia calophylla – Banksia grandis* with scattered understorey, including *Leucopogon verticillatus, Pteridium esculentum, Clematis pubescens and Bossiaea aquifolium* subsp. *aquifolium* on sandy-loam	158.9	5.9%
P	Open Forest of *Allocasuarina fraseriana Eucalyptus marginata Corymbia calophylla Banksia grandis* with scattered understorey, including *Adenanthos barbiger, Leucopogon nutans, Grevillea wilsonii, Leucopogon capitellatus* on sandy gravels	150.5	5.5%
D	Open Forest of *Eucalyptus marginata Corymbia calophylla – Hakea prostrata* on lower slopes with mixed low understorey species, including *Babingtonia*	130.1	4.8%

Vegetation Unit Code	Vegetation Description (Mattiske, 2021)	Area (ha)	Per cent of survey area
	camphorosmae and *Acacia extensa* on clay loams to gravelly clay-loams		
PW	Open Forest of *Allocasuarina fraseriana* *Eucalyptus marginata* *Corymbia calophylla* with scattered understorey, including *Grevillea wilsonii, Adenanthos barbiger, Babingtonia camphorosmae* and *Hypocalymma angustifolium* on sandy gravels	127.2	4.7%
AC	Open Woodland of *Eucalyptus rudis – Melaleuca preissiana - Eucalyptus patens* *Banksia littoralis* with dense *Taxandria linearifolia* and *Astartea scoparia* in understorey on broad swamps and water courses	101.3	3.7%
CW	Woodland to Open Forest of *Eucalyptus patens – Eucalyptus megacarpa* *Corymbia calophylla* *Banksia littoralis* with dense *Taxandria linearifolia* and *Astartea scoparia* in understorey on creek lines and water courses	77.2	2.8%
W	Open Forest of *Eucalyptus megacarpa* *Eucalyptus patens – Corymbia calophylla* on lower slopes with mixed low understorey species, including *Acacia extensa* and *Hypocalymma angustifolium* on seasonally moister sandy-loam gravelly soils	65.8	2.4%
T	Open Forest of *Eucalyptus marginata* *Corymbia calophylla* with scattered understorey, including *Leucopogon verticillatus, Pteridium esculentum, Clematis pubescens* and *Bossiaea aquifolium* subsp. *aquifolium* on sandy-loam gravelly soils	38.5	1.4%
C	Woodland to Open Forest of *Eucalyptus patens – Corymbia calophylla - Banksia littoralis* with dense *Taxandria linearifolia* and *Astartea scoparia* in understorey on creek-lines and water-courses.	29.4	1.1%
CL_Other	Cleared Other	26.6	1.0%
AD	Open Woodland of *Melaleuca preissiana, Banksia littoralis* and *Hakea porostrata* over mixed low understorey species, including *Babingtonia camphorosmae* and *Hypocalymma angustifolium* on clay loams to gravelly clay-loams	23.3	0.9%
AW/CW	Localised patchy mosaic of AW and CW	15	0.5%
R	Open Woodland of *Eucalyptus marginata* *Corymbia calophylla* on fringes of granite outcrops or shallow	13.8	0.5%

Vegetation Unit Code	Vegetation Description (Mattiske, 2021)	Area (ha)	Per cent of survey area
	soils over mixed understorey species reflecting shallow soils over granite		
E	Open woodland of *Eucalyptus marginata* and *Corymbia calophylla* over *Mesomelaena tetragona, Kingia australis, Leptospermum erubescens* and *Babingtonia camphorosmae* on sandy to sandy-loam soils on slopes	9.7	0.4%
AW	Low open woodland of *Eucalyptus patens* and *Melaleuca preissiana* over *Banksia littoralis*, *Hakea prostrata* and *Taxandria linearifolia* over low shrubs and herbs on leached sands over sandy-gravel on lower slopes.	7.2	0.3%
PT	Open Forest of *Allocasuarina fraseriana - Eucalyptus marginata - Corymbia calophylla - Banksia grandis* with scattered understorey, including *Adenanthos barbiger, Leucopogon verticillatus, Pteridium esculentum and Bossiaea aquifolium* subsp. *aquifolium* on sandy-loam gravels.	7.1	0.3%
G	Mosaic of Open Woodland of *Eucalyptus margnata – Corymbia calophylla* on the fringes of outcrops ranging to open heath communities of *Proteaceae-Myrtaceae* species and lithic complexes on the outcrop areas	4.9	0.2%
DA	Open Forest of *Eucalyptus marginata -Corymbia calophylla – Eucalyptus patens - Alllocasuarina fraseriana - Hakea prostrata* and *Xylomelum occidentale* on lower slopes with patches of *Melaleuca preissiana*, *Banksia littoralis* over mixed low understorey species, including *Babingtonia camphorosmae* and *Astartea scoparia* on clay loams to gravelly clay-loams	2.7	0.1%
PL	Plantation	1.5	0.1%
A	Tall shrubland of mixed *Melaleuca* spp., *Taxandria linearifolia, Hypocalymma angustifolium, Pericalymma ellipticum* with emergent *Melaleuca preissiana* on clay-loams in seasonally wet valley floors	1.2	0%
RG	Localised patchy mosaic of R and G site-vegetation types	0.6	0%
	Total	2,711.5[10]	100%

[10] The total reflects the calculations based on four decimal places. The data in this table has been rounded for ease of reading. The small discrepancy will not affect the overall assessment of the POCA.

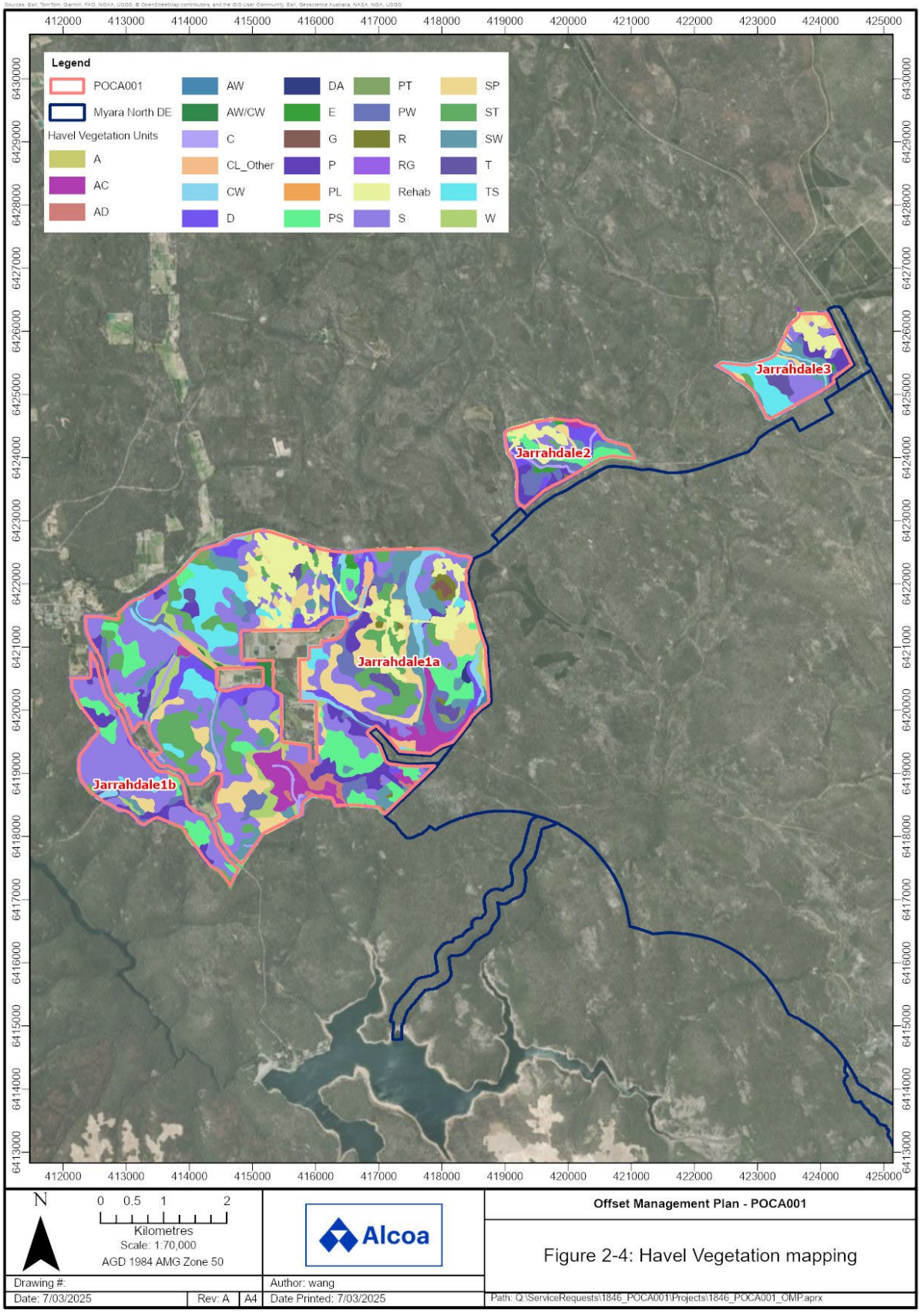


Figure 2-4: Havel Vegetation mapping

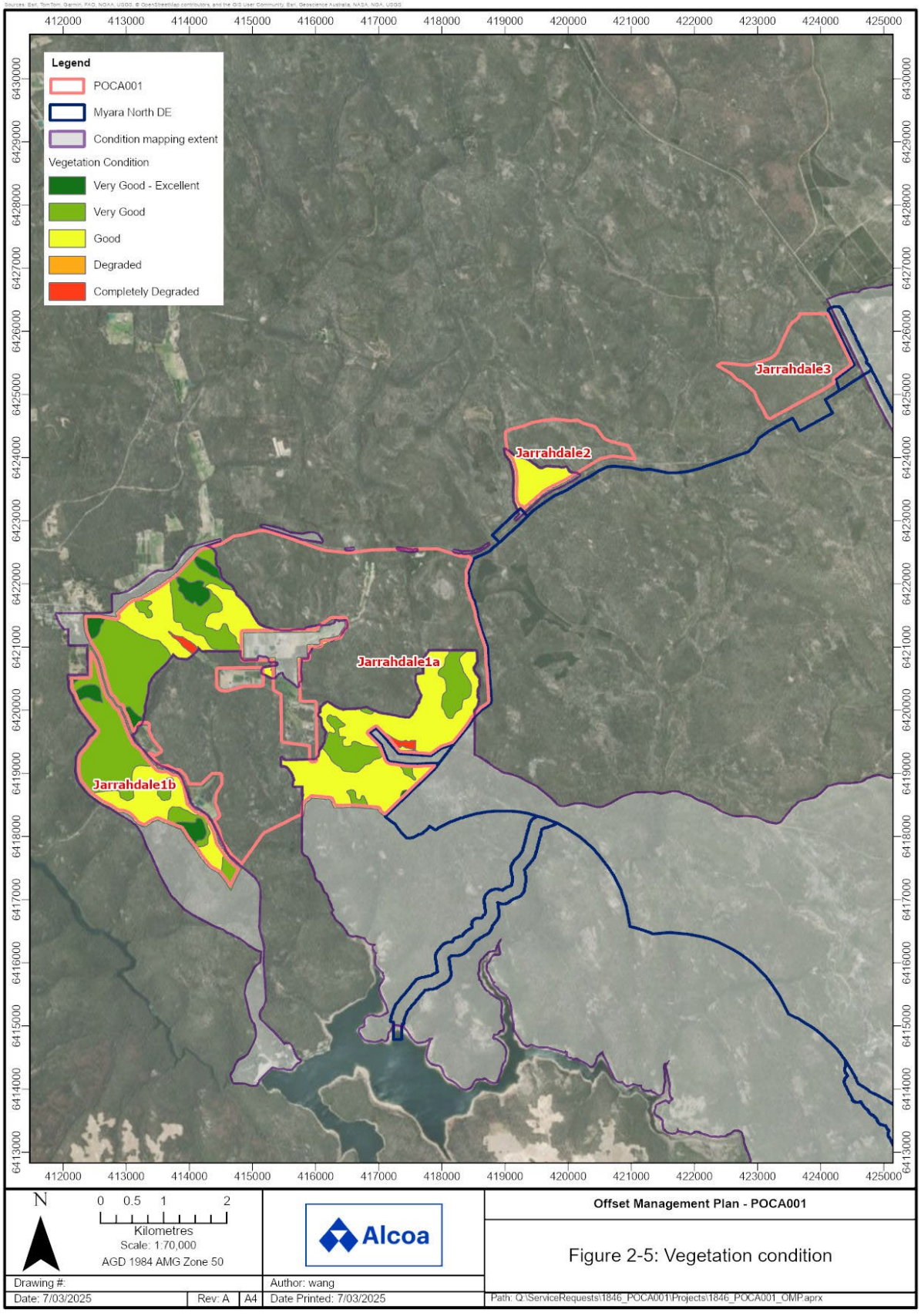


Figure 2-5: Vegetation condition

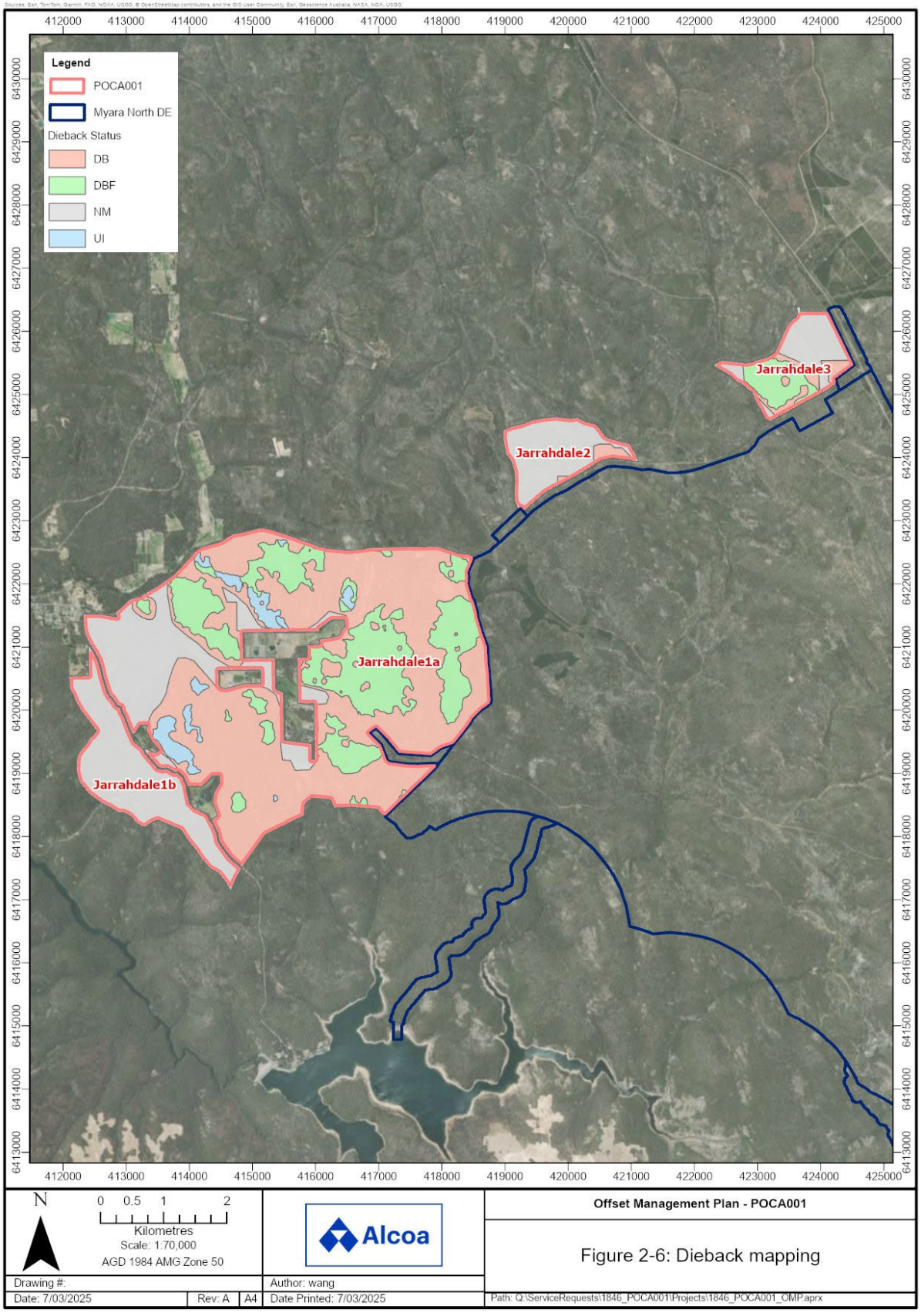


Figure 2-6: Dieback mapping

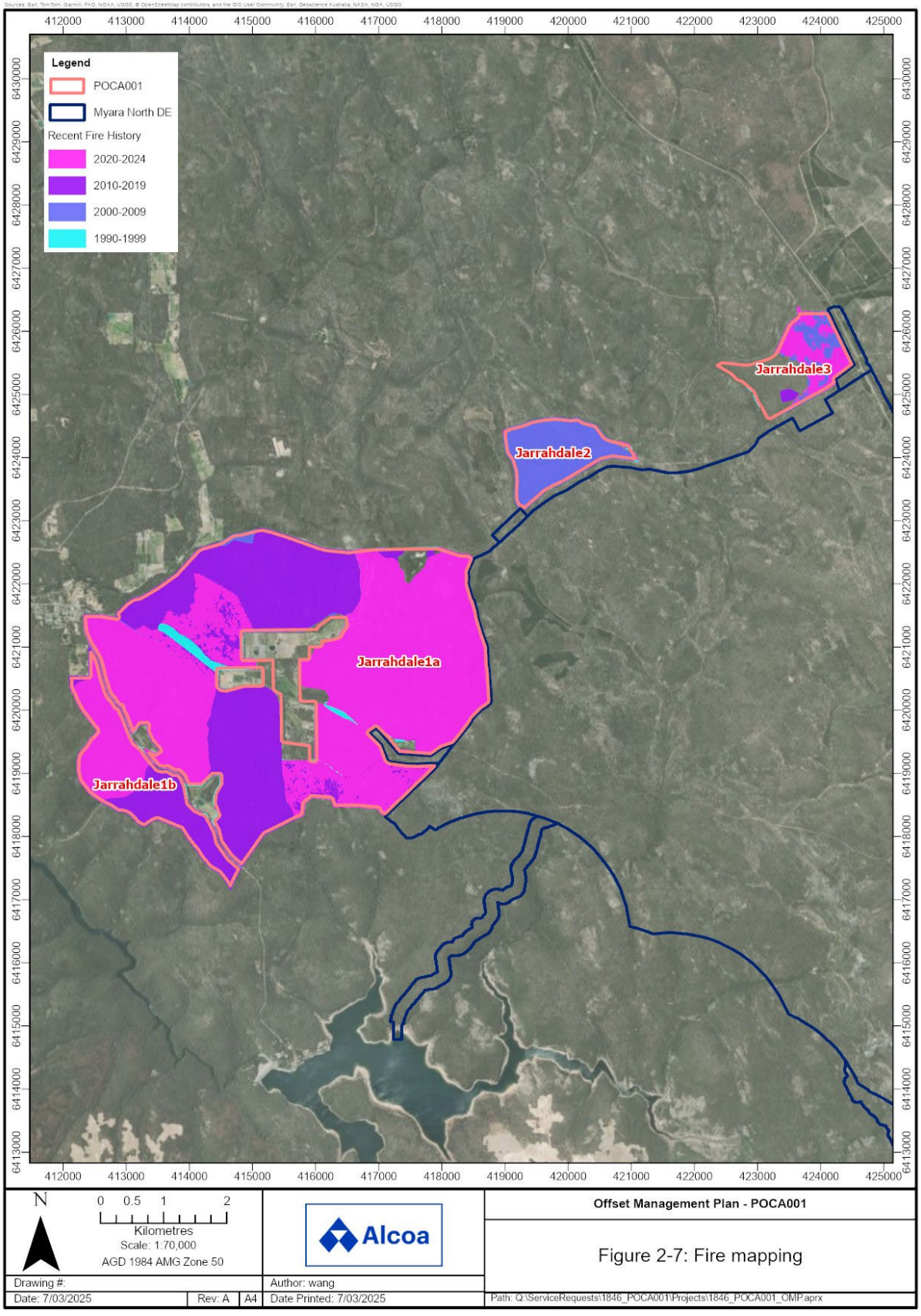


Figure 2-7: Fire mapping

2.8 Fauna

2.8.1 Protect Matters Search Tool

The PMST report (DCCEEW 2024b) indicates the POCA may contain fauna species and/or their habitat as follows:

Species listed as Critically Endangered under the EPBC Act

- Eastern Curlew (*Numenius madagascariensis*) - may occur within the area
- Curlew Sandpiper (*Calidris ferruginea*) - may occur within the area
- Western Ringtail Possum (*Pseudocheirus occidentalis*) - may occur within the area

Species listed as Endangered under the EPBC Act

- Australian Painted Snipe (*Rostratula australis*) - likely to occur within the area
- Baudin's Cockatoo (*Zanda baudinii*) – roosting is known to occur within the area
- Carnaby's Black Cockatoo (*Zanda latirostris*) - known to occur within the area
- Woylie (*Bettongia penicillata ogilbyi*) - may occur within the area
- Numbat (*Myrmecobius fasciatus*) - known to occur within the area

Species listed as Vulnerable under the EPBC Act

- Malleefowl (*Leipoa ocellata*) - likely to occur within the area
- Southern Whiteface (*Aphelocephala leucopsis*) - may occur within the area
- Forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*) –known to occur within the area
- Sharp-tailed Sandpiper (*Calidris acuminata*) - may occur within the area
- Quokka (*Setonix brachyurus*) - known to occur within the area
- Chuditch (*Dasyurus geoffroii*) - known to occur within the area
- Carter's Freshwater Mussel (*Westralunio carteri*) - known to occur within the area.

2.8.2 DBCA data

Publicly available datasets are available on https://data.wa.gov.au/. DBCA black cockatoos datasets indicate:

- A confirmed Carnaby’s cockatoo roost site (DBCA-050) is approximately 600 m to the north-west of the POCA. This places the POCA with the 6 km roosting buffer (DBCA-053), with the buffer overlapping around 50 per cent of the POCA.
- At least five black cockatoo roost sites (DBCA-064) are within 6 km of the POCA.
- The Carnaby’ cockatoo unconfirmed breeding dataset (DBCA-064) overlaps the POCA.

The DBCA threatened and priority fauna search request (obtained June 2024) contained records for fauna species classified as threatened or priority (P1 to P4) fauna under the BC Act. Species recorded within the POCA include Carnaby's cockatoo, numbat, forest red-tailed black cockatoo, quokka, chuditch, quenda, masked owl (southwest), western brush wallaby and western false pipistrelle.

The DBCA (2024) previously mapped areas across the forest landscape to be excluded from timber harvesting to a) provide a refuge for animals vulnerable to disturbance and b) provide habitat areas that fauna could reside in whilst harvested areas regenerated. These fauna habitat zones were intended to help meet the 2014-2023 Forest Management Plan (CCWA 2013) objective of ensuring that biodiversity recovers between one timber harvest and the next. Fauna habitat zones were carefully selected to include a broad range of soil and landform types like those in the existing formal conservation reserve system. This helps establish and maintain a diverse range of habitats, and several stages of growth and regeneration (DBCA 2024). Two interim[11] fauna habitat zones are mapped within the POCA. One in the eastern portion of Jarrahdale 1a and one that overlies most of Jarrahdale 2.

2.8.3 GHD Terrestrial Fauna Survey

Fauna Communities

GHD (2021) conducted detailed and targeted terrestrial fauna surveys over the Myara North Development Envelope. At the time this included the POCA. The GHD fauna survey report is in Appendix C.

GHD identified three main fauna communities:

- Granite outcrop
- Woodlands/forests
- Damplands/riparian.

The granite fauna community is present within the granite outcrop habitat type. This habitat type provides shelter and foraging for a range of reptile and frog fauna, such as the ornate crevice dragon, barking gecko, speckled stone gecko, Gould's hooded snake, southern carpet python, and black-headed monitor. Associated water courses provide seasonal breeding for locally common frog species such as quacking froglet and moaning frog.

The woodlands/forests fauna community occurs in jarrah-marri forest, bullich forest, blackbutt forest and flooded gum woodland habitat types. The woodland and forest habitat provides habitat for a range of species including birds (including black cockatoos) and mammals (including chuditch, brush-tailed phascogale and western brush wallaby).

The damplands/riparian fauna community occur in the low dense understory and near creek lines present in the majority of fauna habitat types (bullich forest, blackbutt forest, flooded

[11] According to the Guidelines for the Selection of Fauna Habitat Zones, Department of Environment and Conservation (2010), Sustainable Forest Management Series, SFM Guideline No. 6, a fauna habitat zone that has been approved by the Director Sustainable Forest Management (Division) as final will have an "interim" status where it is located within a Mineral lease State Agreement. Interim FHZs will be finalised once mining and rehabilitation operations are completed in the area and the WA Government has accepted back from the company responsibility for management of the mined areas.

gum woodland, melaleuca dampland). Quokka, quenda, rakali and several frog and reptile species are potentially present in this community.

Fauna Habitat Types

GHD identified eight broad fauna habitat types, based on vegetation, hydrology, soil and topography. Jarrah marri forest was the most prominent habitat type, forming 78 per cent of the area (2,115 hectares), followed by areas of post-mining rehabilitation (226 hectares, 8 per cent), blackbutt forest (129 hectares, 5 per cent), flooded gum woodland (125 hectares, 5 per cent), bullich forest (66 hectares, 2 per cent), cleared areas (27 hectares, 1 per cent), granite outcrop association (19 hectares, 1 per cent), melaleuca damplands (4 hectares) and pine planation (2 hectares). Fauna habitat types are in Table 2-3 and Figure 2-8.

Fauna Species

Threatened or priority fauna species recorded within the POCA by GHD are in Table 2-4. Other species identified by GHD include emu, western thornbill, wedge-tailed eagle, common brushtail possum, elegant parrot, common bronzewing, Australian magpie, common south-west ctenotus, rainbow lorikeet, Western grey kangaroo, Glauert's froglet, barking gecko, skink, ornate crevice-dragon and grey shrike-thrush. GHD also record an instance of a feral pig and feral cat within the POCA. Fauna locations are in Table 2-4 and Figure 2-8.

Black Cockatoos

GHD reported evidence of forest red-tailed black cockatoos in 43 locations across the POCA, direct observations recorded up to 51 birds, as well as foraging evidence. Foraging evidence consisted of chewed marri or jarrah nuts. A Carnaby’s cockatoo was heard calling from riparian habitat.

DAWE (2022) contains definitions for nesting trees for black cockatoos. The definitions are available in the reference or from the Definitions table at the start of this document. GHD looked at 155 potential nesting trees within the POCA (see Figure 2-9 for approximate locations). Of these, 16 trees were additionally assessed for nest hollow suitability. The results found:

- 3 trees contained a hollow that met the definition of known nesting tree for Baudin’s cockatoo.
- 5 trees contained hollows that met the definition of known nesting tree for forest red-tailed black cockatoo.
- 3 trees contained hollows that met the definition of suitable nesting trees.
- 8 trees had hollows that were unsuitable as nest hollows for black cockatoos (most were blocked).

Table 2-3: Fauna Habitat Types

Habitat Type (GHD, 2021)	Area (ha)	Per Cent
Jarrah – marri forest *E. marginata* and *C. calophylla* open forest over Grass trees (*Xanthorrhoea preissi*), *Lasiopetalum floribundum*, Macrozamia mid shrubland. Patches have dominance of understory *Allocasuarina fraseriana* and *Banksia grandis*. Often with complex mosaic of low shrubs such as Fabaceae, *Hibbertia*, *Leucopogon*, *Adenanthos*, and *Pteridium*. This is the most extensive habitat identified and comprises a number of vegetation types dominated by Jarrah on upper, mid and low slopes and broad valleys. Soils range from well drained gravely sand to sandy clay loam. Historical logging is a significant disturbance factor: extensive areas of forest are at varying ages of regeneration. Other disturbances include frequent fire (significant), feral pigs, *Phytophthora* dieback, trail bike, 4WD and dumped rubbish including weed plants. • Upland Jarrah-Marri Forest 1,656 ha – 61 per cent / Lowland Jarrah-Marri Forest 459 – 17 per cent	2115.2	78%
Mine rehabilitation Historical mine rehabilitation (> 20 years old) of the Huntly Mine and former Jarrahdale Mine. This is historical rehabilitation under previous completion criteria and not representative of current or future rehabilitation programs. These areas include either regrowth of native tree species or exotic eucalyptus trees. These areas generally have high quality foraging habitat for Black Cockatoos but lack trees of suitable age (diameter at breast height (DBH)) to have developed hollows of sufficient diameter and depth to be considered potentially suitable breeding trees for Black Cockatoos. These areas do however provide continuity of forest or woodland connectivity allowing fauna movement and foraging habitat for a range of species ground such as terrestrial reptiles, birds, small mammals.	225.8	8%
Blackbutt forest Blackbutt open forest with occasional Bullich, and Marri over sparse Banksia *littoralis* over *Trymalium*, *Macrozamia*, *Xanthorrhoea preissii*, over *Lepidospermum tetraquetrum*, *Astartea* scoparia and areas of dense Swamp peppermint (*Taxandria linearifolia*). This habitat is limited to localised patches often associated with creeks and drainage lines. Disturbance factors include frequent fire, feral pigs, Phytophthora dieback, trail bike and 4WD.	128.8	5%
Flooded Gum woodland Flooded Gum (E. *rudis*) open woodland with occasional Blackbutt, over open to open to sparse Banksia *littoralis* over Prickly Moses (*Acacia pulchella*), myrtaceous species such as Swamp peppermint (*Taxandria linearifolia*), *Astertea scoparia Trymalium odoratissimum*, low shrub/sedgeland. Substrate varies from dark grey to grey brown sandy clays. Associated with poorly drained broad valleys forming seasonal swamps and occasionally tall open forest along drainage lines. Disturbance factors include frequent fire, feral pigs.	124.6	5%
Bullich forest Valleys and drainage areas dominated by Bullich (*Eucalyptus megacarpa*) and with some Blackbutt (*E. patens*), occasional Marri (*Corymbia calophylla*), over Sheoak (*Allocasuarina fraseriana*), *Banksia littoralis* over Grass trees (*Xanthorrhoea preissii*), Bracken fern, patches of dense *Gahnia trifida* shrubland over *Lasiopetalum floribundum*, sedges and herbs. Substrate is dark clayloam soil. These areas are associated with seasonal creeks and drainage areas. This habitat is limited in extent to localised patches in the Myara North DE. Disturbance factors include frequent fire, feral pigs, *Phytophthora* dieback.	65.8	2%
Granite outcrop Granite outcrops with associated lithic vegetation complexes and adjacent associated fringing open Jarrah and Marri areas with scattered Sheoak, Melaleuca, *Banksia ilicifolia* over occasional Grass trees over mixed open heath communities of myrtaceous and proteaceous low shrubs. Soils are pale grey to yellowish fine sand or sandy clay. Granite outcrops often associated with seasonal watercourse and seasonally damp areas. This habitat found as localised patches throughout the Survey Area. Disturbance factors include frequent fire, feral pigs, *Phytophthora* dieback, damage caused by rock removal, trail bike and 4WD on granite.	19.4	1%
Melaleuca dampland Paperbark (*Melaleuca pressiana*) over sparse isolated Banksia littoralis over open Hakea, occasional Woody Pear (*Xylomelum*), Grass trees and over mixed shrublayer of Cyperaceae, Restionaceae, Babingtonia, Jacksonia and Acacia, over low shrubs, sedges and herbs. There are areas of sparse to occasional stunted Jarrah and Marri however these are limited to lowland transitional zones adjacent to slightly higher elevation and drainage open forest areas. Generally limited to areas of poor drainage and subject to winter inundation such as broad valleys and swamps. Substrate is grey gravely clay and clay loam. Disturbance factors include frequent fire and feral pigs.	3.9	0%

Habitat Type (GHD, 2021)	Area (ha)	Per Cent
Pine plantation These are monocultures of Pine timber tree species (*Pinus*). They represent very high quality foraging habit for Carnaby's and Baudin's Cockatoos. They tend to be devoid of understory and ground layer vegetation and lack habitat values for most other native vertebrates.	1.5	0%
Cleared Areas	26.6	1%
Total	2711.5	**100%**

Table 2-4: Species recorded in the POCA (GHD, 2021)

Species	BC Act Status	EPBC Act Status	DBCA Record	GHD Record
Carnaby's cockatoo	EN	EN	Yes	Yes
Numbat	EN	EN	Yes	No
Forest red-tailed black cockatoo	VU	VU	Yes	Yes
Quokka	VU	VU	Yes	No
Chuditch	VU	VU	Yes	No
Quenda	P1	-	Yes	Yes
Masked owl (southwest)	P3	-	Yes	No
Western brush wallaby	P4	-	Yes	Yes
Western false pipistrelle	P4	-	Yes	No

2.8.4 Fauna habitat assessment

Following desktop assessment, database searches and the GHD (2021) fauna survey it can be concluded the POCA holds suitable and appropriate habitat for threatened fauna species as follows:

- The POCA is predominantly jarrah-marri forest, providing suitable foraging, roosting and breeding habitats for all three species of black cockatoo. Carnaby's and forest-red tail black cockatoo have been observed foraging in the POCA. Known roost sites have been observed within 6 km of the POCA and known Baudin's and forest-red tail black cockatoo nest hollows have been recorded in the POCA, increasing the importance of the foraging habitat and the area in general.
- While chuditch were not recorded in the POCA by GHD, DBCA records (obtained in June 2024) indicate chuditch were historically present in the area. The density of feral predators in the POCA is not known, however a feral cat was recorded. It is possible that while the jarrah-marri forest is suitable habitat for chuditch, the presence of feral predators may deter chuditch from inhabiting the area. With management actions such as feral fox and cat control, the POCA could provide refuge for chuditch from disturbances.

- Woylie were not recorded in the POCA by either GHD or DBCA (obtained in June 2024), which is to be expected given the woylie is a cryptic species that is challenging to detect. However, the POCA does contain habitat suitable for a woylie, particularly if the presence of feral predators is minimised.
- GHD reported the POCA as containing areas of habitat with dense *Taxandria linearifolia*, a key habitat requirement for mainland quokka, and recorded five quokkas on remote cameras during their field surveys. DBCA records (obtained in June 2024) indicate four additional sightings of quokka in the POCA from 2011 to 2019. The POCA is therefore likely to provide important habitat for quokka.
- A feral pig was recorded by GHD close to a quokka habitat and therefore management to survey and reduce the number of feral pigs in the area will provide beneficial outcomes for quokka.

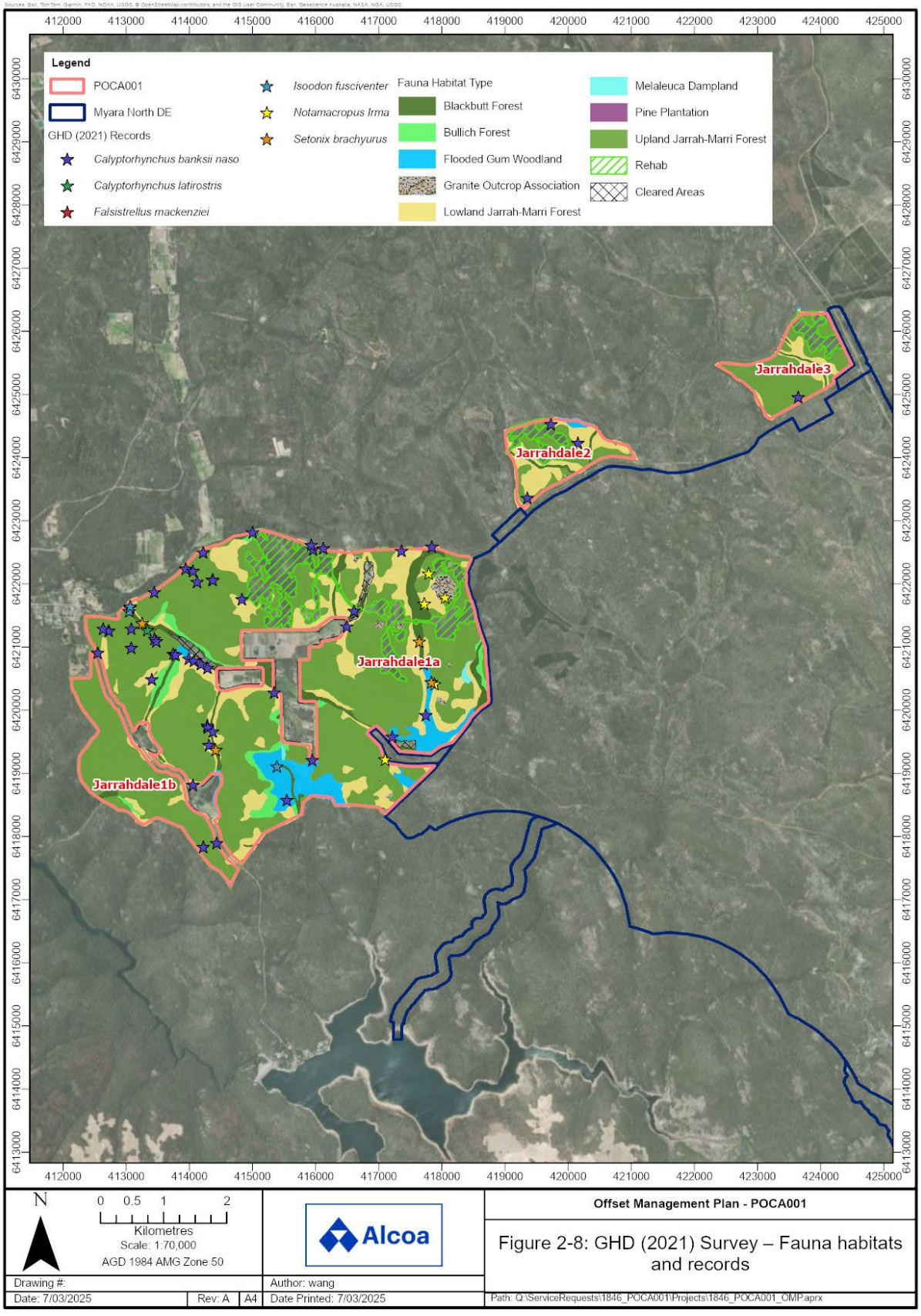


Figure 2-8: GHD (2021) Survey - Fauna habitats and records

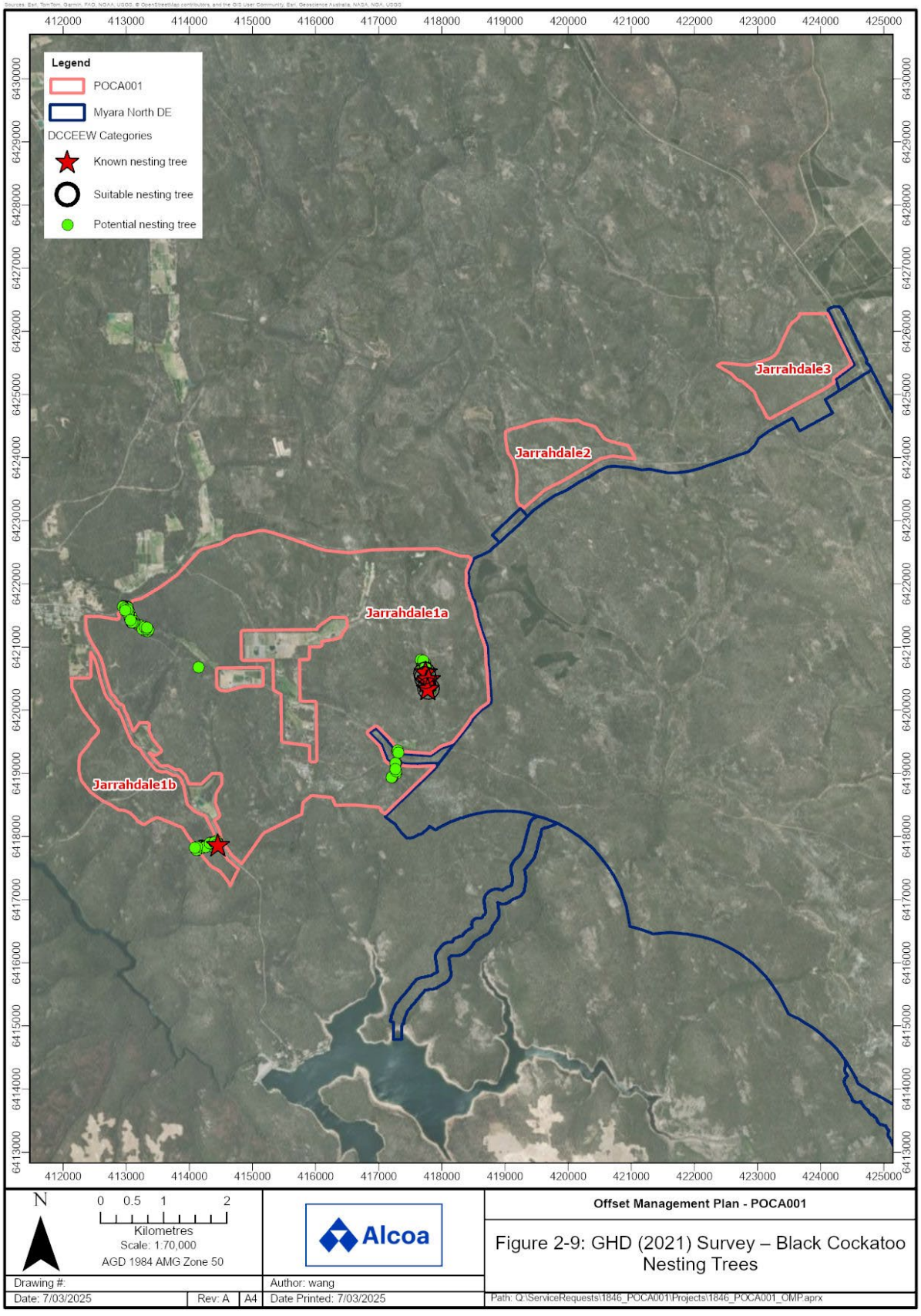


Figure 2-9: GHD (2021) Survey – Black Cockatoo Nesting Trees

2.9 Ecological and/or habitat features

Water is an important habitat feature for threatened species. Black cockatoos need to drink water at least once per day (Craig et al., 2022) , while species such as quokka, chuditch and woylie may use stream zones as movement corridors. The following water features have been identified in the POCA:

- Jarrahdale 1a contains conservation category, resource enhancement and multiple use wetlands (DBCA-019).
- An unnamed significant non-perennial stream (DWER-031) runs through the centre of Jarrahdale 1a, associated with a resource enhancement wetland.
- An unnamed minor non-perennial tributary (DWER-031) runs along the western boundary of Jarrahdale 2.
- An unnamed minor non-perennial tributary (DWER-031) runs along the western boundary of Jarrahdale 2.
- Wungong Brook, a minor river (DWER-031) runs along the western boundary of Jarrahdale 3.
- Alcoa has mapped numerous streams across the POCA.
- DPIRD (DPRID-083) indicates there are 11 farm dams within the cadastral areas of the private properties excluded from the POCA. In some cases, these dams may provide drinking water sources for black cockatoos. Forest red-tailed black cockatoos, generally prefer not to drink from large open areas.

2.10 Ecological linkages

The western boundary of the POCA adjoins the eastern boundary of the Serpentine National Park and lies between the Canning and Wungong Dam reservoirs.

The Perth Regional Ecological Linkage dataset (WALGA 2024) identifies regional ecological linkages mapped to broadly represent a link between patches of remnant vegetation judged to be of regional significance in the Perth Metropolitan Region Scheme Area. The ecological linkage dataset represents the first step in the process of identifying patches of native vegetation that can act as stepping stones to form Regional Ecological Linkages.

Three regional ecological linkages overlay the Serpentine National Park. The Serpentine National Park is part of the major north-south linkage between Darling Range Regional Parks, CALM[12] Conservation Estate on the western portion of the Scarp and the Serpentine National Park (Perth Regional Ecological Linkage, number 146). The Wungong Brook regional linkage (number 56) overlays the western boundary of Jarrahdale 3.

[12] The Department of Conservation and Land Management (CALM) was a department of the Government of Western Australia that was responsible for implementing the WA Governments conservation and environment legislation and regulations.

2.11 Social

State Forest provides recreational access for the community. The POCA contains mapped tracks and trails as follows:

- The Munda Biddi track, used for mountain biking. Passes through the northern area of Jarrahdale 1a and the western boundary of Jarrahdale 3.
- Mundlimup Timber trail, a local trail used for walking and hiking.
- The Balmoral trail, used for walking and hiking.
- Wetlands experience. Short, local trail.

Alcoa intends for all trails within the POCA to remain open and unrestricted during the offset period.

2.12 Heritage

A small portion of the western boundary of Jarrahdale 1b intersects with the public mapped boundary of the Serpentine River Aboriginal Heritage registered site. Through ongoing heritage survey, Alcoa has identified and recorded additional places that are of cultural heritage significance to Noongar People. In partnership with Traditional Owners (via their representative body, Gnaala Karla Booja Aboriginal Corporation), Alcoa is developing a Cultural Heritage Management Framework to ensure that these places are appropriately managed. Alcoa will ensure its actions are consistent with this Framework when implementing conservation actions.

No European heritage areas are recorded on public dataset within the POCA.

3. Contribution to Offset Proposal outcomes

This POCA will contribute towards the outcomes in the Offset Proposal through improvements in habitat for threatened species of at least:

- 2,536 hectares of forest red-tailed black cockatoo habitat including foraging, potential roosting and potential and known breeding habitat
- 2,343 hectares of Carnaby's cockatoo foraging habitat, including foraging, potential roosting and potential breeding habitat
- 2,343 hectares of Baudin's cockatoo foraging habitat, including foraging, potential roosting and potential and known breeding habitat
- 2,685 hectares of chuditch habitat, including 323 hectares of dense riparian vegetation and 2,362 hectares of open upland vegetation
- 2,684 hectares of woylie habitat, including 323 hectares of dense riparian vegetation and 2,360 hectares of open upland vegetation
- 2,684 hectares of quokka habitat, including 323 hectares of habitat critical to the survival of quokka and 2,360 hectares of open upland vegetation that may be used opportunistically by quokka.

Improvements will be achieved through the implementation of environmental offset projects.

4. Indicative conservation actions

Indicative conservation actions for the proposed offset conservation area are outlined in the Environmental Offset Proposal (Alcoa, 2025a).

4.1 Protection mechanism

The WA Government intends to expand the conservation reserve system across the FMP Planning area (CPC 2023) through implementing existing reserve recommendations and progressing indicative areas for increased protection that will cumulatively lead to a change in the reserve category for more than 700,000 hectares. This includes 41,000 hectares proposed to be Forest Conservation Area; with the intent to provide a higher level of security of classification for areas that have some impediment to being considered for a formal conservation reserve category (CPC 2023).

Alcoa propose to work with government agencies to support additions to the conservation reserve system and protect the POCA in an enduring way whilst being actively managed to maintain or improve the habitat. The steps proposed to be undertaken are to:

- Consult with the Conservation and Parks Commission and the DBCA around the options for enduring protection of the POCA.
- Request permission from the Conservation and Parks Commission and the DBCA to enable Alcoa to implement management actions within the POCA.
- Consult with other WA Government agencies including the Forest Products Commission (FPC), Water Corporation, Department of Energy, Mines, Industry Regulation and Safety (DEMIRS), Main Roads Western Australia, Department of Jobs, Tourism, Science and Innovation (DJTSI) and Department of Planning, Lands and Heritage (DPLH) and local government agencies (LGAs).

In terms of Alcoa's freehold land tenure within the POCA, Alcoa will consult with the Conservation and Parks Commission on the prospect of the site being ceded to the WA Government for the purpose of conservation of flora and fauna, once the land use of the site has been agreed. Alternatively, if the site will be used for conservation purposes, Alcoa could place a conservation covenant over the site.

4.2 Post-mining rehabilitation

The POCA contains 226 hectares of post-mining rehabilitation: 173 hectares in Jarrahdale 1a, 27 hectares in Jarrahdale 2 and 26 hectares in Jarrahdale 3.

Post-mining rehabilitation in Jarrahdale 2 and Jarrahdale 3 (53 hectares) is included in the 1,355 hectares of the previous Jarrahdale mine, for which Alcoa has received two Certificates of Acceptance from the State formally acknowledging the areas met all appropriate completion criteria for completed rehabilitation. Alcoa has no residual liability or management responsibilities for these areas that have been handed back to the WA Government.

There is 173 hectares of post-mining rehabilitation in Jarrahdale 1a. Rehabilitation in these areas commenced between 1986 and 2001, making the rehabilitation approximately 23 to 38 years old. No offset measures that contribute to the completion criteria will be implemented in these areas (for example infill planting or revegetation). However, conservation actions that improve habitat functionality for fauna, such as fox and feral cat, feral pig control and black cockatoo habitat monitoring, may be implemented in areas containing post-mining rehabilitation.

4.3 Baseline habitat assessment

Alcoa will conduct field surveys that provide a baseline from which the improvements in habitat and/or increases in species populations can demonstrated over time in a scientific, measurable and repeatable way. Field surveys will include mapping flora and vegetation (including weeds and dieback) and fauna and/or their habitat.

Alcoa will consult with the DBCA, ecologists and species experts or specialists to refine the proposed baseline surveys so that the data collected can:

- Spatially map threatened (and/or priority) species habitat structure, extent and condition.
- Determine threatened (and/or priority) species presence, distribution and/or abundance within the area.
- Estimate threatened (and/or priority) species populations within the area.

It is important that field survey data is collected in a co-ordinated and consistent manner to enable the data to be included in WA Government datasets and mapping. This will allow for a better understanding of the state of the forest and threatened species recovery.

The methodology and timing of surveys will be provided in environmental offset project plans.

4.4 Habitat management areas

The POCA has been separated into habitat management areas, based on the desktop assessment and survey data available. The areas are described below and shown in Figure 4-1. Indicative management actions by habitat management zones are in Table 4-1.

- Black cockatoo foraging / roosting habitat occurs across most of the POCA, except for the granite outcrop habitat type.
- Black cockatoo breeding habitat area(s) are areas in which black cockatoo known and suitable nesting trees have been identified and mapped.
- Chuditch habitat is likely to be found across most of the POCA, similarly most of the POCA could provide habitat suitable for woylie.
- At present, quokka tend to be found within riparian or fringing vegetation.
- Cleared areas, essentially the Alcoa freehold land parcel.

Table 4-1: Indicative conservation actions by habitat management zones

Habitat management area	Indicative Management Action	Indicative Environmental Offset Project Plan
Black cockatoo foraging / roosting areas	Map and monitor black cockatoo potential nesting trees. Locate and maintain known permanent fresh water suitable for black cockatoos within the POCA and surrounds. Rehabilitation of vegetation.	Black cockatoo (draft) Forest health: understory and overstory rehabilitation (to be developed)
Black cockatoo breeding areas	Map, monitor and manage black cockatoo known and suitable nesting trees. Dieback mapping and management. Rehabilitation of vegetation.	Black cockatoo (draft) Forest health: dieback and disease management (to be developed) Forest health: understory and overstory rehabilitation (to be developed)
Chuditch and woylie habitat	Implement feral fox and cat control. Rehabilitation of vegetation.	Feral fox and cat control (draft) Forest health: understory and overstory rehabilitation (to be developed)
Quokka habitat	Implement feral pig control. Dieback mapping and management. Rehabilitation of vegetation.	Feral pig control (under development) Forest health: dieback and disease management (to be developed) Forest health: understory and overstory rehabilitation (to be developed) Forest health: ecological corridors (to be developed)
Cleared areas	TBC	See Section 4.5

4.5 Alcoa freehold land

Alcoa owns 611 Balmoral Road, Jarrahdale (Lot 843 on P156805) (the site) as freehold. The site is approximately 6.6 ha and was formerly used for residence, farming and growing vegetables. The site contains a residence and 3 sheds and is accessible via a track extending from Balmoral Road and/or Blue Rock Road.

Mattiske (2021) mapped the cleared areas within the site as completely degraded (87 per cent) with patches of native vegetation in Good condition. GHD (2021) similarly mapped 87

per cent of the site as cleared and not providing habitat for fauna species. The vegetation and habitat mapping are in Table 4-2 and Figure 4-2.

A significant stream (watercourse, minor, non-perennial) runs along the site's southern boundary (DWER-031). The waterway is associated with vegetation described by Mattiske as dense *Taxandria linearifolia* and *Astartea scoparia* vegetation in the understorey on broad swamps and water courses. The nearest mapped farm dams are at least 1 km away, to the west.

The PMST report (DCCEEW 2024b) indicates species or species habitat likely to occur for Carnaby's, Baudin's and forest red-tailed black cockatoo, chuditch and quokka.

GHD reported observations of forest red-tailed black cockatoo along the northern boundary in the flooded gum woodland. Quenda and western brush wallaby were recorded approximately 50-100 m south of the site, close to Balmoral Road. Quokka were recorded within 1-2 km of the site. Chuditch were recorded > 10 km from the site. No woylie was recorded during the GHD surveys.

DBCA records (obtained in June 2024) indicate woylie have been recorded to the east and south or the site, the nearest record is > 13 km away and the latest record was 2010. Chuditch has been recorded around the site, the nearest record is just over 1 km away, and the most recent record (excluding the GHD records) was in 2000. Quokka have been recorded around the site as recently as 2020 and 2021.

At present, the site is likely to contain < 1 hectare of low-moderate quality foraging and roosting habitat for black cockatoos. Chuditch are common in the Northern Jarrah Forest and would be expected to be present in or around the site, perhaps using the site for dispersal. Quokka may be present within the swamp areas, but surveys are required to confirm presence / absence or distribution. The general area around the site may provide suitable habitat for woylie, however, is not expected to be present due to the amount of cleared area.

Within the POCA, this site may be suitable for rehabilitation, may provide a suitable site as a base for management activities, or may be excluded from the management area and continue to be leased. Alternatively, the homestead area could be annexed from the cleared area to allow continued use as a rural lifestyle property while still revegetating the cleared areas.

4.5.1.1 Option 1 – Revegetation

Revegetation of the cleared areas, broadly using the same jarrah-marri rehabilitation practices currently utilised by Alcoa, is likely to provide foraging habitat for black cockatoos within 8-10 years, understorey cover for chuditch (and possibly woylie) within 10-12 years and ecological connectivity for quokka through the stream zone areas.

4.5.1.2 Option 2 - Management centre

The site may provide a suitable operations centre to manage the POCA. The sheds and cleared areas can be used for storage, vehicle and equipment parking or as laydown areas. The perimeter may provide a suitable location to install a watering point for black cockatoos, close to the forest edge for cockatoos to be able to post sentries, high perches for protection

and away from roads or urban areas. The residence could provide accommodation for DBCA staff, rangers or caretakers.

4.5.1.3 Option 3 - Leasing

The site may be retained by Alcoa for leasing to private citizens. Agreements can be made with the tenant to ensure their activities and actions on the site do not hamper conservation actions. The tenant would be provided with guidance in the management of feral predators and weeds, maintenance of vegetation and the stream zone and maintenance of the water feature; however, these actions are likely to be included in the management of the wider POCA.

4.5.1.4 Consideration

Alcoa will need to undertake a cost-benefit analysis on the use of the site and consult with the DBCA and other stakeholders before confirming how the site can be best used as an environmental offset.

Table 4-2: Vegetation and habitat within the Alcoa freehold land parcel

Vegetation (Mattiske 2021)	Habitat Type GHD (2021)	Area ha (per cent)	Vegetation Condition (Mattiske 2021)	Likely suitable habitat for species (GHD (2021)
AC - Open Woodland of *Eucalyptus rudis – Melaleuca preissiana - Eucalyptus patens Banksia littoralis* with dense *Taxandria linearifolia* and *Astartea scoparia* in understorey on broad swamps and water courses	Flooded Gum woodland	0.44 (7)	Good	Black cockatoos, chuditch, woylie, quokka
CW - Woodland to Open Forest of *Eucalyptus patens – Eucalyptus megacarpa Corymbia calophylla Banksia littoralis* with dense *Taxandria linearifolia* and *Astartea scoparia* in understorey on creek lines and water courses	Blackbutt forest	0.30 (4.7)	Good	Black cockatoos, chuditch, woylie, quokka
P - Open Forest of *Allocasuarina fraseriana Eucalyptus marginata Corymbia calophylla Banksia grandis* with scattered understorey, including *Adenanthos barbiger*, *Leucopogon nutans*, *Grevillea wilsonii*, *Leucopogon capitellatus* on sandy gravels	Jarrah marri forest	0.03 (0.4)	Good	Black cockatoos
PS - Open Forest of *Allocasuarina fraseriana Eucalyptus marginata Corymbia calophylla Banksia grandis* with scattered understorey, including *Adenanthos barbiger*, *Leucopogon capitellatus* on gravels and sandy gravels				
PW - Open Forest of *Allocasuarina fraseriana Eucalyptus marginata Corymbia calophylla* with scattered understorey, including *Grevillea wilsonii*, *Adenanthos barbiger*, *Babingtonia camphorosmae* and *Hypocalymma angustifolium* on sandy gravels				
CL_Other - Cleared Other	Cleared areas	5.57 (87.9)	Completely Degraded	-
Total (rounded up)		6.34 (100)		

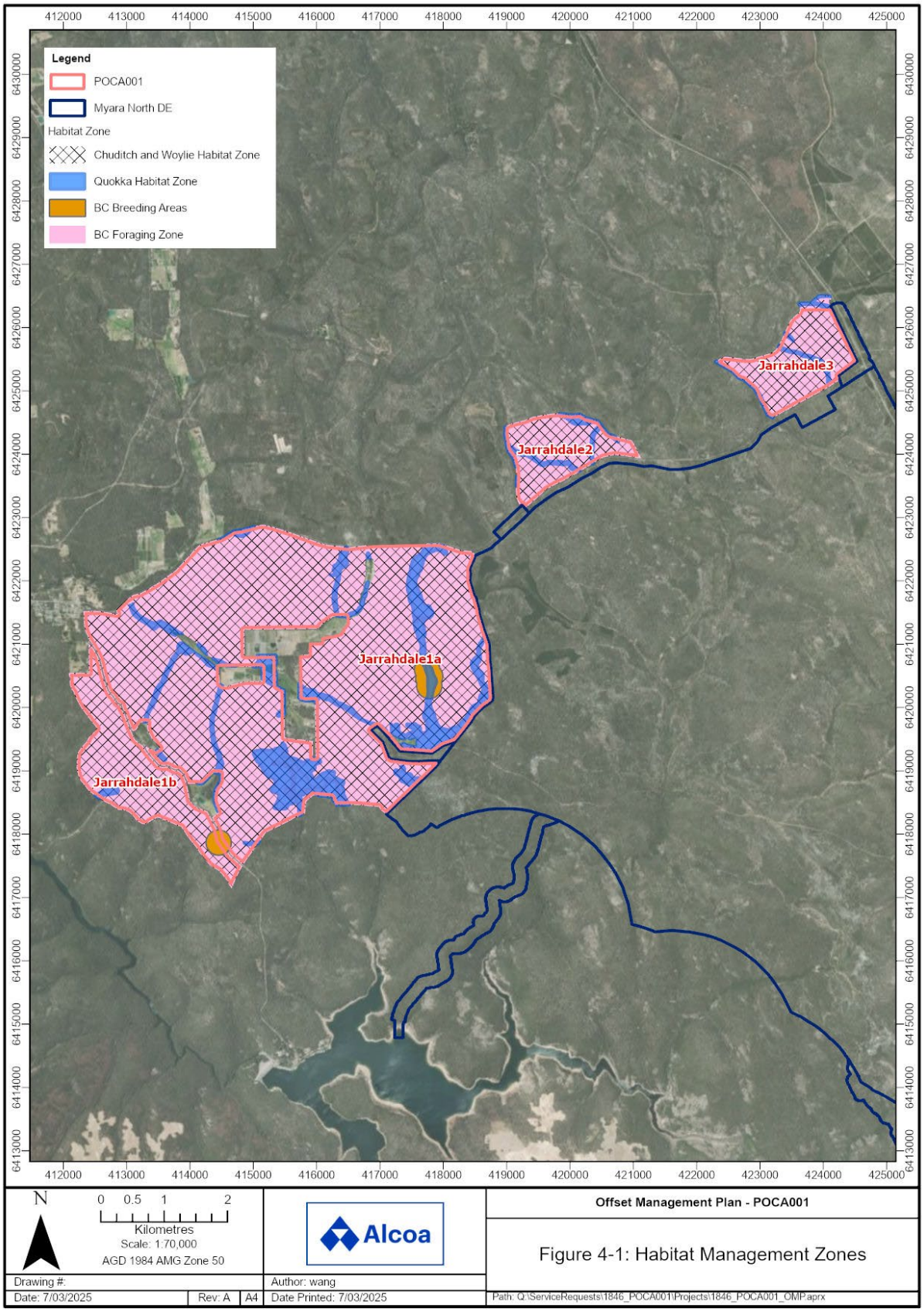


Figure 4-1: Habitat Management Zones

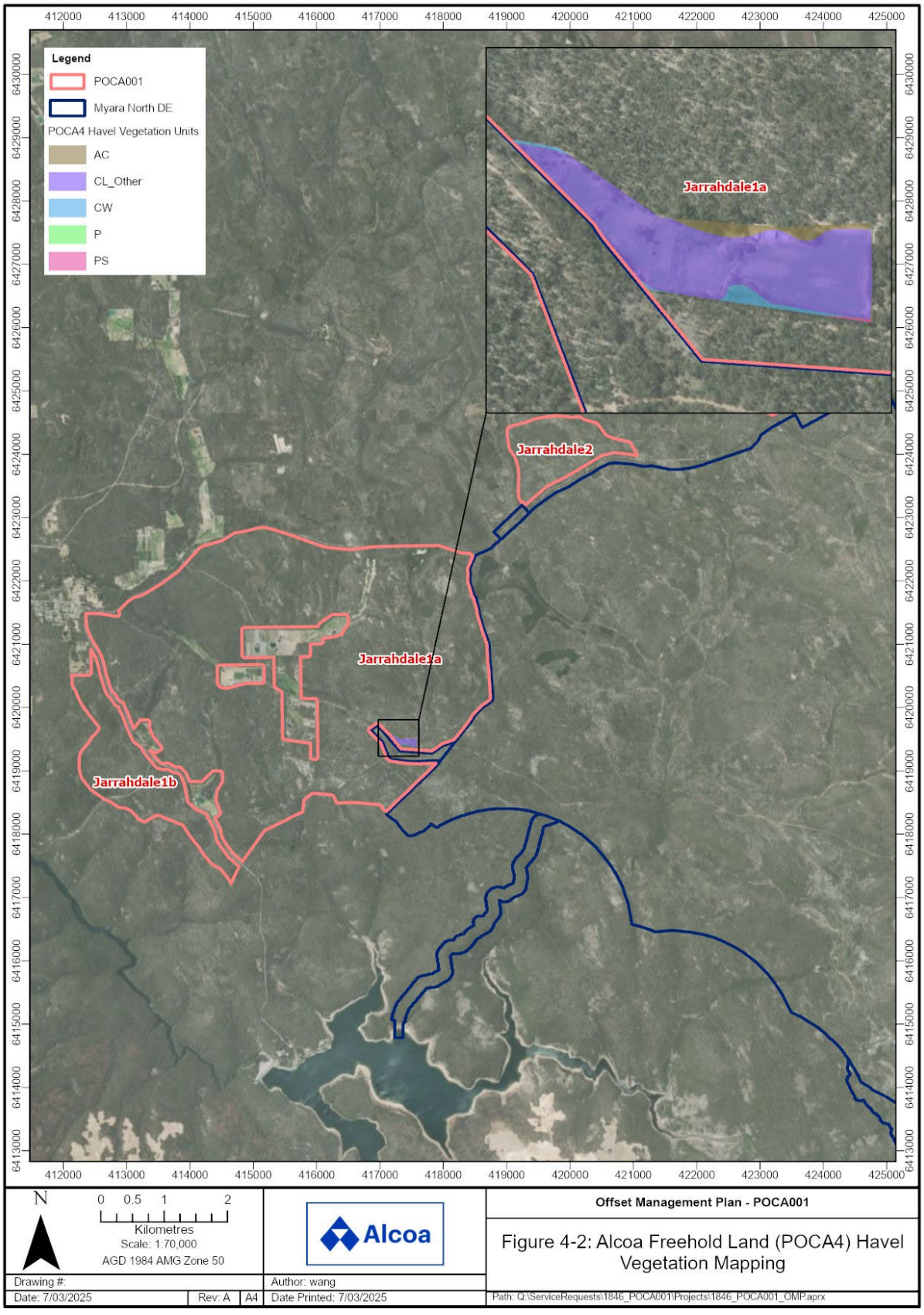


Figure 4-2: Alcoa Freehold Land Havel Vegetation Mapping

4.6 Deliverables and milestones

Conservation actions within the POCA are expected to be delivered for the long-term (over the offset period). The aim is to maintain or improve the habitat for each species such that the health and condition of the habitat is self-sufficient and requires minimal management and intervention when it reverts to the WA Government as the land manager.

Alcoa will continue to consult with the stakeholders in the development of this area for conservation and as an offset. Alcoa are seeking an in-principle agreement with the WA Government to use the area as an offset.

Following agreement, Alcoa will undertake the Baseline survey, preferably in mid-2025, as this is an appropriate time in which to undertaken surveys for ground-dwelling threatened mammals. The results from the Baseline survey can be used to finalise this Plan, including confirmation of management areas and spatial mapping of monitoring locations. If the Proposal is approved, on-ground management and conservation actions can commence in Q1 / Q2 2026.

A high-level indictive schedule of deliverables and milestones is in Table 4-3.

Table 4-3: Indicative Schedule

Milestone	Timing
Agreement to use the POCA as an environmental offset	Q2 2025
Baseline Survey completed	Q4 2025
Offset Area Management Plan finalised	Q4 2025
Conservation actions commence	Q2 2026

4.7 Monitoring program

A monitoring program specific to each project is in the Environmental Offset Project Plans. This includes target criteria, performance indicators, trigger, threshold and response actions, the monitoring methodology and schedule, reporting requirements and evaluation and response actions.

The location of monitoring points will be spatially identified and mapped in this Plan following baseline surveys, see Figure 4-3.

4.7.1 Indicative performance indicators

The monitoring program specific to each project includes a series of indicative performance indicators. These performance indicators will be used to provide evidence that the conservation actions are on a positive trajectory towards the outcomes for each species. The performance indicators will be measured through field surveys within the POCA. Indicative performance indicators include:

- Vegetation structure and condition
- Key habitat features (presence/condition)

- Habitat patch size and/or connectivity
- Presence/abundance of threatened fauna species
- Presence/abundance of feral/invasive/pest species
- Time since last burn.

4.7.2 Response actions

Response actions describe the management actions that will be undertaken if the trigger or threshold criteria are met for the indicators. The response actions specific to each project are in the Environmental Offset Project Plan.

4.7.3 Reporting

Each Environmental Offset Project Plan contains a schedule of reporting for the Plan. Reports showing the progress of the environmental offset projects will be provided to regulators on an annual basis and key stakeholders (as required). Alcoa will also provide information[13] on the progress of the environmental offset projects on its website.

Reports will include information specific to the POCA, for example:

- Changes in extent and/or condition of habitat for each species
- Changes in presence/absence or condition of habitat features
- Changes in usage within the POCA (foraging, roosting or breeding evidence, movement corridors, dispersal routes, etc)
- Species population estimates or observations
- Application of the habitat scoring tools.

4.7.4 Evaluation

The Alcoa Environmental Offset Team will review all information relevant to the environmental offset project and POCA including but not limited to the annual reports, field surveys, habitat assessments and any current peer-reviewed scientific literature.

A technical assessment of the results from the monitoring program will be assessed against the baseline data and reference sites to determine progress towards outcomes. The team will also consider the outcomes in the context of the wider state of the environment to understand if broader issues in the jarrah forest are having an effect (positive or negative) on the outcomes.

Where a performance indicator suggests the targets are not on a positive trajectory, the Environmental Offset Team will work with the delivery partner, ecologists, DBCA, species experts, researchers or other appropriately trained personnel to adapt the management action(s) to resolve the issue.

[13] Environmentally or commercially sensitive information will not be made publicly available.

Figure 4-3: Monitoring locations[14]

[14] Figure to be provided in the Plan following the baseline survey.

4.8 Key risks and management strategies

Risks to the implementation of this Offset Area Management Plan can be through proponent-based events, environmental stochastic events or external events. Alcoa has considered the specific risks to use the POCA as an environmental offset in Table 4-4, along with proposed mitigation and contingency actions.

4.9 Adaptive management and continual improvement

An adaptive management framework ensures there are mechanisms in place to take account of the risk of the POCA not meeting its objectives in the timeframe predicted, and to manage any unforeseen consequences.

Alcoa has built flexibility into the offset area management plan through:

- Procedures – reviewing and evaluting the progress of on-ground management allows Alcoa to adapt the decision-making process over time.
- Resources – engaging the most appropriate contractor or delivery agent for the action(s). Allows the distributuion of works to be shared across businesses, agencies and conservation groups. Built in contingency to account for unanticiapted events.
- Actions – undertake continuous review of the outcomes of management actions, surveys and reports. Applying best practice or emerging technologies.

Reports will be reviewed by species or subject matter experts to ensure appropriate responses are developed to potential or actual events.

Alcoa proposes to manage risks associated with the Offset Area Management Plan through the following actions.

- On-going consultation with stakeholders and delivery partners (section 6).
- Clearly defined outcomes, indicators and response actions (section 4.7).
- Reporting and evaluation mechanisms (section 4.7).
- Clear governance arrangements (section 5).
- Ensuring sufficient funding is available, including for contingency actions (section 5).

Table 4-4: Risk Management

Potential Risk	Mitigation	Contingency Action
Alcoa is unable to secure agreement to use this POCA as an environmental offset.	• Alcoa has undertaken an assessment to demonstrate the suitability of this area as an environmental offset • Alcoa will continue consultation with the WA Government around the use of the POCA as an offset	• Alcoa will work with the WA Government to identify land areas that may be preferable as an environmental offset area
Proximity to townships and semi-urban/rural areas results in vandalism or illegal activities (illegal firewood collection, flytipping, off-road vehicles) that undermine conservation actions.	• Alcoa will seek the support of the local community to protect and enhance the environmental values in and around their area • Erect signs stating the POCA is a conservation area	• Install fences, gates or roadblocks in access points used for illegal activities • Implement security measures within the POCA and/or at access points
Private property owners are unable or unwilling to support management actions for protection of drinking water for black cockatoos or control of feral animals.	• Alcoa will consult with the private property owners prior to commencing the offset • Alcoa will ensure the private property owners are provided with the information, resources and/or funding required to implement conservation actions	• Continue to work with and educate landowners • Intensify feral animal controls on the boundary between the private properties and the POCA • Install safe drinking water areas within the POCA, outside private properties

5. Governance arrangements

Alcoa propose to form a dedicated Environmental Offset Team. The team will be responsible for delivering approved environmental offsets conditioned in Ministerial Statements, EPBC Act Approvals or other regulatory instruments; and developing environmental offsets during approvals and assessment processes.

5.1 Agreements

Any agreements between Alcoa and delivery partners will be legally binding, such as contracts, grant agreements or service agreements. Governance documents will include requirements for timeframes, reporting, financial management, milestones, deliverables, completion criteria and other legal or governance requirements as appropriate.

Likewise, agreements between the landowner and Alcoa to operate and implement the environmental offsets will be appropriately binding and secure.

5.2 Responsibilities

Delivery of management actions may be undertaken by different environmental practitioners, consultants or specialists. Alcoa and delivery partners will enter into legally binding agreements such as contracts, grant agreements or service agreements.

However, Alcoa will remain responsible for ensuring the conservation actions are implemented in a safe manner in accordance with any agreements with the landowner.

5.3 Financial commitments

Alcoa will be responsible for funding the implementation of the Offset Proposal, including all Environmental Offset Projects and associated administration, monitoring and reporting.

6. Stakeholder consultation

Alcoa has identified key stakeholders for the development and implementation of this Offset Area Management Plan.

Alcoa has discussed key recovery actions and threatening processes for targeted threatened fauna species in the Northern Jarrah Forest with species and forest ecology experts. The outcome from these informal discussions indicated the POCA is likely to hold the environmental values required to be offset and would benefit from the implementation of additional conservation measures. Alcoa intend to continue discussions with subject matter experts through the on-going development of this Offset Area Management Plan.

Alcoa will continue to consult with Traditional Owners to understand ways in which traditional land management practices can be incorporated into the POCA and agree the role local people can play in the delivery of this offset.

Stakeholders that are specific and relevant to supporting the implementation of conservation actions within the POCA, and their role, are in Table 6-1.

Table 6-1: Key Stakeholders

Stakeholder	Role
Conservation and Parks Commission (WA)	The POCA overlays land vested to the Conservation and Parks Commission. Alcoa will seek endorsement / agreement to implement additional conservation actions on land vested to the Commission.
DBCA (WA)	State Forest within the POCA is managed on behalf of the Commission by the DBCA. Alcoa will seek endorsement / agreement to implement additional conservation actions with the DBCA. Conservation actions will be additional to management actions within the Forest Management Plan 2024-2033 (CPC 2023)
DEMIRS (WA)	DEMIRS role is to build WA's economy and ensuring resources are developed in a sustainable and responsible manner. Alcoa will seek endorsement / agreement with DEMIRS to use the POCA as an environmental (conservation) offset. Use of the area as an offset will support Alcoa's proposal to implement mining in an ecologically sustainable manner.
DJSTI (WA)	DJSTI oversees Alcoa's operations under the State Agreement. Alcoa will seek support from DJSTI to use the area as an offset in the context of the State Agreement.

Stakeholder	Role
Traditional Owners	Alcoa operate on land of the Bindjareb people, the Whadjuk people and the Wardandi people of the Noongar nation. The POCA contains Registered Aboriginal Sites. Alcoa will seek to partner with the Traditional Owners to implement the conservation actions and obtain relevant approvals (if required) to implement conservation actions within registered sites.
EPA	Alcoa will engage with the EPA to demonstrate the suitability of the POCA as an environmental offset for the Proposal.
DCCEEW	Alcoa will engage with DCCEEW to demonstrate the suitability of the POCA as an environmental offset for the Proposal.

Alcoa will also consult with the additional stakeholders, as appropriate, including but not limited to the Forest Products Commission, the Shire of Murray, the Department of Planning, Lands and Heritage, the Department of Water and Environmental Regulation, Main Roads Western Australia the Water Corporation and conservation or environmental non-government organisations.

A high-level summary of stakeholder engagement relevant to this POCA to December 2024 is in Table 6-2.

Table 6-2: Stakeholder Consultation on the POCA

Stakeholder	Date	Purpose of engagement	Outcome
DBCA	August 2022	Alcoa met with DBCA Conservation and Ecosystem Management branch to introduce Alcoa's offset roadmap.	DBCA requested further information around areas Alcoa considers may be appropriate and suitable as environmental offsets. Information was provided by Alcoa following the meeting. Following the meeting, Alcoa sent a request to the DBCA seeking information on specific land offsets, consideration of regional parks, possible protection measures and research opportunities.
DBCA EPA Services DCCEEW	November 2022	Collective discussion on Alcoa's proposed offset approach for the Pinjarra Alumina Refinery Revised Proposal.	Acknowledgement of the challenges surrounding provision of environmental offsets at scale in the NJF. Alcoa to engage with the WA Government agencies around use of Crown land for offsets. Alcoa to ensure details of the tenure, timeframes, outcomes and commitments to mitigate the risks of the offset approach is provided in offset documents.
DBCA	December 2022	Alcoa provided spatial data of proposed offset conservation areas with DBCA for discussion.	DBCA gave advice on obtaining further information on proposed offset conservation areas. Alcoa to continue to engage with DBCA around management areas and actions within the NJF.

Stakeholder	Date	Purpose of engagement	Outcome
DBCA	February 2023	Discuss alignment between Alcoa's proposed offset strategy with DBCA priority areas for the protection and management of the Northern Jarrah Forest under the draft 2024-2033 Forest Management Plan (FMP).	Acknowledgement that there is interest from both the DBCA and the public to see an increase in the extent of land under conservation tenure in the State Agreement areas.
Black cockatoo subject matter experts (SMEs)	January 2024	Informal group discussion and information exchange on threats, priority actions and potential conservation actions for black cockatoos relevant to the NJF.	Information provided by SMEs has been used to inform the proposed conservation actions and the environmental offset project plans.
Critical weight mammal (CWM) SMEs	March 2024	Informal group discussion and information exchange on threats, priority actions and potential conservation actions for threatened CWM (chuditch, quokka and woylie) relevant to the NJF.	Information provided by SMEs has been used to inform the proposed conservation actions and the environmental offset project plans.
Black cockatoo subject matter experts (SMEs)	May 2024	Technical discussion on potential black cockatoo conservation actions.	Advised that permanent suitable drinking water points was a key requirement for black cockatoos. Installation of a network of permanent suitable drinking water points has been incorporated in the draft black cockatoo environmental offset project.

Stakeholder	Date	Purpose of engagement	Outcome
Critical weight mammal (CWM) SMEs	May 2024	Technical discussion on potential quokka conservation actions.	Advised that feral pigs were a major threat to quokka and/or their habitat in the NJF. Feral pig control was an ongoing challenge for land managers. Alcoa propose to develop a feral pig control environmental offset project plan for proposed offset conservation areas.
DBCA	July 2024	DBCA provided an opportunity for Alcoa to present its current position on offsets to the Executive Director of the Conservation and Ecosystem Management branch, the Policy and Legislation team, the Forest Management team, species and communities branch and the Swan region. Alcoa presented an overview of proposed offset program and some indicative land areas as examples. Discussions centred on engagement with other WA Government agencies and the Gnaala Karla Booja Aboriginal Corporation; options for land tenure improvements, additionality, monitoring and ecological thinning.	DBCA confirmed that they are not a decision-making authority on offsets, rather have an advisory function within Government. DBCA were receptive to the challenges Alcoa faces in delivering offsets at scale across the NJF and the unique tenure arrangements with underlying State Forest the primary tenure overlapping ML1SA. DBCA to meet with EPA Services to discuss offset proposal.
DCCEEW EPA Services	August 2024	Alcoa presented progress on offset program: document framework, offset areas, proposed surveys, performance indicators, projects/management actions.	Information to address queries raised by DCCEEW not already included or incorporated into offset documents has been added.

Stakeholder	Date	Purpose of engagement	Outcome
EPA Board	November 2024	Alcoa presented the proposed environmental offset strategy to the board. Request the board consider if Alcoa's proposed offset approach meets their expectations and public advice on regional offsets, provide advice and feedback via EPA Services officers. Respond to board queries on the offset proposal.	Alcoa to incorporate feedback into the offset proposal. Alcoa to arrange for a site visit for new EPA Board members (at the EPA Chair's request).

7. Key offset concepts

Proponents need to demonstrate how their proposed offsets are consistent with WA Government and Commonwealth offset policy and guidance documents.

The WA Environmental Offset Policy (GoWA 2011) contains principles related to the use of environmental offsets and are not relevant to the specifics of the Offset Area Management Plan. The Offset Proposal and Environmental Offset Project Plans provide information on how the principles in the WA Environmental Offset Policy have been addressed.

The WA Environmental Offsets Guidelines (GoWA2014) expand on the WA Environmental Offset Policy (GoWA 2011) and provide further context on clarifying the determination and application of environmental offsets in Western Australia. Table 7-1 shows how this POCA aligns with the key concepts in the WA Environmental Offsets Guidelines.

The EPBC Act - Environmental Offset Policy (DSEWPC 2012a) also contains a set of requirements for environmental offsets. Table 7-1 shows how this POCA aligns with the relevant requirements in the EPBC Act - Environmental Offset Policy.

Table 7-1: Principles in the WA Environmental Offset Guidelines

WA Environmental Offsets Guidelines concept	EPBC Act - Environmental Offset Policy concept	Consideration
Offset type	Direct offsets are those actions that provide a measurable conservation gain for an impacted protected matter. Suitable offsets must be built around direct offsets. A minimum of 90 per cent of the offset requirements for any given impact must be met through direct offsets.	Direct offset. Alcoa will implement on-ground management actions within the POCA that will result in a tangible improvement to environmental values in the offset area.
In proximity to area of impact	Suitability of the location of the offset site. In most cases this will be as close to the impact site as possible.	The POCA adjoins the northern boundary of the Myara North Development Envelope and is therefore in close proximity to the impact areas.
Similar or better vegetation condition than area impacted Similar habitat structure to undisturbed examples of impacted vegetation type	The condition of an offset site in relation to the ecological requirements of a threatened species or ecological community. This includes considerations such as vegetation condition and structure, the diversity of habitat species present, and	The POCA contains similar vegetation and habitat structure (predominantly jarrah-marri forest) in similar condition (mostly Good to Very Good) to the area proposed for mining operations, noting both the impact area and POCA have been previously disturbed by

WA Environmental Offsets Guidelines concept	EPBC Act - Environmental Offset Policy concept	Consideration
	the number of relevant habitat features.	timber harvesting, fire and dieback.
Has a better area to perimeter ratio than the area impacted	No specific reference to area to perimeter ratio in the EPBC Act - Environmental Offset Policy	Bauxite occurs as tabular ore pods that vary in depth from 2 – 10m with an average depth of about 3.5m. Mine pits range in size from a single hectare to tens of hectares but average around 30 hectares. Due to the nature of the ore pods, the mine is characterised by a constantly moving mining footprint followed by progressive rehabilitation. The mine consists of a mosaic of ore pods, linked via a network of haul roads to a crusher and facilities area. Therefore, the mining footprint can be considered pods connected by linear corridors. The POCA has a better area to perimeter ratio than the area impacted given the POCA consists of a 2,360 hectare contiguous area and two smaller (~169 and 187 hectare) patches.
Contains additional rare or otherwise significant species and threatened species of community compared with the impact site	No specific reference to containing additional species in the EPBC Act - Environmental Offset Policy	The POCA is likely to contain habitat for conservation significant flora and vegetation (section 2.6, 2.7) and fauna (section 2.8).
Close to or contiguous with an existing conservation area	The relative importance of a site in terms of its position in the landscape, taking into account the connectivity needs of a threatened species or ecological community. This includes considerations such as movement patterns of the species, the proximity of the site in relation to other areas of suitable habitat, and the role of the site in relation to the overall	The POCA's western boundary adjoins the Serpentine National Park (section 2.10).
Likely to enhance biological corridors or ecological linkages between conservation areas		The POCA contains or is near to mapped regional linkages (section 2.10). The POCA will enhance the ecological linkage between the Serpentine National Park and the Monadnocks Conservation Park (proposed as a National

WA Environmental Offsets Guidelines concept	EPBC Act - Environmental Offset Policy concept	Consideration
	population or extent of a species or community. (from How to use the Offsets assessment guide (DSEWPC 2012b))	Park under the Forest Management Plan).
It includes actions to address threatening processes	Conservation gain is the benefit that a direct offset delivers to the protected matter, which maintains or increases its viability or reduces any threats of damage, destruction or extinction.	This management plan contains actions to address threatening processes (section 4) including: • Reducing habitat loss • Controlling feral species • Rehabilitation of vegetation • Climate Change mitigations
Allows for secure management arrangements in place that will provide for long term conservation	Current land tenure of the offset and the proposed method of securing and managing the offset for the life of the impact. Offsets on public lands • should be legally secured for conservation purposes for at least the duration of the impact • should be statutorily defined and resourced • any change in management status should require Ministerial or statutory approval.	The POCA overlays State Forest on Crown land, vested to the Conservation and Parks Commission and managed on behalf of the Commission by the DBCA. Alcoa are seeking to agree formal arrangements with the WA Government to allow for the conservation actions to be delivered within the POCA. Following the conclusion of offset period, the management of the POCA will revert to the landowner (WA Government) or manager (DBCA or equivalent government agency).
Sound knowledge and adaptive management	Offsets must be based on both scientifically robust and transparent information that sufficiently analyses and documents the benefit to a protected matter's ecological function or values. This includes undertaking desktop	This Offset Area Management Plan has been informed by desktop assessment; flora, vegetation and fauna field surveys and discussions with subject-matter/species experts. Alcoa will commission a baseline survey (section 4.3) to

WA Environmental Offsets Guidelines concept	EPBC Act - Environmental Offset Policy concept	Consideration
	modelling of offset benefits and conducting relevant field work as appropriate.	refine habitat management areas. The adaptive management framework has been outlined in section 4.9. Findings from the implementation of on-ground management actions (effectively applied research) will be evaluated and used to inform future actions within the POCA.
Likely offset success. Can the values be defined and measured? What is the operator experience / evidence of previous success?	Offset proposals will need to include clearly articulated measures of success that are linked to the purpose of the offsets and provide clear benchmarks about their success or failure.	Alcoa considers implementing on-ground management within this PCOA has a very high likelihood of success. Projects that have employed similar management actions have proven the outcomes are achievable. Fauna habitat extent and condition can be defined and measured. Fauna presence, abundance and density can be measured or estimated using existing methodologies (section 4.7.1). Alcoa has been operating in the Northern Jarrah Forest for over 60 years. Alcoa's rehabilitation program has successfully returned fauna habitat following mining and its research program has provided valuable information to the broader scientific community.
Time lag	Time it will take an offset to yield a conservation gain for the protected matter.	Alcoa propose to commence implementing this Offset Area Management Plan following approval (if obtained). Indicative timeframes are in section 4.6. It is estimated that the on-ground actions will provide tangible benefits for all species within 5 years (for example

WA Environmental Offsets Guidelines concept	EPBC Act - Environmental Offset Policy concept	Consideration
		through installation of black cockatoo watering points, fox, feral cat and feral pig control).
Long term strategic outcomes	Offsets can help to achieve long-term environmental outcomes for matters protected under the EPBC Act. Social and economic or environmental co-benefits may be delivered where an offset aligns with broader strategic environmental objectives. For example: an offset contributing to an area recognised as important to increasing landscape connectivity, above and beyond what is required by the impacted protected matter.	The commitment to fund, manage and monitor key fauna habitat within the POCA for the long term (offset period) provides confidence that the habitat will be maintained for the foreseeable future. This long-term management will promote species resilience to threats, but also a rapid response to emerging or unforeseen threats.

8. References

Alcoa. (2025a). *Pinjarra Alumina Refinery Revised Proposal Environmental Offset Proposal REV 1, February 2025*.

Alcoa. (2025b). *Pinjarra Alumina Refinery Revised Proposal Environmental Review Document REV 3, March 2025*. Alcoa of Australia Limited.

Conservation and Parks Commission [CPC]. (2023). *Forest Management Plan 2024-2033*. Perth, Western Australia

Conservation Commission of Western Australia. (2013). *Forest management plan 2014-2023*. Perth, Western Australia

Craig, M. D., Kirkby, T., Stokes, V. L., Renton, M., & Hobbs, R. J. (2022). Does the need to drink influence nest site selection in a wide-ranging threatened cockatoo? *Forest Ecology and Management*, *505*, 119928.

Department of Agriculture, Water and the Environment [DAWE]. (2022). *Referral guideline for 3 WA threatened black cockatoo species: Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-tailed Black cockatoo. February 2022*. Canberra

Department of Biodiversity, Conservation and Attractions [DBCA]. (2024). *About our forests*. Department of Biodiversity, Conservation and Attractions. Retrieved 2 September from https://www.dbca.wa.gov.au/management/forests/about-our-forests#:~:text=Old%E2%80%91growth%20forest%20is%20ecologically,to%20prepare%20Western%20Australia's%20RFA

Department of Climate Change, Energy, the Environment and Water [DCCEEW]. (2024a). *Environmental Management Plan Guidelines*. Canberra

Department of Climate Change, Energy, the Environment and Water [DCCEEW]. (2024b). *EPBC Act Protected Matters Report dated 9 August 2024*. Canberra

Department of Conservation and Environment [DEC]. (1980). *Atlas of natural resources, Darling system, Western Australia [cartographic material]*. http://nla.gov.au/nla.obj-234331728

Department of Parks and Wildlife [DPaW]. (2017). *Procedures for the assessment, identification and demarcation of old-growth forest FEM Procedure No. FEM075*. Perth, Western Australia

Department of Sustainability, Environment, Water, Population and Communities [DSEWPC]. (2012a). *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy*. Canberra

Department of Sustainability, Environment, Water, Population and Communities [DSEWPC]. (2012b). *How to use the Offsets assessment guide*. Canberra

Department of the Environment [DotE]. (2013). *Matters of National Environmental Significance Significant impact guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999*. Canberra: Commonwealth of Australia

Environmental Protection Authority [EPA]. (2024). *Instructions: How to prepare Environmental Protection Act 1986 Part IV environmental management plans*. Perth, Western Australia

GHD. (2021). *Terrestrial Fauna Survey and Black Cockatoo Habitat Assessment for Huntly Mine - Myara North Pinjarra Alumina Refinery Revised Proposal*.

Glevan. (2021). *Myara North and Holyoake regions, Huntly Mine Phytophthora Dieback occurrence assessment*. G. Consulting.

Government of Western Australia [GoWA]. (2011). *WA Environmental Offsets Policy*. Government of Western Australia

Government of Western Australia [GoWA]. (2014). *WA Environmental Offsets Guidelines*. Government of Western Australia

Mattiske. (2021). *Alcoa of Australia Limited Pinjarra Alumina Refinery Revised Proposal Detailed Flora and Vegetation Survey for Huntly Mine - Myara North*. M. C. P. Ltd.

Mattiske, E., & Havel, J. (1998). Vegetation mapping in the south west of Western Australia. *Department of Conservation and Land Management*.

Weerheim, M. S. (2008). Distribution patterns and habitat use of black cockatoos (Calyptorhynchus spp.) in modified landscapes in the south-west of Western Australia.

Western Australian Local Government Association [WALGA]. (2024). *Perth Regional Ecological Linkages* (WALGA 2004. https://catalogue.data.wa.gov.au/dataset/perth-regional-ecological-linkages

Datasets used

All datasets accessed from www.data.wa.gov.au unless otherwise referenced

DBCA-011 DBCA - Legislated Lands and Waters (DBCA-011) accessed 2 September 2024

DBCA-019 Geomorphic Wetlands, Swan Coastal Plain (DBCA-019) accessed on 2 September 2024

DBCA-024 Forest Disease Risk Areas (DBCA-024) accessed on 2 September 2024

DBCA-047 Vegetation Complexes - South West forest region of Western Australia (DBCA-047) accessed on 2 September 2024

DBCA-050 Carnabys Cockatoo Confirmed Roost Sites (DBCA-050) accessed on 2 September 2024

DBCA-051 Carnabys Cockatoo Unconfirmed Roost Sites (DBCA-051) accessed on 2 September 2024

DBCA-052 Carnabys Cockatoo Confirmed Roost Sites Buffered 6km (DBCA-052) accessed on 2 September 2024

DBCA-053 Carnabys Cockatoo Unconfirmed Roost Sites Buffered 6km (DBCA-053) accessed on 2 September 2024

DBCA-054 Carnabys Cockatoo Confirmed Breeding Areas within the Swan Coastal Plain and Jarrah Forest IBRA Regions (DBCA-054) accessed on 2 September 2024

DBCA-055 Carnabys Cockatoo Unconfirmed Breeding Areas within the Swan Coastal Plain and Jarrah Forest IBRA Regions (DBCA-055) accessed on 2 September 2024

DBCA-056 Carnabys Cockatoo Areas requiring investigation as feeding habitat in the Jarrah Forest IBRA Region (DBCA-056) accessed on 2 September 2024

DBCA-060 DBCA Fire History (DBCA-060) accessed on 2 September 2024

DBCA-064 Black Cockatoo Roosting Sites - Buffered (DBCA-064) accessed on 2 September 2024

DBCA-065 Black Cockatoo Breeding Sites - Buffered (DBCA-063) accessed on 2 September 2024

DBCA-080 Forest Management Plan (FMP) Boundary: 2024 - 2033 (DBCA-080) accessed on 2 September 2024

DBCA-081 Regional Forest Agreement (RFA) Boundary (DBCA-081) accessed on 2 September 2024

DCCEEW Interim Biogeographic Regionalisation for Australia (IBRA), Version 7 (Subregions) accessed from www.data.gov.au on 2 September 2024. Commonwealth of Australia and Department of Climate Change, Energy, the Environment and Water 2024.

DMIRS-003 Mining Tenements (DMIRS-003) accessed on 2 September 2024

DPIRD-005 Native Vegetation Extent (DPIRD-005) accessed on 2 September 2024

DPIRD-083 Farm dams of Western Australia (DPIRD-083) accessed on 2 September 2024

DPRID-006 Pre-European Vegetation (DPIRD-006) accessed on 2 September 2024

DWER-031 Hydrography, Linear (Hierarchy) (DWER-031) accessed on 2 September 2024

Perth Regional Ecological Linkages accessed on 2 September 2024

Appendix A - DCCEEW Protected Matters Search Tool Report

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 obtained for POCA001 - Jarrahdale

Report created: 09-Aug-2024

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

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	21
Listed Migratory Species:	8

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	2
Commonwealth Heritage Places:	None
Listed Marine Species:	13
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:	3
Regional Forest Agreements:	1
Nationally Important Wetlands:	None
EPBC Act Referrals:	8
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

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

Ramsar Site Name	Proximity	Buffer Status
Peel-yalgorup system	30 - 40km upstream from Ramsar site	In feature area

Listed Threatened Ecological Communities [Resource Information]

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

Community Name	Threatened Category	Presence Text	Buffer Status
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community may occur within area	In buffer area only

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 feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calyptorhynchus banksii naso			
Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area	In feature area
Leipoa ocellata			
Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Numenius madagascariensis](#)			
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
[Rostratula australis](#)			
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
[Zanda baudinii listed as Calyptorhynchus baudinii](#)			
Baudin's Cockatoo, Baudin's Black-Cockatoo, Long-billed Black-cockatoo [87736]	Endangered	Roosting known to occur within area	In feature area
[Zanda latirostris listed as Calyptorhynchus latirostris](#)			
Carnaby's Black Cockatoo, Short-billed Black-cockatoo [87737]	Endangered	Species or species habitat known to occur within area	In feature area
MAMMAL			
[Bettongia penicillata ogilbyi](#)			
Woylie [66844]	Endangered	Species or species habitat may occur within area	In feature area
[Dasyurus geoffroii](#)			
Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Myrmecobius fasciatus](#)			
Numbat [294]	Endangered	Species or species habitat known to occur within area	In feature area
[Pseudocheirus occidentalis](#)			
Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat may occur within area	In feature area
[Setonix brachyurus](#)			
Quokka [229]	Vulnerable	Species or species habitat known to occur within area	In feature area
OTHER			
[Westralunio carteri](#)			
Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat known to occur within area	In feature area
PLANT			
[Anthocercis gracilis](#)			
Slender Tailflower [11103]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Diuris purdiei Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat likely to occur within area	In feature area
Lasiopetalum pterocarpum Wing-fruited Lasiopetalum [64922]	Endangered	Species or species habitat known to occur within area	In feature area
Morelotia australiensis listed as Tetraria australiensis Southern Tetraria [92784]	Vulnerable	Species or species habitat may occur within area	In feature area
Thelymitra stellata Star Sun-orchid [7060]	Endangered	Species or species habitat may occur within area	In feature area

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
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]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
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
Pandion haliaetus			
Osprey [952]		Species or species habitat likely to occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

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

Commonwealth Land Name	State	Buffer Status
Unknown		
Commonwealth Land - [51976]	WA	In feature area
Commonwealth Land - [51524]	WA	In feature area

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]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
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
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat likely to 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
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat may occur within area overfly marine area	In buffer area only

Extra Information

State and Territory Reserves [Resource Information]

Protected Area Name	Reserve Type	State	Buffer Status
Monadnocks	5(1)(g) Reserve	WA	In buffer area only
NTWA Bushland covenant (0011)	Conservation Covenant	WA	In feature area
Serpentine	National Park	WA	In feature area

Regional Forest Agreements [Resource Information]

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

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

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Huntly Bauxite Mine Transition	2022/09204		Assessment	In feature area
Serpentine Pipehead Dam Embankment Remedial Works	2022/09377		Completed	In buffer area only
Controlled action				
Alcoa Pinjarra Refinery Production Increase and Bauxite Export	2020/8743	Controlled Action	Completed	In feature area
Expansion of an existing overtaking lane and creation of 4 gravel pits, Albany Hway, WA	2014/7406	Controlled Action	Completed	In buffer area only
Not controlled action				
Albany Highway Gravel Pits, WA	2015/7615	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

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.

© Commonwealth of Australia
Department of Climate Change, Energy, the Environment and Water
GPO Box 3090
Canberra ACT 2601 Australia
+61 2 6274 1111

Appendix B - Mattiske Flora and Vegetation Survey Report for Mayra North 2021

ALCOA OF AUSTRALIA LIMITED

PINJARRA ALUMINA REFINERY REVISED PROPOSAL

DETAILED FLORA AND VEGETATION SURVEY

FOR HUNTLY MINE – MYARA NORTH

Prepared By

Mattiske Consulting Pty Ltd



DOCUMENT STATUS				
DOCUMENT REFERENCE: ALC2004/07/21				
VERSION	TYPE	AUTHOR/S	REVIEWER/S	DATE DISTRIBUTED
V1	Desktop - Internal review	Liam Rowles/ Jemima Wescombe	E. M. Mattiske	
V2	Desktop - Draft for client	Liam Rowles/ Jemima Wescombe	E. M. Mattiske	15/07/2020
V3	Desktop - Final report	E. M. Mattiske	E.M. Mattiske	5/08/2020
V4	Merged Report – Draft for client	E.M. Mattiske	E.M. Mattiske	03/02/2021
V5	Updated Report following review	E.M. Mattiske	E.M. Mattiske	12/04/2021
V6	Report following Edits	E.M. Mattiske	E.M. Mattiske	17/05/2021
V7	Final Report	E. M. Mattiske	E.M. Mattiske	18/07/2021

Mattiske Consulting Pty Ltd

(ACN 063 507 175, ABN 39 063 507 175)

PO Box 437
Kalamunda WA 6926
Phone: +61 8 9257 1625
Email: admin@mattiske.com.au

COPYRIGHT AND DISCLAIMER

Copyright
The information contained in this report is the property of Mattiske Consulting Pty Ltd. The use or copying of the whole or any part of this report without the written permission of Mattiske Consulting Pty Ltd is not permitted.

Disclaimer
This report has been prepared on behalf of and for the exclusive use of GHD on behalf of Alcoa of Australia Limited and is subject to and issued in accordance with the agreement between GHD and Mattiske Consulting Pty Ltd. This report is based on the scope of services defined by GHD on behalf of Alcoa of Australia Limited, the budgetary and time constraints imposed by GHD on behalf of Alcoa of Australia Limited, and the methods consistent with the preceding.

Mattiske Consulting Pty Ltd has utilised information and data supplied by Alcoa of Australia Limited (and its agents), and sourced from government databases, literature, departments and agencies in the preparation of this report. Mattiske Consulting Pty Ltd has compiled this report on the basis that any supplied or sourced information and data was accurate at the time of publication. Mattiske Consulting Pty Ltd accepts no liability or responsibility whatsoever for the use of, or reliance upon, the whole or any part of this report by any third party.

TABLE OF CONTENTS

Page

EXECUTIVE SUMMARY 1

1. INTRODUCTION 5

1.1. Location and Scope of Proposal 5
1.2. Environmental Legislation and Guidelines 5

2. OBJECTIVES 6

3. METHODS 8

3.1. Desktop Assessment 8
3.2 Field Surveys 8
3.3 Data Analysis 10
3.4. Survey Limitations 10

4. DESKTOP FINDINGS 12

4.1. Climate 12
4.2. DBCA Estates 12
4.3. Geology, Soils and Topography 12
4.4. Regional Vegetation 19
4.5. Potential Flora 23
4.5.1. Potential Threatened and Priority Flora 23
4.5.2. Potential Introduced (Weed) Species and Declared Pest (Plant) Organisms 30
4.6. Potential Groundwater Dependent Ecosystems 31
4.7. Old Growth Forests 31
4.8. Previous Surveys 34
4.9. Potential Threatened and Priority Ecological Communities 37
4.10. Wetlands of International Importance (Ramsar) 37

5. FIELD STUDIES FINDINGS 38

5.1 Survey Effort 38
5.2 Flora 40
5.3 Introduced Flora Species 40
5.4 Threatened and Priority Flora 43
5.5 Potential Range Extensions 49
5.6 Site-vegetation Types 49
5.7. Vegetation Condition 64
5.8. Threatened and Priority Ecological Communities 73
5.9. Potential Groundwater Dependent Ecosystems 74
5.10. Old Growth Forests 74

6. DISCUSSION AND CONCLUSIONS 76

6.1. Flora 76
6.2 Vegetation Values 76

7. ACKNOWLEDGEMENTS 79

8. PERSONNEL 79

9. REFERENCES 80

TABLES

1: Potential flora and vegetation survey limitations for the Myara North survey area
2: Extent of Land Systems intersecting the Myara North survey area
3: Extent of Soil Landscapes intersecting the Myara North survey area
4: Extent of pre-European vegetation associations intersecting the Myara North survey area
5: Extent of Vegetation complexes intersecting the Myara North survey area
6: Summary of Potential Threatened and Priority Flora recorded in the Myara North survey area by Vegetation Complexes and Dominant Landforms and Soil Groupings
7: Summary of Previous Site-vegetation Types mapped by E.M. Mattiske and Associates (1992)
8: Summary of Flora Species in the Myara North survey areas
9: Summary of Weeds of National Significance, Declared Weeds or Introduced Flora with a High Ecological Impact
10: Summary of Threatened and Priority Flora recorded in Myara North survey area
11: Summary of Site-vegetation Types (SVT) on the Myara North Survey Area
12: Summary of Condition Ratings in Myara North survey area

FIGURES

1: Locality and Tenements Myara North survey area
2: Climatic data for the Myara North survey area
3: DBCA Estates Myara North survey area
4: Land Systems of the Myara North survey area
5: Landform and Soils of the Myara North survey area
6: Pre-European Vegetation of the Myara North survey area
7: Vegetation Complexes of the Myara North survey area
8: DBCA Threatened and Priority Flora and Ecological Communities
9: Old Growth Forests (as defined by DBCA 2020)
10: Harvest History (as defined by DBCA 2020)
11: Tracks and Plots in North Myara survey area
12: Previous Site-vegetation Type Mapping in Myara North survey area
13: Introduced Species recorded in Myara North survey area
14: Dendrogram based on Plots within and near Myara North survey area
15: Non-Metric MDS based on Plots within and near Myara North survey area
16: Site-vegetation Types in Myara North area (Sheets 16.1 to 16.9)
17: Vegetation Condition in Myara North area (Sheets 17.1 to 17.7)
18: Patches of Larger Trees in Myara North survey area
19: Potential GDEs based on Site-vegetation Types in Myara North survey area

APPENDICES

A1:	Threatened and priority flora definitions
A2:	Threatened and priority ecological community definitions
A3:	Categories and control measures of declared pest (plant) organisms in Western Australia
A4:	Other definitions
A5:	Condition Ranking Scale (adapted from Keighery 1994 and Trudgen 1988 and EPA 2016b)
B:	Vascular plant species with the potential to occur in the Myara North survey area
C:	Likelihood of conservation significant plant species potentially occurring within the Myara North survey area
D:	Introduced plant species potentially occurring within the Myara North survey area
E:	Summary of Site-vegetation Types defined previously in and near the Myara North survey area
F:	Vascular Plant species recorded in Myara, Jarrahdale and nearby Forest Areas and Plots
G:	Summary of Introduced Species in the Myara North Survey area and adjacent Myara/Huntly Region
H:	Vascular Plant Species recorded in Myara, Jarrahdale and nearby Forest Plots
I:	Summary of Vascular Plant Species by Site-Vegetation Types in the Myara North survey area
J:	Summary of Species, Density and Foliage Cover results from Key Site-Vegetation Types sampled within the North Myara survey area AND Myara region

LIST OF ABBREVIATIONS

BAM Act:	*Biosecurity and Agriculture Management Act 2007* (WA)
BC Act:	*Biodiversity Conservation Act 2016* (WA)
BOM:	Bureau of Meteorology
DAWE:	Department of Agriculture, Water and the Environment
DBCA:	Department of Biodiversity, Conservation and Attractions
DPIRD:	Department of Primary Industries and Regional Development
EP Act:	*Environmental Protection Act 1986* (WA)
EPA:	Environmental Protection Authority
EPBC Act:	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
MN:	Myara North survey area
IBRA:	Interim Biogeographical Regionalisation for Australia
PEC:	Priority ecological community
PMST:	Protected Matters Search Tool
TEC:	Threatened ecological community
TPFL:	Threatened and Priority Flora (WA Herbarium)
WAH:	Western Australian Herbarium (PERTH)

EXECUTIVE SUMMARY

Alcoa of Australia Limited (Alcoa) is proposing to increase production at the Pinjarra Alumina Refinery by 5 per cent from 5.0 Million tonnes per annum (Mtpa) to 5.25 Mtpa and transition the Huntly Bauxite Mine to the proposed Myara North and Holyoake mine regions (the Proposal). The Proposal is located in the Peel Region of Western Australia (WA), approximately 100 km southeast of Perth.

The Huntly Mine is located predominantly within the Shires of Murray, Serpentine-Jarrahdale and Boddington within the Peel Region of Western Australia. The Myara North mine area is south east of the town of Jarrahdale, and the Holyoake mine area is east of Dwellingup.

The Proposal will be subject to environmental impact assessment under Part IV of the WA *Environmental Protection Act 1986* (EP Act), and the *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act). The environmental impact assessment will be via a Public Environmental Review (PER).

Mattiske Consulting Pty Ltd (Mattiske) was commissioned in May 2020 by GHD on behalf of Alcoa of Australia Ltd (Alcoa) to conduct a detailed flora and vegetation survey of the Myara North (MN) mine region. The MN survey area consists of the Myara North mine Development Envelope (DE) and adjacent conveyor and haul road corridors that connect the DE to the existing Huntly mine operations in the Myara North region.

Various databases were used to identify the possible occurrence of flora (including introduced, threatened and priority taxa) and threatened and priority ecological communities within the MN survey area. Vegetation plots established as part of this assessment were monitored in the spring months. Baseline vegetation grid mapping and targeted searches were completed over a much more diverse and spatially complex area than the permanent plots (i.e. landforms such as the slopes, ridges, swamps, broad valley systems, and outcrops), and as such, the six month monitoring window was considered comprehensive.

The MN survey area lies within the Interim Biogeographical Regionalisation for Australia (IBRA), with the survey area falling within the Northern Jarrah Forest subregion (JF1) of the Jarrah Forest (JAF) Region (DAWE 2020c). The geology of the region comprises lateritic duricrust, with drainage lines and occasional granite hills. The Northern Jarrah Forest subregion is characterised by Jarrah (*Eucalyptus marginata*) forest on ironstone gravels and Marri-Wandoo (*Corymbia calophylla* - *Eucalyptus wandoo*) woodlands on loamy soils, with sclerophyll understoreys.

Parts of the MN survey area and the nearby areas have previously been surveyed by E.M. Mattiske and Associates (Mattiske 1991 to 1993) and Mattiske Consulting Pty Ltd (Mattiske 1994 and 2019) at both a detailed level of flora studies and site-vegetation type mapping as well as at a regional mapping scale as part of the System 6 studies (Heddle et al. 1980) and the Regional Forest Agreement (RFA) project by Mattiske and Havel (1998). In addition, more local flora and vegetation values have been studied over some 40 years for a variety of clients including studies in the Wungong catchment north of the MN survey area (Mattiske Consulting 2009b, 2011b), the nearby Mt Cooke and 31 Mile Brook by Havel (1975a and 1975b), the recent re-mapping of 31 Mile Brook (Mattiske Consulting2011c), the extensive mapping for Alcoa within and near the MN survey area (E.M. Mattiske and Associates 1991 to 1993) and Mattiske Consulting Pty Ltd (1994 and 2019).

Potential Flora Values

The desktop assessment which was undertaken on the basis of a 20km radius using NatureMap (DBCA 2007-) and the Protected Matters Search Tool (DAWE 2020b) and a review of previous studies both within and near the MN survey area (E.M. Mattiske and Associated 1991 -1993 and Mattiske Consulting Pty Ltd (1994 – 2019).

The key findings from the desktop assessment were:

. 1454 vascular plant taxa, representative of 412 genera and 108 families, have the potential to occur within the MN survey area. The dominant families were Fabaceae (175 taxa), Proteaceae (121 taxa) and Myrtaceae (111 taxa). The dominant genera were *Acacia* (61 taxa), *Stylidium* (45 taxa) and *Drosera* (37 taxa).

. 17 threatened flora species and 49 priority flora species have the potential to occur in the MN survey area. These potential threatened and priority flora species were also related to underlying site preferences. The latter was based on information collated from Florabase (WAH 1998-), vegetation complexes and where available site-vegetation types. Several threatened species have only been recorded on the Swan Coastal Plain within the 20km radius and consequently are unlikely to occur in the MN survey area. The majority of potential Priority flora species were recorded in the main areas on granite outcrops (e.g. Mt Cooke, Mr Windsor and Mt Wells) to the north and east, and the eastern Jarrah forest in lower rainfall areas.

. A total of 192 introduced taxa have the potential to occur in the MN survey area. Ten of the introduced species are declared pest organisms pursuant to section 22 of the BAM Act. A further four of the introduced species are declared pest organisms pursuant to section 22 of the BAM Act, and are also listed as prohibited organisms pursuant to section 12 of the BAM Act. Ten of the introduced taxa are listed Weeds of National Significance. Another 12 of the introduced plant taxa with the potential to occur in the MN survey area have both High ecological impact and Rapid invasiveness ratings.

Recorded Flora Values

The survey efforts were undertaken over multiple years and seasons and therefore the coverage of the flora was considered to exceed the EPA (2016a and 2016b) guidance statements expectations. The flora and vegetation values were recorded in vegetation plots (20m x 20m with 20 x 2m x 2m quadrats within each plot), in regular recording sites (20m radius for trees and site parameters and 5m radius for understorey species in line with the methods defined in Havel (1975a and 1975b) and as used in previous site-vegetation type studies) and during targeted searches of the flora in the different landforms and soils. The vegetation plots were established in the spring months, the 2020 recordings on the grids was undertaken over a six month period and the targeted flora searches were undertaken over the six month period in all of the different landforms and soils.

The key findings from the detailed flora survey were:

. A total of 681 vascular taxa was recorded in the MN survey area and the adjacent areas.

. No Threatened flora species, pursuant to section 179 of the *EPBC Act* and as listed by DAWE (2020a) or pursuant to Part 2, Division 1 and Subdivision 2 of the *BC Act* and as listed by DBCA (2018a) were recorded during the detailed flora and vegetation survey of the MN survey area. The lack of threatened flora was a key outcome of the survey effort and as such reinforces the desktop assessment which found a moderate to low likelihood of threatened flora occurrence on the MN survey area.

. Fourteen Priority flora species as listed by DBCA (2018c) have been recorded in the MN survey area.

. During 2020, four Priority species were recorded within the specific MN survey area, namely *Acacia drummondii* subsp. *affinis* (P3), *Acacia horridula* (P3), *Conospermum scaposum* (P3) and *Stylidium scabridum* (P4).

. Additional Priority flora species (*Acacia oncinophylla* subsp. *oncinophylla, Boronia tenuis, Bossiaea modesta, Banksia recurvistylis, Grevillea crowleyae, Grevillea manglesii* subsp. *dissectifolia* and

Grevillea pimeleoides) were recorded on the fringes of the MN survey area and in nearby flora and vegetation studies in previous studies.

. The Priority flora species occur on the varying landform and soil groupings, namely - 41.9% in swamps, 58.1% on or near granite outcrops and 61.3% with lateritic gravelly soils.

. 58 introduced were recorded in the MN assessment. One of the introduced species is a declared pest organism pursuant to section 22 of the BAM Act, namely:**Gomphocarpus fruticosus* (DPIRD 2020). None of the introduced species are listed as a Weed of National Significance (WONS) (DAWE 2020d). Of the 58 introduced species, 8 have been ranked as High Ecological Impact by DPAW (2014) and 24 have been ranked as Rapid Invasiveness by DPAW (2014). **Gomphocarpus fructicosus* is associated with cleared and degraded, **Leptospermum laevigatum* is associated with areas near previous disturbance and tracks,**Watsonia meriana* is associated with valley floors and creek lines. The remainder are associated with degraded and completely degraded areas and fringes of road and tracks.

A key characteristic of the survey area is the shift in landforms and soils from west to east across the MN survey area and the latter is reflected in the change in the dominance of flora species that tolerate the broader valley systems, swamps and the outcrop areas. The summary of results from the plots and the recording sites as summarized by the site-vegetation types reflects this shift from species in the lateritic slopes and ridges and the broader valleys and outcrops.

Potential Vegetation Values

Based on the 20km radius database search, there are four threatened ecological communities (TECs) listed at Commonwealth level pursuant to sections 181 and 182 of the *EPBC Act* and listed by the DAWE (2020e) or at State level pursuant to Part 2 of the *BC Act* and as listed by DBCA (2018b) with the potential to occur within the MN survey area. None of the above mentioned TECs would occur in the MN survey area, as these threatened ecological communities are restricted to the Swan Coastal Plain and as such do not extend into the Jarrah forest area on the Darling Range associated with the Darling Plateau.

There is one botanical PEC, listed at State level (Granite Communities of the northern Jarrah Forest), which has been designated within the MN survey area. There is a potential that the site-vegetation types associated with granite outcrops (site-vegetation types G and R as defined by Mattiske utilising the definitions of Havel (1975a and 1975b) will have affinities with the PEC. Clarification of the latter affinities necessitated comparisons with the granite areas studied by Markey (1997) on the northern Darling Scarp (pers comm. J. Pryde DBCA). In this context there are some species that reflect the presence of exposed or shallow granite outcrops; however these species tend to occur on wider areas of granites and the differentiation on whether all granite areas in the southwest should be aligned is open to interpretation.

Recorded Vegetation Values

The survey efforts were undertaken over multiple years and seasons and the coverage of the vegetation was considered to exceed the EPA (2016a and 2016b) guidance statements expectations. The vegetation values were recorded in vegetation plots (20m x 20m with 20 x 2m x 2m quadrats within each plot), in regular recording sites and from aerial photographic imagery interpretations. The vegetation plots were established in the spring months, the 2020 recordings on the grids was undertaken over a six month period.

The key findings from the detailed vegetation survey were:

. 32 site-vegetation types were defined and mapped on the MN survey area. The delineation of the site-vegetation types was based on the interpretation of the ranking data for the flora species and the underlying landforms and soils.

. A range of analyses were on the vegetation plot data and a reliance was placed on keystone species as defined by Havel (1975a and 1975b) and as modified by Mattiske for the northern Jarrah forest. The continuum nature of the vegetation was reflected in the findings for the site-

vegetation types which occur on the lateritic slopes and ridges and the more distinct communities on the swamps and broader valley systems.

. The site-vegetation types were subdivided into six main groupings associated with site conditions which reflected landforms, soils and soil moisture levels. The site-vegetation types on the extreme sites such as granite outcrops and broad valley systems and swamps differ markedly from the forest and woodland areas on the slopes and ridges.

. No Threatened Ecological Communities (TECs) occur in the MN survey area.

. The only botanical Priority Ecological Community has some affinities with the values in G and R (and variants). There is a lack of clarity on the values that determine the presence of the Priority Ecological Community other than the association with the outcrops. On a local scale the outcrop areas are locally very variable from lithic complexes to heaths to open woodlands. The species as recorded by Markey (1997), on the granite outcrops to the west on the Darling Scarp, were compared with those recorded in the site-vegetation types G and R by Mattiske Consulting team in 2020. Of these the main keystone species include *Calothamnus quadrifidus, Borya sphaerocephala, Grevillea bipinnatifida, Allocasuarina humilis* and *Babingtonia camphorosmae*. Of these species the initial four species are associated with shallow soils and granite outcrops. The *Babingtonia camphorosmae* is associated with seasonally moister soils which may occur in a range of site conditions including near run-off areas near granite outcrops.

. A few areas supporting patches of larger trees were designated as potential fauna habitats. These sites supported a mixture of trees with a diameter at breast height greater than 50cm.

Potential Groundwater Dependent Ecosystems

The potential groundwater dependent ecosystems were determined on the basis of the vegetation complexes and when the more detailed site-vegetation type mapping was available the initial interpretations were updated. The dominant and key indicator species which occur in moister and wetter soils on the swamps and lower slopes of the valley systems underpinned the selection of the potential groundwater dependent ecosystems.

Old Growth Forest Areas

State Government mapping indicates that there is a number of patches of Old Growth Forest occurring in the area surrounding the MN survey area, with some occurring within 10 km of the survey area boundary to the north, south, east and west. A small section of Old Growth Forest intersects the survey area in the central part of the south-western boundary of the MN survey area. The survey did not identify any additional areas within the survey area that could potentially be un-mapped Old Growth Forest, based on Department of Parks and Wildlife criteria (DPAW 2017).

Vegetation Condition

The vegetation condition rating was adapted from the EPA (2016b) guidance statement and the earlier work by Keighery (1994) and Trudgen scale (1988), Appendix A5. The condition in the MN survey area was determined on the basis of previous harvesting (DBCA 2020 supplied data), dieback mapping (Glevan Consulting 2020), site-vegetation types as defined and mapped by Mattiske Consulting Pty Ltd, detailed data on logging debris, residual stumps and numbers and types of larger trees (>50cm Diameter at Breast Height). Whilst some forest areas were identified with patches of larger trees that have the potential values of some areas for fauna habitats. Less stumps and logging activities were recorded within the swamp areas and on lower sandier soils in the broader valley types; although dieback disease from *Phytophthora cinnanomi*) has influenced many of the valley systems in the MN survey area (Glevan Consulting 2020).

1. INTRODUCTION

Alcoa of Australia Limited (Alcoa) is proposing to increase production at the Pinjarra Alumina Refinery by 5 percent from 5.0 Mtpa to 5.25 Mtpa and transition the Huntly Bauxite Mine to the proposed Myara North and Holyoake mine regions (the Proposal). The Proposal is located in the Peel Region of Western Australia (WA), approximately 100 km southeast of Perth.

The Huntly Mine is located predominantly within the Shires of Murray, Serpentine-Jarrahdale and Boddington within the Peel Region of Western Australia. The Myara North mine area is south east of the town of Jarrahdale, and the Holyoake mine area is east of Dwellingup.

The Proposal will be subject to environmental impact assessment under Part IV of the WA *Environmental Protection Act 1986* (EP Act), and the *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act). The environmental impact assessment will be via a Public Environmental Review (PER).

Mattiske Consulting Pty Ltd was commissioned in May 2020 by GHD on behalf of Alcoa of Australia Ltd (Alcoa) to conduct a detailed flora and vegetation survey of the MN region.

1.1. Location and Scope of Proposal

The MN survey area lies within tenement ML 1SA. The MN survey area consists of the MN mine Development Envelope (DE) and adjacent conveyor and haul road corridors that connect the DE to the existing Huntly mine operations at the Myara region, Figure 1. The MN survey area lies within the Northern Jarrah Forest subregion of the Southwest Botanical Province (Beard 1990), approximately 50 km south east of Perth, WA (Figure 1).

Parts of this region have previously been surveyed by Mattiske Consulting Pty Ltd between 1991 and 2020 at both a detailed level of site-vegetation type mapping as well as at a regional mapping scale as part of the Regional Forest Agreement (RFA) project by Mattiske and Havel (1998). These studies built on the earlier work of Havel (1975a and 1975b) in the northern Jarrah forest.

This report describes the potential and recorded flora and vegetation values of the MN survey area and places them within a local and regional context.

1.2. Environmental Legislation and Guidelines

The following key Commonwealth (federal) legislation relevant to this survey is the:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The following key Western Australian (state) legislation relevant to this survey includes the:

- *Biodiversity Conservation Act 2016* (BC Act);
- *Biosecurity and Agriculture Management Act 2007* (BAM Act) and *Regulations 2013*;
- *Environmental Protection Act 1986* (EP Act); and
- *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*

Furthermore, key Western Australian guidelines relevant to this survey are the:

- *Environmental Factor Guideline: Flora and Vegetation* (Environmental Protection Authority [EPA] 2016a); and
- *Technical Guidance – Flora and vegetation surveys for environmental impact assessment* (EPA 2016b); and.

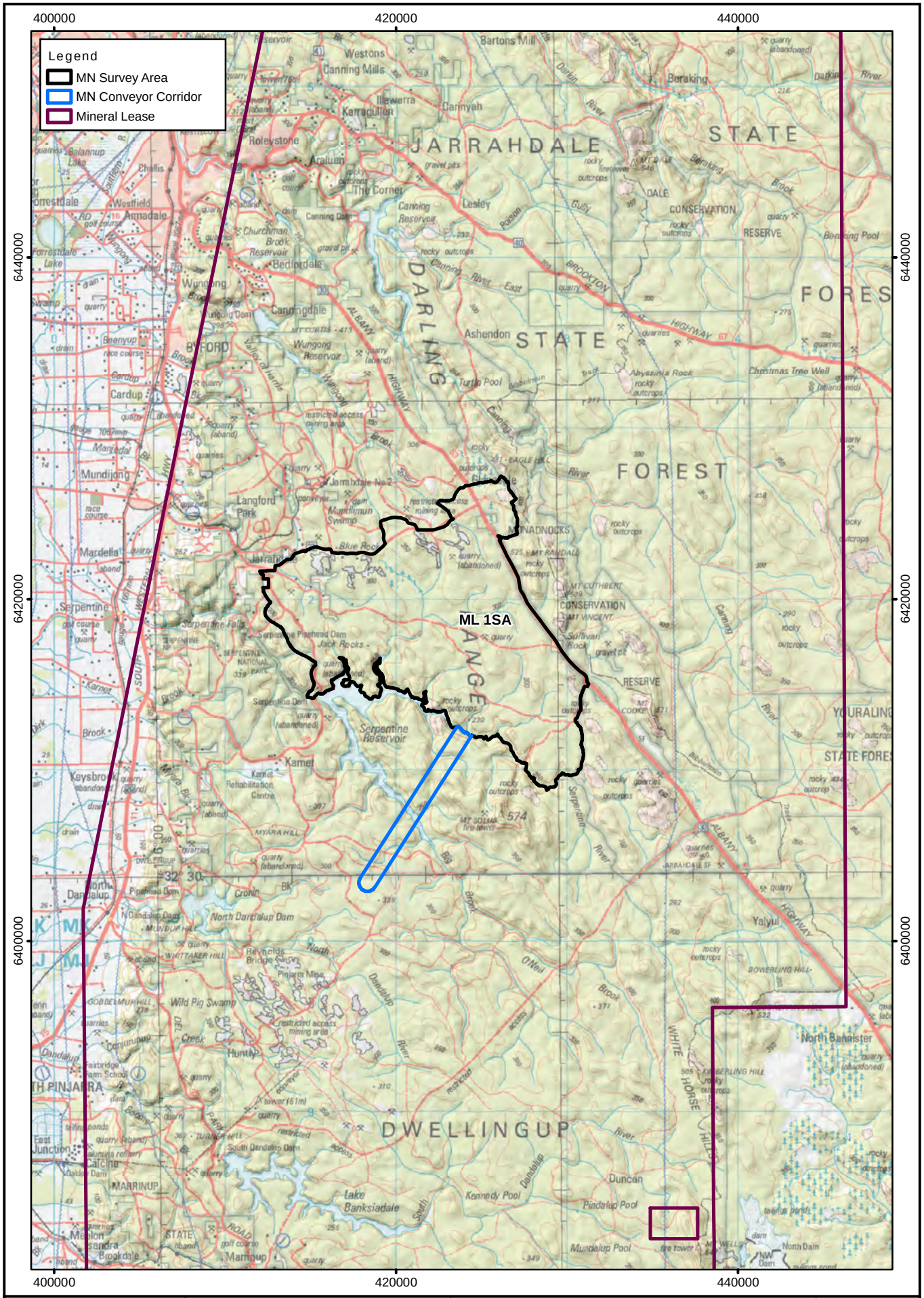
- *Commonwealth of Australia (2013) - Survey Guidelines for Australia's Threatened Orchids. Guidelines for detecting Orchids listed as "Threatened" under the Environment Protection and Biodiversity Conservation Act 1999.*

Definitions of flora and vegetation terminology commonly used throughout this report are provided in Appendix A1-A5.

2. OBJECTIVES

The objective of this assessment was to undertake a detailed flora and vegetation survey of the Myara North (MN) survey area, including:

- Undertake a desktop assessment of the potential native and introduced flora, threatened and priority flora, vegetation, threatened and priority ecological communities, vegetation condition, potential groundwater dependent ecosystems and old growth forests in the MN survey area;
- . Review the matters of local, regional, state and national conservation significance associated with the MN survey area;
- Undertake a detailed assessment of the flora and vegetation of the MN survey area, with an emphasis on native and introduced flora, threatened and priority flora, vegetation, threatened and priority ecological communities, vegetation condition, potential groundwater dependent ecosystems and old growth forests;
- Review previous literature and current databases associated with the MN survey area;
- Review the conservation status of the vascular plant species recorded by reference to current literature and current listings by the Department of Biodiversity, Conservation and Attractions (DBCA 2018a, 2018c) and plant collections held at the Western Australian Herbarium ([WAH] 1998 -), and plants listed by the Department of Agriculture, Water and the Environment [DAWE] (2020a) under the EPBC Act;
- Review the conservation status of the vegetation values recorded by reference to current literature and current listings by the Department of Biodiversity, Conservation and Attractions (DBCA 2020a, 2020c) Department of Agriculture, Water and the Environment [DAWE 2020e) under the EPBC Act;
- Prepare a report summarising the findings.



N

0 2 4 km

Scale: 1:300,000
MGA94 (Zone 50)

CAD Ref: a1992_MyNth_F01_02

Date: March 2021 | Rev: A | A4

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640
Author: E M Matttiske | MCPL Ref: ALC1901
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Locality and Tenements
Myara North survey area

Figure: **1**

3. METHODS

3.1. Desktop Assessment

The NatureMap (DBCA 2007-) and *EPBC Act* Protected Matters Search Tool (DAWE 2020b) databases were used to identify the possible occurrence of flora (including threatened and priority taxa) and threatened and priority ecological communities within the MN survey area.

Searches within NatureMap were centred on the point -32° 21' 54" S, 116° 10' 23" E. A search radius of 20 km. The search parameters used for the *EPBC Act* Protected Matters Search Tool search were the same as those for the NatureMap search. The databases of threatened and priority flora and ecological communities (DBCA 2007-, 2018a. 2018b, 2020a. 2020b) were arranged by CAD Resources (Carine, WA). In addition, any flora recorded by E. Mattiske and Associates) and Mattiske Consulting Pty Ltd (1991-2020) within or adjacent to the survey areas were included. Data was also supplied by the DBCA in 2020 on the timber harvesting and old growth forest records.

In addition, historical documentation and vegetation mapping of the Northern Jarrah forest subregion that provide resource material for the floristics and vegetation of the MN survey area was reviewed, including (E.M. Mattiske and Associates 1991 to 1993) and Mattiske Consulting Pty Ltd (1994 and 2019) reports on their flora and vegetation surveys in the MN survey area. Nomenclature of flora species was checked against and is consistent with Florabase (WAH 1998-).

3.2 Field Surveys

To maintain consistency with previous mapping of the area, enabling spatial and temporal comparisons, flora and vegetation were assessed using site-type classification based on Heddle *et al.* (1980). Sites were pre-designated using a 120 x 120 m grid system overlaid on the survey area. Additional opportunistic sites were surveyed when changes in the vegetation, representing communities which would otherwise have been missed, were encountered whilst walking between designated survey sites. Site data was used to define vegetation types for each survey site. This data was then used in combination with aerial imagery and field observations to map the vegetation of the survey area. Searches for threatened, priority or weed (introduced species) species were undertaken during the field survey work both during the grid survey work and through additional coverage of areas.

The following information was recorded at each vegetation assessment site:

GPS location	Easting, Northing and datum;
Soil types	gravels, sandy-gravels, sandy-loam-gravels, sandy-loams, loams, clay-loams, clays and peat;
Topography	ridge, upper slope, mid-slope, lower slope, valley floor and swamp;
Outcropping	type – granite, laterite, dolerite, and quantity – few, moderate, numerous;
Logging history	light, moderate or heavy, together with number of stumps within a 20 m radius;
Fire history	years since last fire; and
Dieback occurrence	*Phytophthora* spp. demarcation – field blazing, coloured flagging on trees, vegetation deaths, either old or recent.

At each site species were ranked according to the scale developed by Havel (1975a, 1975b). Tree and understorey species were assessed separately using the following method.

Tree species

Tree species (*Allocasuarina fraseriana, Banksia grandis, B. littoralis, B. seminuda, Corymbia calophylla, Eucalyptus marginata, E. megacarpa, E. patens, E. rudis, E. wandoo, Melaleuca preissiana, M. rhaphiophylla, Nuytsia floribunda, Persoonia elliptica, P. longifolia* and *Xylomelum occidentale*) were assessed within a 20m radius from the observation point using the following scale:

0 absent;

1 one or two trees;
2 three to five trees;
3 more than five trees, but contributing less than one third of the total stand;
4 between one third and one half of the total stand; or
5 more than one half of the total stand.

Understorey species

Understorey species were assessed within a 5m radius from the observation point using the following scale:

0 absent;
1 very rarely seen, only after a careful search;
2 present, observable, but in small numbers only;
3 common locally, but not uniform over the whole area;
4 common over the whole area; or
5 completely dominating the understorey.

The physiological stress was determined for each species within a 20m radius from the observation point and ranked according to the following scale.

0 healthy, no evidence of stress;
1 odd plant showing signs of stress, not dead;
2 one or two dead plants, near death;
3 scattered stressed plants, (2-4) dead plants around survey site;
4 susceptible plants dying or dead (> 4 plants); or
5 "graveyard" death

The vegetation and condition conditions rating was based on Keighery (1994) and Trudgen scale (1988), Appendix A5. The condition in the MN survey area was determined on the basis of previous harvesting (DBCA 2020 supplied data), dieback mapping (Glevan Consulting 2020), site-vegetation types as defined and mapped by Mattiske Consulting Pty Ltd, detailed data on logging debris, residual stumps and numbers and types of larger trees (>50cm Diameter at Breast Height), introduced species, degree of disturbance and stages of rehabilitation. Some condition states may be temporary and assessed on current status rather than potential condition state. In areas not traversed, interpretation was based on recent aerial photographic interpretation, previous studies in the area and extrapolation from adjacent areas. Some forest areas were identified with patches of larger trees that have the potential values of some areas for fauna habitats. These sites supported a mixture of trees with a diameter at breast height greater than 50cm. Although previous logging activities and fires may have influenced the flora and vegetation values, the underlying factors such as site tolerances and seasonal conditions have been delineated as key drivers of the flora and vegetation values by a range of authors in the northern Jarrah forest (Havel 1975a, 1975b, Heddle et al. 1980, Mattiske and Havel 1998, Havel 2000). The current state of rehabilitation areas was also considered in the condition rating and as indicated by Grant and Koch (2007) and Daws *et al*. (2021) may be influenced by a range of factors related to age of rehabilitation, site treatments that will influence the resulting structural and floristics on different areas. Consequently, condition states are related to a range of factors and criteria and in this context as such differ from the more generic one in the EPA (2016b) Guidance Statement.

All plant specimens collected during the field survey were dried and processed in accordance with the requirements of the Western Australian Herbarium (WAH). All plant specimens were identified through comparisons with pressed specimens housed at the WAH. Where appropriate, plant taxonomists with specialist skills were consulted. Nomenclature of the species recorded is in accordance with the WAH (1998-).

Twenty-two plots (plots 20m x 20m with 20 x 2m x 2m quadrats in each plot corner and in centre) were established in the dominant site-vegetation types. In each quadrat of each plot data was collected on densities and foliage cover for all species present in the quadrats. The location of each plot was designated

by a peg in the north-west corner and also by recording the northwest easting and northing (GDA94 Datum). This data was then combined with selected previous plot data collected by Mattiske teams and also Alcoa environmental teams within the MN survey area and nearby forest areas. This combined data set was then analysed (Section 3.3).

3.3 Data Analysis

Data analysis of recording sites was undertaken by reference to the interpretation of the presence of keystone species as developed and defined by Havel (1975a and 1975b) and as further developed by Mattiske over some 40 years of extensive vegetation mapping in the northern Jarrah forest. In addition, the position in the landscape, the type or landform and soils and the presence of granite outcrops were taken into consideration in the delineation of site-vegetation types. To enable integration with the surrounding vegetation mapping undertaken over these 40 years by Havel (1975b) and E. Mattiske and Associates (1988-1993) and Mattiske Consulting (2006-2019) the definition of the site-vegetation types were maintained with only slight changes to accommodate local variants.

The vegetation plot data (plots 20m x 20m with 20 x 2m x 2m quadrats in each plot corner and in centre) from the MN survey area and from the previous areas in close proximity to MN survey area from previous plot data in the Jarrahdale and Myara/Huntly areas were combined and analysed using the Plymouth Routines in Multivariate Ecological Research v7 (PRIMER) statistical analysis software was used to analyse species-by-site data and discriminate survey sites on the basis of their species composition (Clarke and Gorley 2015). A range of analyses were undertaken including inclusion of presence/absence data, quantitative data. Introduced species, annual species were excluded from the data set prior to analysis. A range of analyses were undertaken on the plots and as a result a reliance was placed on presence/absence and quantitative foliage cover data keystone species as defined by Havel (1975a and 1975b) and as modified by Mattiske (1988 to 2019) for the northern Jarrah forest. Computation of similarity matrices was based on the Bray-Curtis similarity measure. Hierarchical Clustering (CLUSTER) was used in conjunction with Similarity Profile (SIMPROF) and plot descriptions; combining these methods increased the understanding of plot inter-relations and thus the ability to interpret trends in the survey area.

3.4. Survey Limitations

A general assessment was made of the current survey against a range of factors that may have limited the outcomes and conclusions of this report (Table 1).

Table 1: Potential flora and vegetation survey limitations for the Myara North survey area

Potential Survey Limitation	Impact on Survey
Sources of information and availability of contextual information (*i.e.* pre-existing background versus new material)	Minor constraint: Reference resources such as mapping by Beard (1979), Mattiske and Havel (1998), previous vegetation mapping completed for Alcoa by E.M Mattiske and Associates together with online flora and vegetation information, has provided an appropriate level of information for the current survey. In view of the lack of DBCA data within the defined PEC areas within the MN survey areas affinities with communities on granite outcrops on the Darling Scarp as defined by Markey (1997) raises some issues on which species and site-vegetation types associated with granite outcrops should be aligned with the PEC as defined by DBCA 2020a. A conservative approach was adopted and as such there was a reliance on the site-vegetation types G and R as defined by Havel (1975a, 1975b) and as defined and mapped previously in the northern Jarrah forest.
Scope (*i.e.* what life forms, *etc.*, were sampled)	Not a constraint: Vascular flora, which were the focus of the present survey was sampled on a close grid pattern within the survey area and with an additional 22 Myara plots (20m x 20m) which were integrated with the previous nearby plots near Jarrahdale (14 plots), on the previous mapped areas and in nearby Huntly and Myara forest areas (74 plots) as established by Alcoa which resulted in a total of 110 plots of which 28 occur within or on the fringes of the MN survey area.

Table 1: Potential flora and vegetation survey limitations for the Myara North survey area

Potential Survey Limitation	Impact on Survey
Proportion of flora collected and identified (based on sampling, timing and intensity)	Not a constraint: The survey areas has been sampled over multiple years from previous assessments near Jarrahdale and within the Huntly and Myara areas with the more recent work on the detailed records on the grid system, targeted tracks and extra targeted work on granite areas and in the permanent plots as established. The recent survey effort in the majority of the areas was undertaken in both winter, spring and summer months in 2020 (June to December 2020), with the majority of the work being undertaken in the spring months. The botanists undertaking the field surveys have had extensive experience working with the flora of the Jarrah forest. Any flora which could not be identified in the field was collected for subsequent identification. 91 of the taxa recorded were unable to be identified due to lack of flowering and fruiting material. The majority of the 91 species were unlikely to be threatened and priority flora species. Most of these species occurred as sterile plants (e.g. *Lomandra*, *Lepidosperma, Haemodorum* or *Drosera* species) in genera where conservation status of local species is not applicable.
Mapping reliability	Not a constraint: The vegetation was mainly assessed on a 120m x 120m grid pattern within the survey area. A total of 120 vegetation plots have been established by Alcoa and Mattiske (including an additional 22 plots within the 2020 MN survey area) and 13,556.79 kilometres were surveyed within the Huntly/Myara survey area. This together with over 6000 recording sites and the targeted and opportunistic survey sites (particularly near the granites and swamp areas) enabled intensive coverage of the values on the MN survey area and therefore the associated mapping of key flora values and the site-vegetation types with a high level of confidence.
Timing, weather, season, cycle	Not a constraint: The EPA (2016a) recommends that flora and vegetation surveys in the South – West Botanical Province be conducted in Spring (September-November). The intensive work undertaken in sections of MN has enabled coverage of different seasons with a concentration of effort in the spring months of 2020. The detailed survey work commenced in June and was completed largely by the end of November 2020. As indicated in Figure 2 the seasonal rains occurred in the winter months prior to survey work and although it was drier in some months the rans in May, September and November were higher than the long term averages and hence has not influenced the coverage of the flora. All of the survey sites on the grid systems were supplemented by a series of new and previous permanent plots (20m x 20m) and targeted work on the flora. The majority of the conservation significant flora can be recorded out of season with the exception of the Orchid species (which require flowering material, e.g. *Paracaleana granitica), Tetratheca phoenix, Pimelea rara* and *Stylidium ireneae*. However, the *Paracaleana granitica* and *Tetratheca phoenix* are associated with granitic outcrops which have been less disturbed by activities in the area. Further detailed work has been undertaken in the northern Jarrah forest and near creeklines in the adjacent Serpentine and Huntly area in different seasons (including spring months) and therefore the risks remain relatively low. These assessments have included multiple assessments of plots and transects in nearby Wungong catchment (2009b, 2011b) for the Water Corporation and also in plots for Alcoa.
Disturbances (fire flood, accidental human intervention, *etc.*)	Minor constraint: The majority of the survey area has been subject to previous logging activities and recreational activities, the vegetation of the survey area has been influenced to varying degrees by such activities. Sections of the survey area has been burned in recent years and consequently there was a need to rely on the key perennial species for site-vegetation type mapping. The dieback disease (*Phytophthora cinnamomi*) has also influenced the distribution of flora species in the MN survey area.
Access problems (*i.e.* ability to access survey area)	Not a constraint: Vehicle access through the MN area was only restricted in a small sections in the south that can be covered by foot traverses; although it did lead to a slight decrease in foot traverses and coverage. This southern areas was less diverse than the eastern and northern eastern broader valley systems.
Experience levels (*e.g.* degree of expertise in plant identification to taxon level)	Not a constraint: All botanists had direct and recent experience working in the Jarrah Forest and working for Alcoa and a range of other clients, and thus were familiar with the local flora and vegetation values. Dr Mattiske has more than 40 years of ecological experience in flora and vegetation studies in the southwest forests at a detailed floristic level, as well as detailed and regional vegetation assessment level. The experienced botanists in the Mattiske team included 3 members with more than 7 years in the Jarrah forest and the majority of the other botanists had more than 3 years of intensive Jarrah forest mapping and monitoring plot experience. Plant identifications were assisted by three botanists with more than 7 years working on the identification of flora from the Jarrah forest.

4. DESKTOP FINDINGS

The climate, geology, soils and landforms all influence the vegetation of the area and are described in this section. Potential flora, including threatened, priority and introduced species are described, along with possible vegetation communities, and placed within a local and regional context.

4.1. Climate

Beard (1990) described the climate of this area as being warm Mediterranean, with rainfall of 600 – 1200 mm per annum and 5 - 6 dry months per year. The closest weather station is the Jarrahdale and Karnet weather stations, approximately 1.6km and 11.1km from Jarrahdale town. Annual average rainfall at Jarrahdale (1991-2020) is 1169.2 mm (Bureau of Meteorology [BOM] 2021). Rainfall in 2020 was lower in June, July, August and October and higher in May, September and November (Figure 2). These fluctuations led to an extended spring season following peaks of rain in September and November 2020.

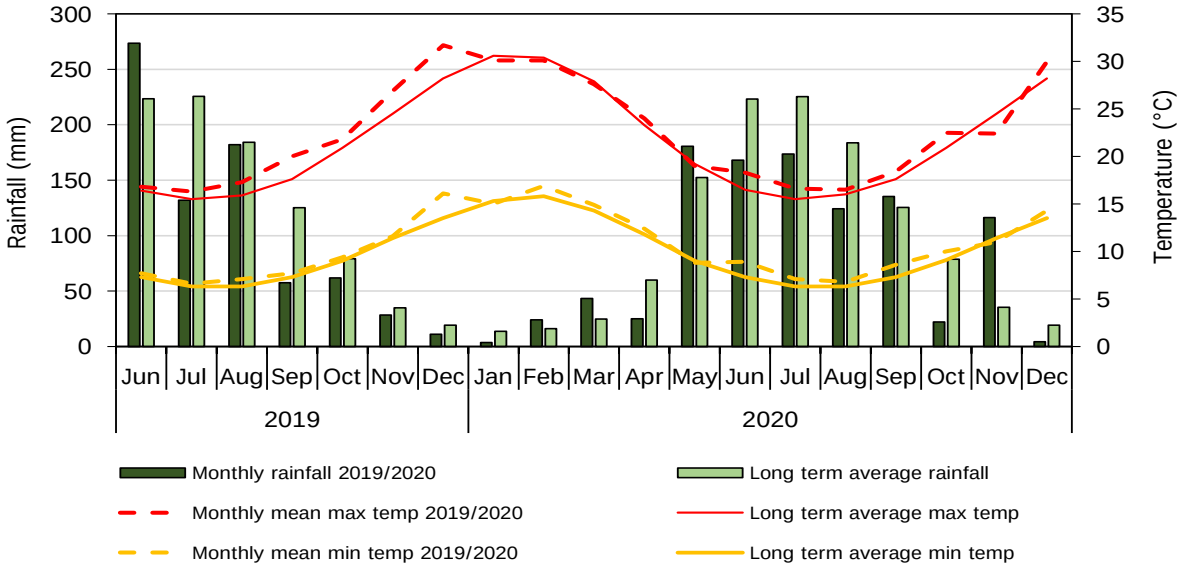


Figure 2: Climatic data for the Myara North survey area
Long term average rainfall and temperature from the Jarrahdale and Karnet weather station (ID 009023 and 009111 respectively, years 1991-2020) (BOM 2020).

4.2. DBCA Estates

The MN survey area is situated in State Forest, with the Serpentine National Park to the west of the survey area, and the Monadnocks Conservation Park to the east (Figure 3).

The Holyoake survey area occurs within the Regional Forest Agreement (RFA) area of the southwest forests DAWE (2020b) and as such was considered during the RFA process.

4.3. Geology, Soils and Topography

The MN survey area is situated within Beard's (1990) Northern Jarrah Forest subregion of the Southwest Province. The Northern Jarrah Forest subregion encompasses the area to the east of the Darling Scarp, overlying Archaean granite and metamorphic rocks of the Yilgarn Craton at an average elevation of 300 m (Beard 1990). The area is capped by extensive lateritic duricrust, dissected by drainage lines and broken

by occasional granite hills. In the eastern section, the laterite becomes deeply dissected until it compresses isolated remnants. The duricrusted plateau of the Yilgarn Craton is characterised by lateritic gravels, consisting of 5 m or more of ironstone gravels in a yellow sandy matrix, and related lateritic podzolic soils with ironstone gravels in a sandy surface horizon. These overlay mottled yellow-brown clay subsoils and hard setting loamy soils, which become evident in the east (Beard 1990).

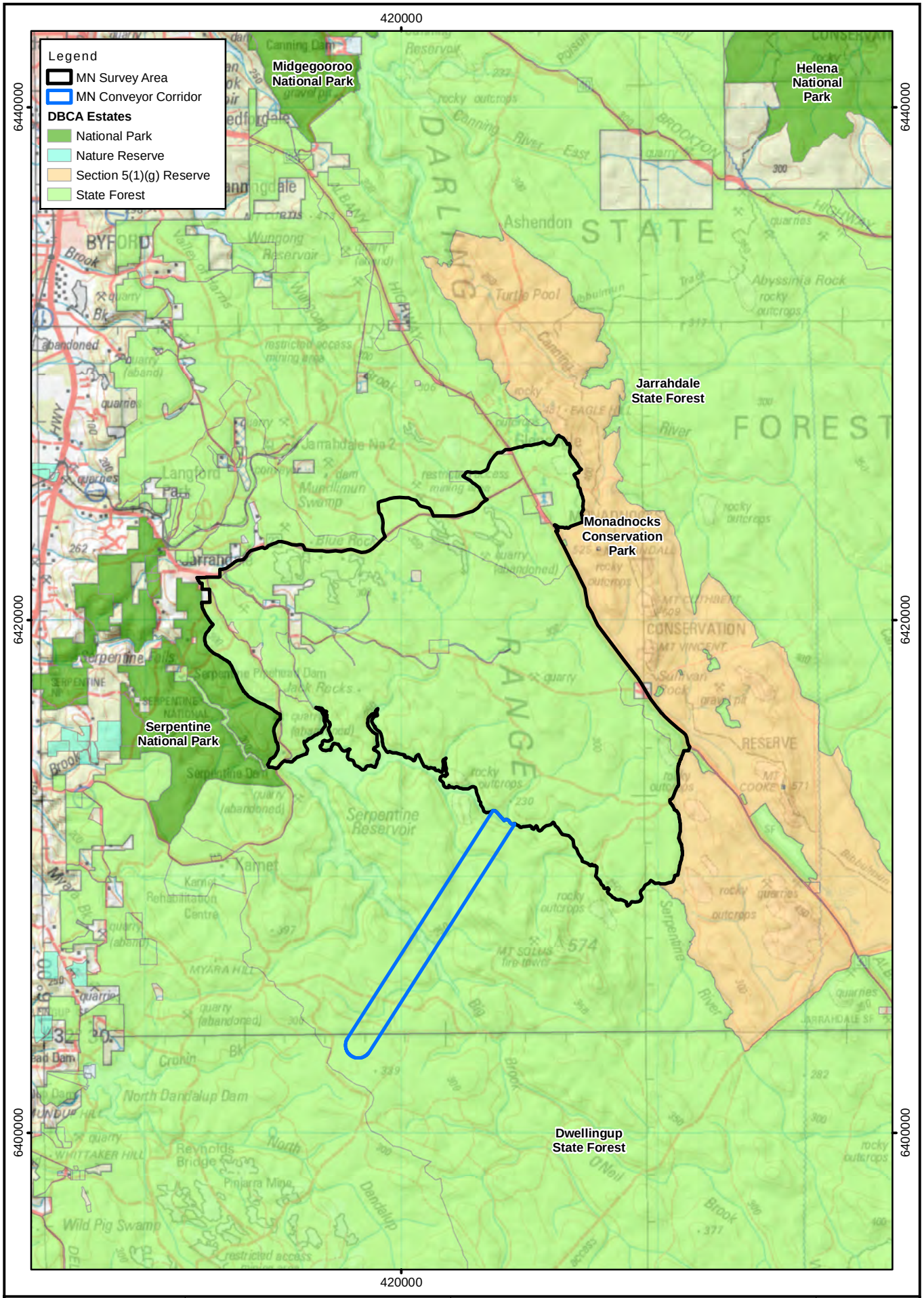
The Department of Primary Industries and Regional Development's (DPIRD) Land Systems present within the MN survey area (Figure 4, Table 2) includes:

1. Darling Plateau System (255Dp): Lateritic plateau. Duplex sandy gravels, loamy gravels and wet soils. Jarrah-marri-wandoo forest and woodland.

2. Murray Valleys System (255Mv): Western Darling Range from the Avon Valley to Harvey. Deeply incised valleys with red loamy earths, shallow duplexes and rock outcrop and Jarrah-marri-wandoo forest and woodland with mixed shrubland.

Table 2: Extent of Land Systems intersecting the Myara North survey area

Land System	Mapping Unit	Total Extent (ha)	Area of Intersection with the Myara North survey area (ha)	Area of Intersection with the Myara Conveyor Corridor (ha)	Proportion of Current Extent (%)
Darling Plateau System	255Dp	820265.76	15714.87	833.42	2.02
Murray Valleys System	255Mv	132642.63	1734.07	258.34	1.50



N

0 1.5 3 km

Scale: 1:200,000
MGA94 (Zone 50)

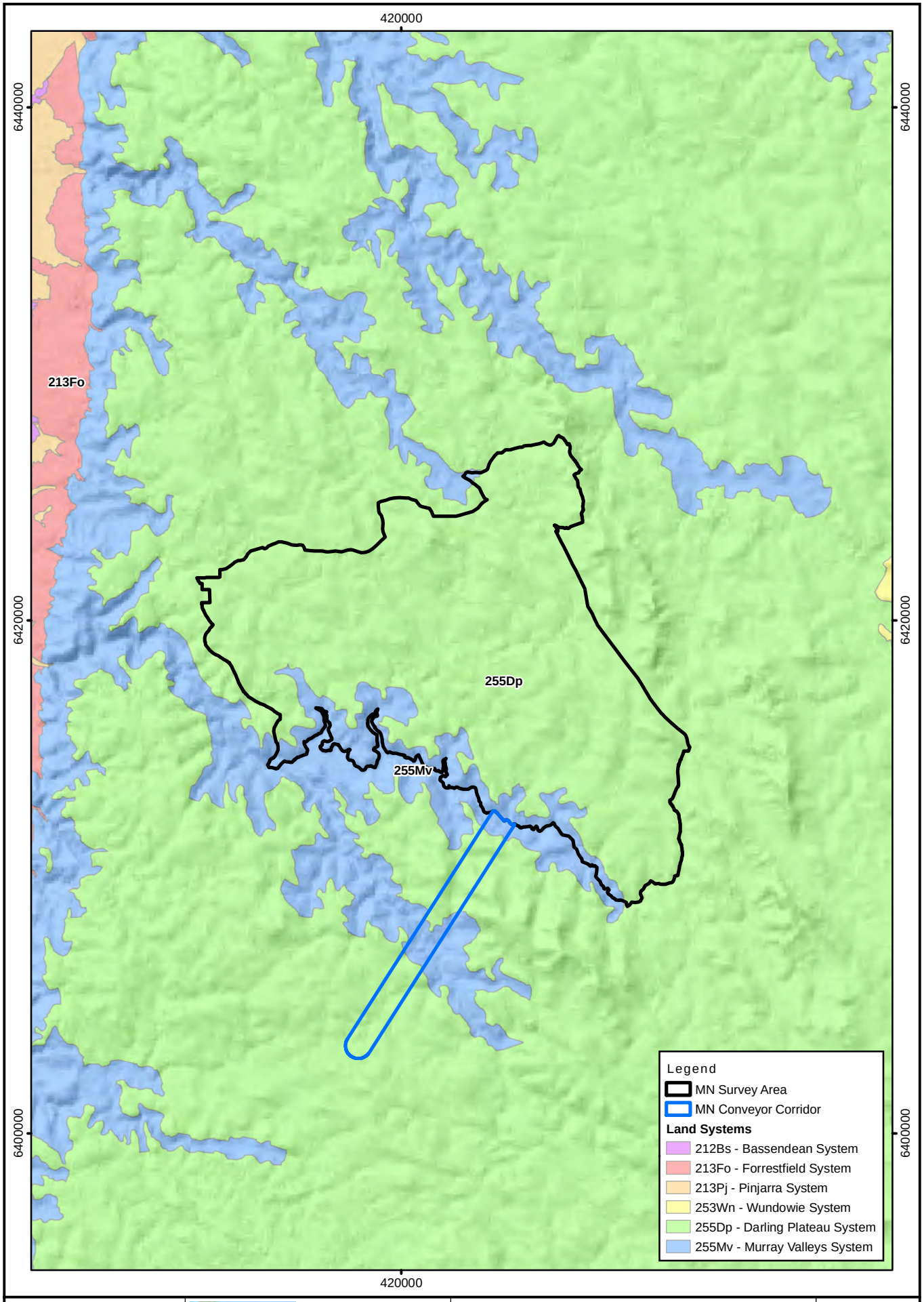
CAD Ref: a1992_MyNth_F01_03

Date: March 2021 | Rev: A | A4

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640
Author: E M Matttiske | MCPL Ref: ALC1901
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

DBCA Estates
Myara North survey area

Figure: **3**



N

0 1.5 3 km

Scale: 1:200,000
MGA94 (Zone 50)

CAD Ref: a1992_MyNth_F01_04

Date: March 2021 | Rev: A | A4

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640
Author: E M Matttiske | MCPL Ref: ALC1901
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Land Systems of the Myara North survey area

Figure: **4**

Furthermore, Western Australia is divided into twelve Systems, separated by natural and demographic boundaries (Department of Conservation and Environment 1980). The survey area lies within the Darling System (as known as System 6), which is further divided into provinces, with the survey area lying in The Darling Plateau province (Department of Conservation and Environment 1980).

The six underlying landform and soil units of the Darling Ranges of Darling Plateau were defined by Churchward and McArthur (1980) and have been updated into eleven soil landscape mapping units (DPIRD 2020 dataset) (Figure 5), namely:

Dwellingup: Gently undulating landscape with duricrust on ridges; sands and gravels in shallow depressions.

1097 Dwellingup Subsystem – Divides, lower to upper slopes and hillcrests. Duplex sandy gravels and loamy gravels with minor areas of shallow gravels, deep sandy gravels, yellow deep sands and yellow and pale deep sands, often gravelly.

3998 Dwellingup 2 Phase - Very gently to gently undulating terrain (<10%) with well drained, shallow to moderately deep gravelly brownish sands, pale brown sands and earthy sands overlying lateritic duricrust.

Murray: Deeply incised valleys with red and yellow earths on slopes; narrow alluvial terraces.

4738 Murray Subsystem - Deeply incised valley of the Murray River; red and yellow earths and minor duplex soils; occasional rock outcrops; narrow sandy terrace.

Yarragil: Valleys of the western part of the plateau; sandy gravels on the slopes; orange earth in swampy floors.

1187 Yarragil Subsystem - Shallow, narrow, upper valleys of the deeply dissected Murray, Bindoon and Helena units. Alluvial, clay and loam soils, moderately well drained, often gravelly, with some sands and loams. Salt prone. Woodland of *E. wandoo, E. accedens.*

4000 Yarragil 1 Phase - Very gentle to moderately inclined concave sideslopes. Moderately well drained yellow duplex soils and yellow and brown massive earths and gravels. Woodland of *E. wandoo, E. marginata, E. accedens. Casuarina obesa* on salt affected areas.

4003 Yarragil 4 Phase - Valley floors with some poorly drained mottled yellow duplex soils and gentle lower slopes with moderately well to well drained loamy and sandy earths, gravels and duplex soils. Low woodland of *E. wandoo, E. marginata* and *Acacia* spp..

6360 Yarragil Swamp Phase - Level to very gently inclined valley floors. Swampy river flats and terraces in granitic rocks; loamy and sandy duplex, wet soils, non-cracking clays and loams.

6820 Yarragil DpYGh Phase - Very gentle to moderately inclined (<20%) concave valley sideslopes. Moderately well drained yellow duplex soils and yellow and brown massive earths.

Other landform and soil units occurring in the survey area include:

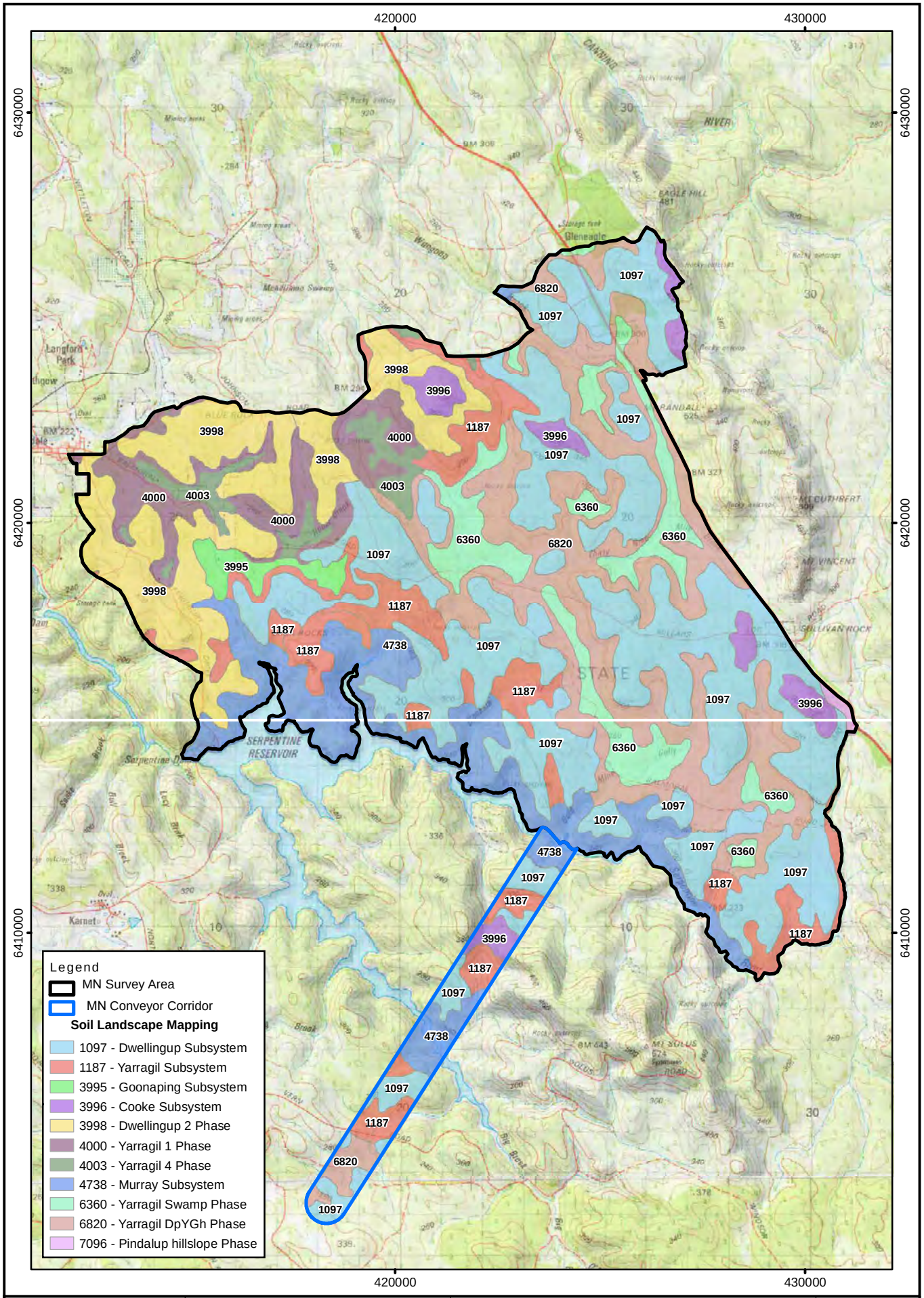
Goonaping: Shallow upland valleys with grey sands and some swamps.
3995 Goonaping Subsystem - Level to gently sloping imperfectly drained swampy margins with deep grey, yellowish brown or brown siliceous or bleached sands.

Cooke: Hills rising above general plateau level; mainly mantled by laterite with some rock outcrop.
3996 Cooke Subsystem - Crests and upper slopes dominated by granite outcrop and very shallow yellow duplex soils, and yellow and brown massive earths.

Pindalup: Valleys of the central part of the plateau; gravelly duplex soils on slopes; some rock outcrop; grey sands, duplex yellow soils and orange earths in broad floors.
7096 Pindalup hillslope Phase - Sideslopes of minor valleys.

Table 3: Extent of Soil Landscapes intersecting the Myara North survey area

Soil Landscape	Mapping Unit	Total Extent (ha)	Area of Intersection with the Myara North survey area (ha)	Area of Intersection with the Myara Conveyor Corridor (ha)	Proportion of Current Extent (%)
Dwellingup Subsystem	1097	231143.22	5513.57	359.48	2.54
Yarragil Subsystem	1187	71930.78	1509.00	276.00	2.48
Goonaping Subsystem	3995	1712.09	211.638	-	12.36
Cooke Subsystem	3996	14044.45	435.42	75.32	3.64
Dwellingup 2 Phase	3998	65466.40	2203.79	-	3.37
Yarragil 1 Phase	4000	13843.54	956.33	-	6.91
Yarragil 4 Phase	4003	5026.70	412.43	-	8.20
Murray Subsystem	4738	61549.36	1734.08	258.27	3.24
Yarragil Swamp Phase	6360	5373.88	1211.11	-	22.54
Yarragil DpYGh Phase	6820	22362.89	3226.71	122.70	14.98
Pindalup hillslope Phase	7096	16507.21	34.88	-	0.21
Total			17448.94	1091.77	



N

0 1 2 km

Scale: 1:125,000
MGA94 (Zone 50)

CAD Ref: a1992_MyNth_F01_05

Date: April 2021 | Rev: A | A4

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640
Author: E M Matttiske | MCPL Ref: ALC1901
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Landform and Soils
Myara North survey area

Figure: **5**

4.4. Regional Vegetation

The survey area is situated within Beard's (1990) Northern Jarrah Forest subregion of the Southwest Province. The Northern Jarrah Forest subregion is characterised by Jarrah (*Eucalyptus marginata*) forest on ironstone gravels and Marri-Wandoo (*Corymbia calophylla* - *Eucalyptus wandoo*) woodlands on loamy soils, with sclerophyll understoreys. Dell and Havel (1989) broadly classified the Jarrah Forest as an open forest in its northern extent and as a tall forest in its southern extent. In lower rainfall areas towards the east trees decrease in size, forming woodlands or low forests. This dry sclerophyllous forest typically comprises a dominant *Eucalyptus marginata* and *Corymbia calophylla* overstorey, a mid-storey of *Allocasuarina fraseriana* (Sheoak), *Banksia grandis* (Bull Banksia), *Persoonia longifolia* (Snottygobble), *Persoonia elliptica* (Spreading Snottygobble), and a groundcover of woody shrubs with grass trees *Xanthorrhoea preissii*, *Kingia australis* and the cycad *Macrozamia riedlei* (Dell and Havel 1989).

The Pre-European vegetation systems present within the MN survey area (Figure 6, Table 4) include:

1. West Darling System
   Vegetation Association 3.3: Medium forest, jarrah-marri.
   Vegetation Association 128.0: Bare areas, rock outcrops.

Table 4: Extent of pre-European vegetation associations intersecting the Myara North survey area

System	Vegetation Association	State-wide Pre-European Extent (ha)	Area of Intersection with the Myara North survey area (ha)	Area of Intersection with the Myara Conveyor Corridor	Proportion of Current Extent (%)
West Darling	3.3	686824.44	17418.60	1091.76	2.69
West Darling	128.0	2036.28	30.35	-	1.49

Heddle *et al*. (1980) defined and described the dominant pre-European vegetation of the Darling System in a series of vegetation complexes as part of the System 6 studies. Mattiske and Havel (1998) updated this initial more restricted mapping coverage to the wider south-west forest region as (Regional Forest Agreement vegetation complexes). Havel, J.J. (2000) summarized in greater detail the relationships between the landforms, soils and climatic conditions. Mattiske and Havel (1998) defined and described nine vegetation complexes in the MN survey area (Figure 7, Table 5). These include:

Cooke (Ce): Mosaic of open forest of *Eucalyptus marginata* subsp. *marginata* - *Corymbia calophylla* (subhumid zone) and open forest of *Eucalyptus marginata* subsp. *thalassica* - *Corymbia calophylla* (semiarid and arid zones) and on deeper soils adjacent to granite outcrops, closed heath of Myrtaceae - Proteaceae species and lithic complex on granite outcrops and associated soils in all climate zones, with some *Eucalyptus laeliae* (semiarid), and *Allocasuarina huegeliana* and *Eucalyptus wandoo* (mainly semiarid to periarid zones).

Dwellingup 1 (D1): Open forest of *Eucalyptus marginata* subsp. *marginata* - *Corymbia calophylla* on lateritic uplands in mainly humid and subhumid zones.

Dwellingup 2 (D2): Open forest of *Eucalyptus marginata* subsp. *marginata* - *Corymbia calophylla* on lateritic uplands in subhumid and semiarid zones.

Goonaping (G): Mosaic of open forest of *Eucalyptus marginata* subsp. *marginata* (humid zones) and *Eucalyptus marginata* subsp. *thalassica* (semiarid to periarid zones) on the sandy-gravels, low woodland of *Banksia attenuata* on the drier sandier sites (humid to periarid

zones) with some *Banksia menziesii* (northern arid and periarid zones) and low open woodland of *Melaleuca preissiana – Banksia littoralis* on the moister sandy soils (humid to periarid zones).

Murray 1 (My1): Open forest of *Eucalyptus marginata* subsp. *marginata* - *Corymbia calophylla* - *Eucalyptus patens* on valley slopes to woodland of *Eucalyptus rudis – Melaleuca rhaphiophylla* on the valley floors in humid and subhumid zones.

Pindalup (Pn): Open forest of *Eucalyptus marginata* subsp. *thalassica – Corymbia calophylla* on slopes and open woodland of *Eucalyptus wandoo* with some *Eucalyptus patens* on the lower slopes in semiarid and arid zones.

Swamp (S): Mosaic of low open woodland of *Melaleuca preissiana – Banksia littoralis*, closed scrub of Myrtaceae spp., closed heath of Myrtaceae spp. and sedgelands of *Baumea* and *Leptocarpus* spp. on seasonally wet or moist sand, peat and clay soils on valley floors in all climatic zones.

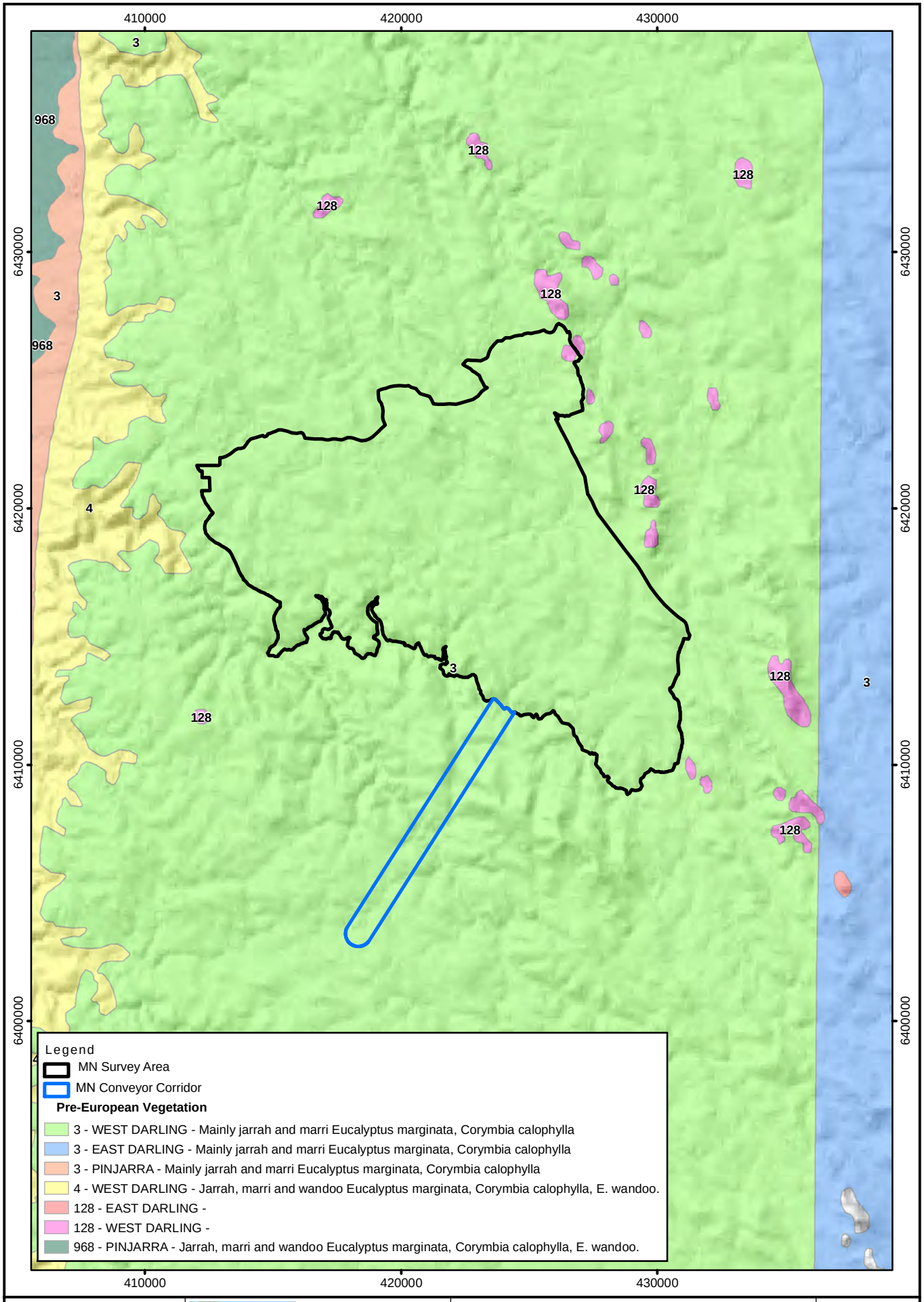
Yarragil 1 (Yg1): Open forest of *Eucalyptus marginata* subsp. *marginata* - *Corymbia calophylla* on slopes with mixtures of *Eucalyptus patens* and *Eucalyptus megacarpa* on the valley floors in humid and subhumid zones.

Yarragil 2 (Yg2): Open forest of *Eucalyptus marginata* subsp. *thalassica – Corymbia calophylla* on slopes, woodland of *Eucalyptus patens – Eucalyptus rudis* with *Hakea prostrata* and *Melaleuca viminea* on valley floors in subhumid and semiarid zones.

Table 5: Extent of Vegetation Complexes intersecting the Myara North survey area

Vegetation Complex	Vegetation Class	Total Extent (ha)	Area of Intersection with the Myara North survey area (ha)	Area of Intersection with the Myara Conveyor Corridor	Proportion of Current Extent (%)
Cooke	Ce	51872.10	435.49	75.31	0.98
Dwellingup 1	D1	297624.85	2630.77	359.40	1.00
Dwellingup 2	D2	120755.00	4951.67	-	4.10
Goonaping	G	38871.59	304.21	-	0.78
Murray 1	My1	97562.81	1745.63	258.36	2.05
Pindalup	Pn	236540.59	34.91	-	0.01
Swamp	S	76245.98	1537.83	-	2.02
Yarragil 1	Yg1	113828.12	871.15	276.02	1.01
Yarragil 2	Yg2	71234.37	4937.29	122.67	7.10

More recently, the vegetation of Western Australia has been assigned to bioregions and subregions under the Interim Biogeographical Regionalisation for Australia (IBRA), with the survey area falling within the Northern Jarrah Forest subregion (JF1) of the Jarrah Forest (JAF) Region (DAWE 2020c). The vegetation of the Northern Jarrah Forest subregion consists of Jarrah – Marri forest, with Bullich and Blackbutt in the valleys to the west, grading to Wandoo and Marri woodlands to the east. Heath vegetation is the common understorey of forests and woodlands and occurs on granite outcrops. The majority of the diversity between communities in this subregion occurs on lower slopes and near granite outcrops (Williams and Mitchell 2001).



N

0 1.5 3 km

Scale: 1:200,000
MGA94 (Zone 50)

CAD Ref: a1992_MyNth_F01_07

Date: March 2021 | Rev: A | A4

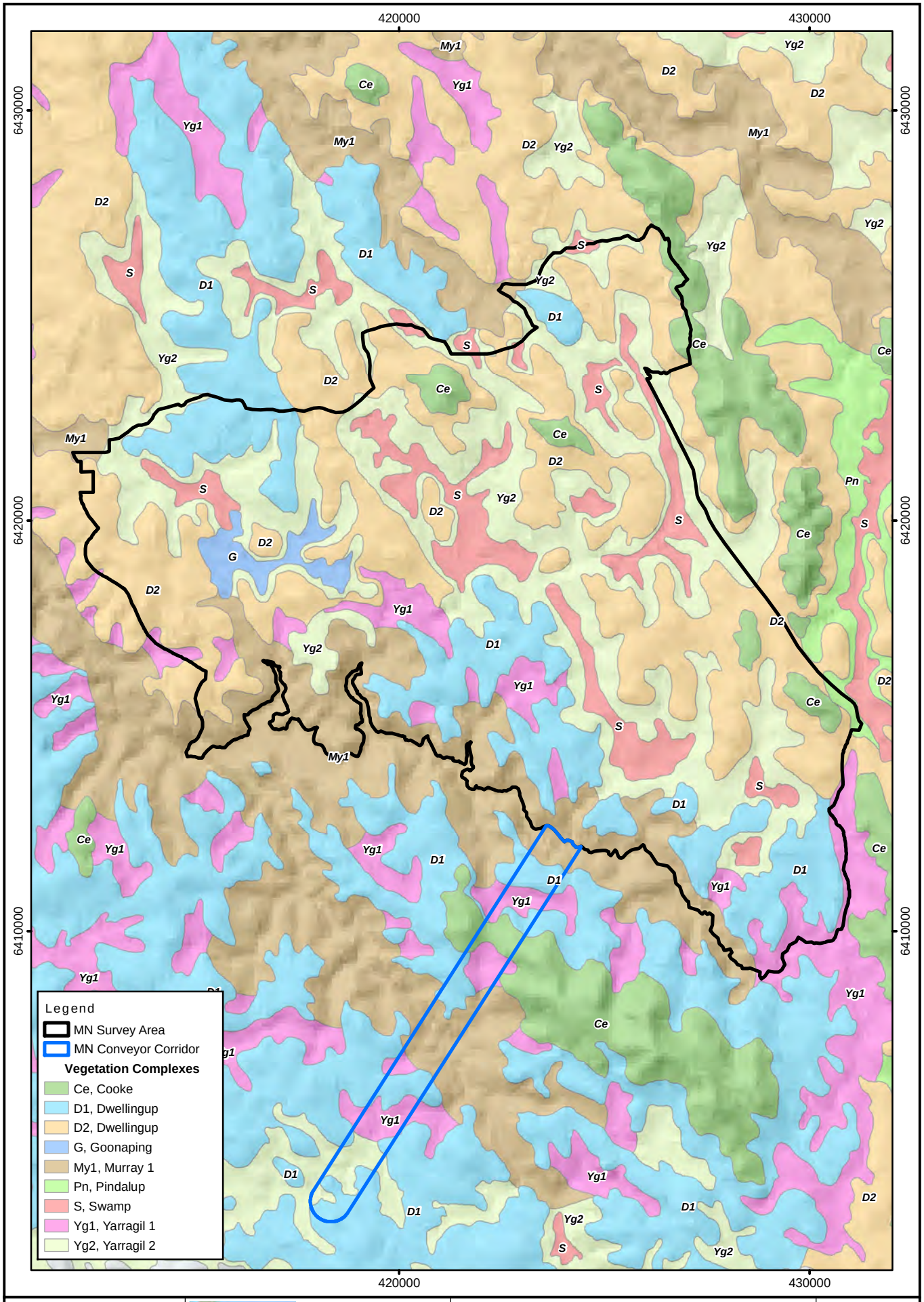
Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640

Author: E M Matttiske | MCPL Ref: ALC1901

Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Pre-European Vegetation
Myara North survey area

Figure: **6**



N

0 1 2 km

Scale: 1:125,000
MGA94 (Zone 50)

CAD Ref: a1992_MyNth_F01_08

Date: March 2021 | Rev: A | A4

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640

Author: E M Matttiske | MCPL Ref: ALC1901

Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Vegetation Complexes
Myara North survey area

Figure: **7**

4.5. Potential Flora

A total of 1454 vascular plant taxa, representative of 411 genera and 108 families, have the potential to occur within the MN survey area. This total was based on NatureMap (DBCA 2007-) and PMST (DAWE 2020b) searches and a summary of all previous data collected during previous surveys within and near MN survey area (E. M. Mattiske and Associates 1988-1993 and Mattiske Consulting Pty Ltd 2006-2019). The most commonly represented families were Fabaceae (175 taxa), Proteaceae (121 taxa) and Myrtaceae (111 taxa). The most commonly represented genera were *Acacia* (61 taxa), *Stylidium* (45 taxa) and *Drosera* (37 taxa).

4.5.1. Potential Threatened and Priority Flora

The PMST, DBCA and Herbarium database searches reported a total of 17 threatened flora species, pursuant to section 179 of the *EPBC Act* and as listed by DAWE (2020a) or pursuant to Part 2, Division 1 and Subdivision 2 of the *BC Act* and as listed by DBCA (2018a) have the potential to occur in the MN survey area.

The DBCA and Herbarium database searches reported a total of 49 priority flora species as listed by DBCA (2018c) have the potential to occur within the MN survey area as recorded within a 20km radius of the MN survey area (Appendix C, Table 6, Figure 8). The likelihood that these species would occur within the survey area was determined using the following criteria:

- Known records within a 20 km radius of the centre of the survey area (as described above). More recent, proximal and numerous records were ranked higher.
- Potential presence of suitable habitat and landforms for the species within the survey area (e.g. soil type, bedrock type, topography, drainage lines, vegetation).

The likelihood was ranked Low, Moderate or High based on current knowledge on database searches using Florabase (WAH 1998-), knowledge of the site preferences of the respective threatened and priority species available from the State Herbarium records and knowledge of the species from the experienced team members.

In summary, the likelihood assessment indicated that a total of no threatened species and 12 priority species have a high likelihood of occurring within the survey area, and 9 threatened species and 19 priority species have a moderate likelihood of occurring within the survey area (Table 6, Appendix C). Of the species with high and moderate likelihood of occurring, the species are mostly associated with swamps (41.9%) or granite outcrops (58.1%) and 61.3% with lateritic gravelly soils. The use of the 20km radius in baseline desktop searches included species that are restricted to the Swan Coastal Plain and a range of species that occur in the main areas on granite outcrops (e.g. Mt Cooke, Mr Windsor and Mt Wells) to the north and east, and the eastern Jarrah forest in lower rainfall areas.

No threatened flora species have a high likelihood of occurring in the MN survey area and the majority occur in areas near granite outcrops and within swamps and valley systems. This interpretation is reinforced by the concentration of threatened flora on the western fringes on the Swan Coastal Plain and Darling Scarp (western fringes of the Darling Ranges) within the 20km radius, Figure 8. Two non-vascular species *Amanita kalamundae* and *Xanthoparmelia darlingensis* were also delineated in the database search, Figure 8; although the scope of the current work did not include survey coverage of non-vascular plant species. *Amanita kalamundae* extends southwards throughout the forest to the southcoast area (Florabase WAH 1998-) and *Xanthoparmelia darlingensis* occurs as disjunct populations near Jarrahdale and the southcoast and as such may reflect the lack of research on non-vascular species in Western Australia.

TABLE 6: SUMMARY OF POTENTIAL THREATENED AND PRIORITY FLORA RECORDED IN THE MYARA NORTH SURVEY AREA BY VEGETATION COMPLEXES, AND DOMINANT LANDFORM AND SOIL GROUPINGS

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; DAWE 2020a) conservation code definitions. A range of species were included in the 20km radius desktop search and depending on location (based collections in State Herbarium - Florabase) and also site conditions were ranked as likelihood of Low, Moderate or High. SVT Code – site-vegetation code based on Havel (1975a and 1975b).

Species	Family	SCC	FCC	Likelihood of Occurrence	20km Radius Search Vegetation complex outside Occurrence	Lateritic Soils on Uplands and Slopes	Granite Outcrops	Valley Systems and Swamps
Anthocercis gracilis	Solanaceae	T	V	Moderate	Not recorded within MN area previously or during 2020 and earlier studies. Recorded in Dwellingup 1 in wider Jarrah forest. Mainly near granites (Florabase records) and less likely in lateritic gravels.		X	
Diuris drummondii	Orchidaceae	T	V	Moderate	Not recorded within MN area previously or during 2020 and earlier studies. On swamps and not likely in lateritic soils.			X
Diuris micrantha	Orchidaceae	T	V	Moderate	Not recorded within MN area previously or during 2020 and earlier studies. On swamps and not likely in lateritic soils.			X
Eleocharis keigheryi	Cyperaceae	T	V	Moderate	Not recorded within MN area previously or during 2020 and earlier studies. On seasonally wetter areas and not likely in lateritic soils.			X
Grevillea flexuosa	Proteaceae	T	V	Moderate	Recorded in Cooke, Ce in wider Jarrah forest. Mainly associated with granites.		X	
Lasiopetalum pterocarpum	Malvaceae	T	E	Moderate	Recorded on Darling Scarp, DS2, Murray 1, My1 and Helena 1, He1, so may extend to granite outcrops. Not in lateritic soils.		X	
Verticordia fimbrilepis subsp. *fimbrilepis*	Myrtaceae	T	E	Moderate	Recorded in Swamps, S in wider Jarrah forest. Some potential in lateritic soils.	X		X
Verticordia plumosa var. *ananeotes*	Myrtaceae	T	E	Moderate	Not recorded within MN area North previously or during 2020 and earlier studies. Not likely in lateritic soils.			X

TABLE 6: SUMMARY OF POTENTIAL THREATENED AND PRIORITY FLORA RECORDED IN THE MYARA NORTH SURVEY AREA BY VEGETATION COMPLEXES, AND DOMINANT LANDFORM AND SOIL GROUPINGS (continued)

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; DAWE 2020a) conservation code definitions. A range of species were included in the 20km radius desktop search and depending on location (based collections in State Herbarium - Florabase) and also site conditions were ranked as likelihood of Low, Moderate or High. SVT Code – site-vegetation code based on Havel (1975a and 1975b).

-Species	Family	SCC	FCC	Likelihood of Occurrence	20km Radius Search Vegetation complex outside Occurrence	Lateritic Soils on Uplands and Slopes	Granite Outcrops	Valley Systems and Swamps
Andersonia sp. Saxatilis (F. & J. Hort 3324)	Ericaceae	P1	-	High	Recorded on Dwellingup, D2 and Cooke, Ce	X	X	
Calytrix simplex subsp. *simplex*	Myrtaceae	P1	-	Moderate	Recorded in Dwellingup 2, D2 within wider Jarrah forest. Potential in lateritic soils.	X		X
Paracaleana gracilicordata	Orchidaceae	P1	-	High	Not likely in lateritic soils as associated mainly with outcrops (may be localised small occurrences in Dwellingup2, D2, Pindalup, Pn) but more likely in Cooke, Ce.		X	
Paracaleana granitica	Orchidaceae	P1	-	High	Mainly on granite outcrops, not in lateritic soils, may be in other complexes if small localised outcrops that are small in size (Dwellingup 2, D2).		X	
Banksia recurvistylis	Proteaceae	P2	-	High	Recorded in Cooke, Ce and Dwellingup 2, D2 within wider Jarrah forest. Less likely in deeper lateritic soils.		X	
Grevillea crowleyae	Proteaceae	P2	-	High	Not recorded within MN previously or during 2020 and earlier studies. East of area in Dwellingup 2, D2.	X		
Grevillea manglesii subsp. *ornithopoda*	Proteaceae	P2	-	High	Recorded in Dwellingup 1, D1 and Murray 1, My1, less likely in deeper lateritic soils.		X	X
Millotia tenuifolia var. *laevis*	Asteraceae	P2	-	Moderate	Recorded in Dwellingup, D2. Potential in lateritic and granite soils.	x	X	
Tetratheca phoenix	Elaeocarpaceae	P2	-	Moderate	Recorded in mainly Cooke, Ce and occasionally in Dwellingup 4, D4 in wider Jarrah forest area. Most likely on granite. Not likely in deeper lateritic soils.		X	
Acacia drummondii subsp. *affinis*	Fabaceae	P3	-	Moderate	Potential in lateritic soils. Recorded in Yarragil 1 within wider Jarrah forest.	X		
Acacia horridula	Fabaceae	P3	-	Moderate	Recorded in Dwellingup, D2, Yarrail 1, Yg1, and Darling Scarp, DS2 in wider Jarrah forest. Potential in lateritic soils.	X	X	

TABLE 6: SUMMARY OF POTENTIAL THREATENED AND PRIORITY FLORA RECORDED IN THE MYARA NORTH SURVEY AREA BY VEGETATION COMPLEXES, AND DOMINANT LANDFORM AND SOIL GROUPINGS (continued)

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; DAWE 2020a) conservation code definitions. A range of species were included in the 20km radius desktop search and depending on location (based collections in State Herbarium - Florabase) and also site conditions were ranked as likelihood of Low, Moderate or High. SVT Code – site-vegetation code based on Havel (1975a and 1975b).

-Species	Family	SCC	FCC	Likelihood of Occurrence	20km Radius Search Vegetation complex outside Occurrence	Lateritic Soils on Uplands and Slopes	Granite Outcrops	Valley Systems and Swamps
Acacia oncinophylla subsp. *oncinophylla*	Fabaceae	P3	-	High	Recorded in Dwellingup 1, D1 in wider Jarrah forest. More likely on granites (Florabase, WAH 1998-)		X	
Andersonia sp. Audax (F. Hort, B. Hort & J. Hort 3179)	Ericaceae	P3	-	High	Recorded on Dwellingup 1, D1, Dwellingup 2, D2, Dwellingup 4, D4, Yarragil 2, Yg2, Swamp, S, Yarragil 2, Yg2 and Cooke, Ce. Potential in lateritic soils.	X	X	X
Conospermum scaposum	Proteaceae	P3	-	Moderate	Recorded in Yarragil 2, Yg2. Not likely in lateritic soils.			X
Grevillea manglesii subsp. *dissectifolia*	Proteaceae	P3	-	Moderate	Recorded in in Dwellingup, D1, Murray 1, My1, Cooke, Ce and Pindalup, Pn. Potential in lateritic soils.	X		X
Halgania corymbosa	Boraginaceae	P3	-	Moderate	Recorded in Darling Scarp 2, DS2. Potential in lateritic soils.	X	X	
Lasiopetalum glutinosum subsp. *glutinosum*	Malvaceae	P3	-	Moderate	Recorded in Dwellingup 1, Darling Scarp 2, DS2 and Murray 1, My1 in wider area. Potential in lateritic soils.	X	X	
Petrophile filifolia subsp. *laxa*	Proteaceae	P3	-	Moderate	Recorded in Yarragil 1, Yg1 in wider area. Not likely in lateritic soils.			X
Pithocarpa corymbulosa	Asteraceae	P3	-	Moderate	Recorded in Yarragil 2, Yg2, Dwellingup 2, D2 and Swamp, S. Not likely in deeper lateritic soils.		X	
Stackhousia sp. Red-blotched corolla (A. Markey 911)	Celastraceae	P3	-	Moderate	Recorded north of MN in Dwellingup 2, D2 in wider Jarrah forest. Potential for occurrence in lateritic soils.	X	X	
Synaphea pandurata	Proteaceae	P3	-	Moderate	Recorded in Pindalup, Pn, Swamp, S and Dwellingup 2, D2 in wider Jarrah forest and earlier studies.	X		X

TABLE 6: SUMMARY OF POTENTIAL THREATENED AND PRIORITY FLORA RECORDED IN THE MYARA NORTH SURVEY AREA BY VEGETATION COMPLEXES, AND DOMINANT LANDFORM AND SOIL GROUPINGS (continued)

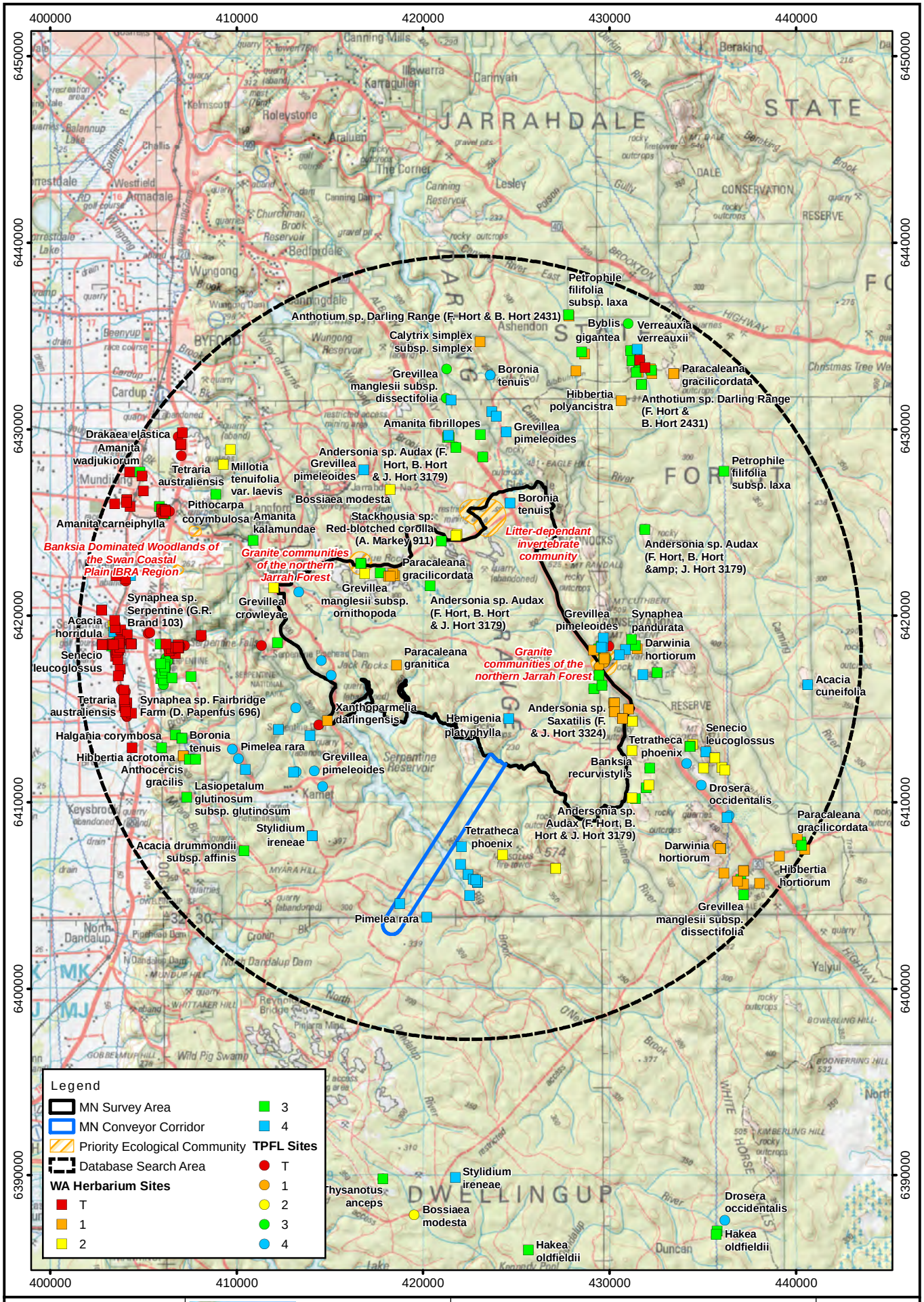
Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; DAWE 2020a) conservation code definitions. A range of species were included in the 20km radius desktop search and depending on location (based collections in State Herbarium - Florabase) and also site conditions were ranked as likelihood of Low, Moderate or High. SVT Code – site-vegetation code based on Havel (1975a and 1975b).

-Species	Family	SCC	FCC	Likelihood of Occurrence	20km Radius Search Vegetation complex outside Occurrence	Lateritic Soils on Uplands and Slopes	Granite Outcrops	Valley Systems and Swamps
Thysanotus anceps	Asparagaceae	P3	-	Moderate	Recorded in Murray 1, My1 and Dwellingup, D1 in wider Jarrah forest. Potential for occurrence in lateritic soils.	X		X
Boronia tenuis	Rutaceae	P4	-	High	Recorded in Dwellingup 2, D2, Yarragil 1, Yg1 and Murray 1, My1 in wider Jarrah forest. Potential in lateritic soils in valleys and on granite outcrops.	X	X	
Chorizema ulotropis	Fabaceae	P4	-	Moderate	Recorded in Dwellingup 1, D1 and Dwelllingup 2, D2 within wider Jarrah forest. Potential in lateritic soils.	X	X	X
Grevillea pimeleoides	Proteaceae	P4	-	High	Recorded in Murray 1, My1, Dwellingup, D1, Dwellingup, D2, Pindalup, Pn and Cooke, Ce in wider Jarrah forest. Although on outcrops, there is potential in lateritic soils.	X	X	
Hemigenia platyphylla	Lamiaceae	P4	-	High	Recorded in Dwellingup 1, D1. Less likely in deeper lateritic soils. Potential in sandy-gravels.	X	X	
Lasiopetalum cardiophyllum	Malvaceae	P4	-	Moderate	Recorded on sandy gravels and further east in wider Jarrah forest. May occur in lateritic soils.	X		X
Parsonsia diaphanophleba	Apocynaceae	P4	-	Moderate	Recorded in Murray 1, My1 and Yarragil 1, Yg1 in wider Jarrah forest. Less likely in lateritic soils.			X
Pimelea rara	Thymelaeaceae	P4	-	High	Recorded in Dwellingup, D1, Dwellingup 2, D2, Murray 1, My1, Yarragil 1, Yg1, Yarragil 2, Yg2, and to a lesser degree Cooke, Ce in wider Jarrah forest. Potential to occur in lateritic soils.	X		
Stylidium ireneae	Stylidiaceae	P4	-	Moderate	Recorded in Yarragil 1, Yg1 and Yarragil 2, Yg2 in wider Jarrah forest ranked as moderate. Not likely in lateritic soils.			X
Stylidium scabridum	Stylidiaceae	P4	-	Moderate	Less likely in lateritic soils, although was recorded in Dwellingup complexes.			X

Eight threatened flora species, *Anthocercis gracilis* (T), *Diuris micrantha* (T), *Diuris drummondii* (T), *Eleocharis keigheryi* (T), *Grevillea flexuosa* (T), *Lasiopetalum pterocarpum* (T), *Verticordia fimbrilepis* subsp. *fimbrilepis* (T) and *Verticordia plumosa* var. *ananeotes* (T), had a moderate likelihood of occurring in the MN survey area. Although raised in initial reviews, *Caladenia huegelii* (T) has been considered to have a low likelihood of occurring in any of the vegetation complexes within the MN survey area, due to it primarily occurring in the Swan Coastal Plain and an isolated population in the northern Jarrah Forest near Toodyay. Seven of these eight threatened flora species with a moderate likelihood occur in either seasonally moister soils or near granite outcrops. Eleven threatened flora species had a low likelihood of occurring in the MN survey area (Appendix C).

Twelve priority flora species, *Andersonia* sp. Saxatilis (F. & J. Hort 3324) (P1), *Paracaleana gracilicordata* (P1), *Paracaleana granitica* (P1), *Banksia recurvistylis* (P2), *Grevillea crowleyae* (P2), *Grevillea manglesii* subsp. *ornithopoda* (P2), *Acacia oncinophylla* subsp. *oncinophylla* (P3), *Andersonia* sp. Audax (F. Hort, B. Hort & J. Hort 3179) (P3), *Boronia tenuis* (P4), *Grevillea pimeleoides* (P4), *Hemigenia platyphylla* (P4) and *Pimelea rara* (P4), had a high likelihood of occurrence, mainly due to previous records in the area and suitable habitat. Nineteen priority flora species had a moderate likelihood of occurrence (Table 6, Appendix C).

All potential threatened and priority flora are listed in Appendix C, along with their State and Federal Conservation Codes (see Appendix A for definitions), a description and an assessment of the likelihood of their occurrence in the MN survey area.



N

0 2 4 km

Scale: 1:275,000
MGA94 (Zone 50)

CAD Ref: a1992_MyNth_F01_06

Date: March 2021 | Rev: A | A4

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640
Author: E M Matttiske | MCPL Ref: ALC1901
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

DBCA Threatened and Priority Flora and Priority Ecological Communities

Figure: **8**

4.5.2. Potential Introduced (Weed) Species and Declared Pest (Plant) Organisms

A total of 192 introduced taxa from 51 families and 127 genera may potentially exist in the MN survey area, based on NatureMap (DBCA 2007-), the *EPBC Act* Protected Matters Search Tool (DAWE 2020b) search results (Appendix D) and records from Mattiske Consulting Pty Ltd (1991-2020) surveys. Ten of these species, * *Asparagus asparagoides*, **Gomphocarpus fruticosus*, **Moraea flaccida*, **Rubus fructicosus* aggregate (**Rubus anglocandicans*, **Rubus laudatus*, **Rubus ulmifolius*, **Rubus ulmifolius* var. *ulmifolius*), **Solanum elaeagnifolium, *Tamarix aphylla* and **Zantedeschia aethiopica*, are declared pest organisms pursuant to section 22 of the BAM Act. A further four of the introduced species, **Chrysanthemoides monilifera*, **Chrysanthemoides monilifera* subsp. *monilifera*, **Lantana camara* and **Salvinia molesta*, are declared pest organisms pursuant to section 22 of the BAM Act, and are also listed as prohibited organisms pursuant to section 12 of the BAM Act. Ten of the introduced taxa, **Asparagus asparagoides, *Chrysanthemoides monilifera* subsp. *monilifera, *Genista monspessulana, *Lantana camara, *Lycium ferocissimum, *Rubus fruticosus* aggregate, **Salix* spp. (except *S. babylonica*, *S.* x *calodendron* & *S.* x *reichardtii*), **Salvinia molesta, *Solanum elaeagnifolium,* and **Tamarix aphylla,* are listed Weeds of National Significance (DAWE 2020d).

**Asparagus asparagoides*, **Moraea flaccida, *Solanum elaeagnifolium, *Tamarix aphylla* and **Zantedeschia aethiopica* have no control category and a declared pest organism keeping category of Exempt for the whole of Western Australia (DPIRD 2020). **Rubus anglocandicans*, **Rubus laudatus*, **Rubus ulmifolius* and **Rubus ulmifolius* var. *ulmifolius* fall into the control category of C3 –Management and have a declared pest organism keeping category of Exempt for the whole of Western Australia (DPIRD 2020). **Gomphocarpus fruticosus* falls into the control category of C3 – Management but does not have a declared pest organism keeping category. **Chrysanthemoides monilifera* subsp. *monilifera* and **Salvinia molesta* fall into the control category of C2 – Eradication and a declared pest organism keeping category of Prohibited for the whole of Western Australia (DPIRD 2020). **Chrysanthemoides monilifera* and **Lantana camara* fall into the control category of C1 – Exclusion and a declared pest organism keeping category of Prohibited for the whole of Western Australia (DPIRD 2020).

Declared pest organisms with a control category of C3 – Management should have a form of management applied that alleviate the harmful impact of the organism, reduce the numbers or distribution or prevent or contain the spread of the organism (DPIRD 2020). A declared pest category of Exempt requires no permits or conditions for keeping, although there may be other requirements under the *Biosecurity and Agriculture Management Act 2007*. Organisms in this category may also be regulated by legislation such as the *Biodiversity Conservation Act 2016* administered by DBCA. Declared pest organisms with a control category of C1 – Exclusion should be excluded from part or all of Western Australia. Declared pest organisms with a control category of C2 – Eradication should be eradicated from part or all of Western Australia. A declared pest organism with the keeping category of Prohibited can only be kept under permit for scientific research, public display or education purposes, by entities approved by the state authority (DPIRD 2020).

An assessment of the likelihood that the 18 significant weed species (Weeds of National Significance and/or declared pest organisms) would occur within the MN survey area (Appendix D) was determined using the following criteria:

- Known records within a 20 km radius of the centre of the survey area (as described above). More recent, proximal and numerous records were ranked higher.
- Potential presence of suitable habitat and landforms for the species within the survey area (e.g. soil type, bedrock type, topography, drainage lines, vegetation).

The likelihood was ranked Low, Moderate or High.

Based on this assessment, 13 of the significant weed species had a moderate likelihood, and five had a low likelihood, of occurring in the MN survey area.

4.6. Potential Groundwater Dependent Ecosystems

The potential groundwater dependent ecosystems (GDEs) were determined initially in the desktop assessment on the basis of the extent of the vegetation complexes (Mattiske Consulting 2020). The version of GDEs based on the vegetation complexes was refined following the site-vegetation type mapping of the MN survey area (see Section 5.9). In view of the extensive flora and vegetation studies in the northern Jarrah Forest the more detailed mapping of the site-vegetation types provides a more specific and comprehensive indication of areas of vegetation that occur on seasonally moister and wetter soils.

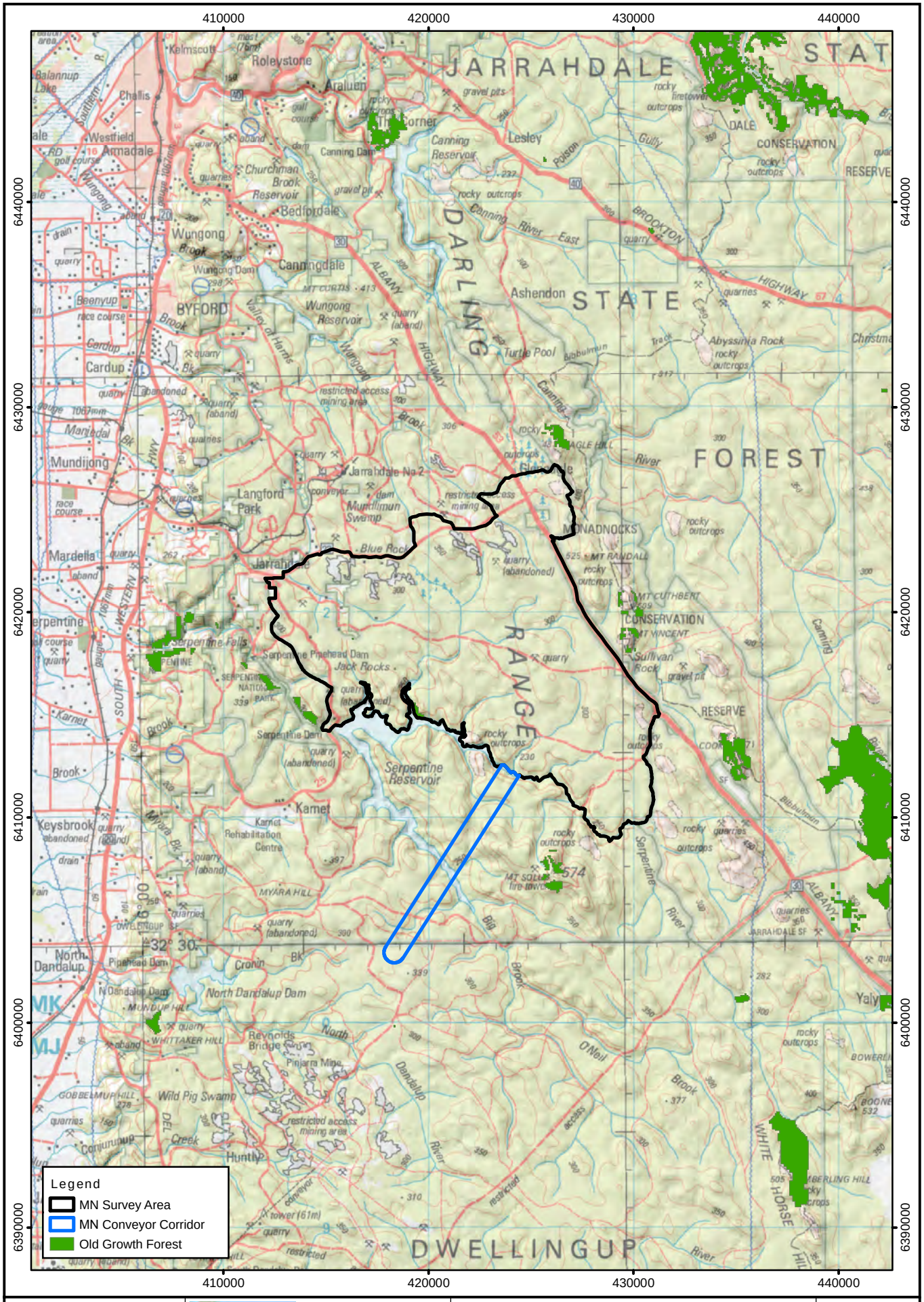
Key indicator plant species that are generally accepted as indicators of moister soils and, hence, potential groundwater dependent ecosystems include – *Banksia littoralis, Hakea varia, Acacia divergens, Pultenaea skinneri, Boronia molloyae, Thomasia paniculata, Astartea scoparia, Eucalyptus rudis, Hypocalymma cordifolium, Melaleuca preissiana, Melaleuca rhaphiophylla, Melaleuca viminea, Baumea* and *Leptocarpus species* and *Taxandria linearifolia. Babingtonia camphorosmae* and *Hypocalymma angustifolium* indicate seasonal moister soils and as such are significant in determining local conditions.

4.7. Old Growth Forests

DBCA mapping indicated that there are a number of patches of old growth forests occurring in the area surrounding the MN survey area, with some occurring within 10 km of the survey area boundary to the north, south, east and west (Figure 9). A small section of old growth forest intersects the survey area in the central part of the south-western boundary of the MN survey area (Figure 9).

Due to the proximity of the MN survey area to the township of Jarrahdale and the Perth population it is unlikely that there will be additional old growth forests in the survey area. Jarrahdale had a timber mill until 1997 after some 125 years of operation (https://www.jarrahdale.com/a-history-of-jarrahdale-western-australia, Dell, Havel and Malajczuk 1989).

The data as presented on the history of harvesting (supplied from period of pre 1920 to 2016) in the area reflects the age of logging on the MN survey area, see Figure 10. These results as supplied by DBCA (2020) reflect the increased logging in the northern section of the MN area and as such reflect previous activities in the area. The areas west of Jarrahdale and a few locations south of Jarrahdale have not been logged for some time. The cleared areas and dam areas reflect early historical clearing efforts. The red areas reflect layering of datasets.



N

0 2 4 km

Scale: 1:250,000
MGA94 (Zone 50)

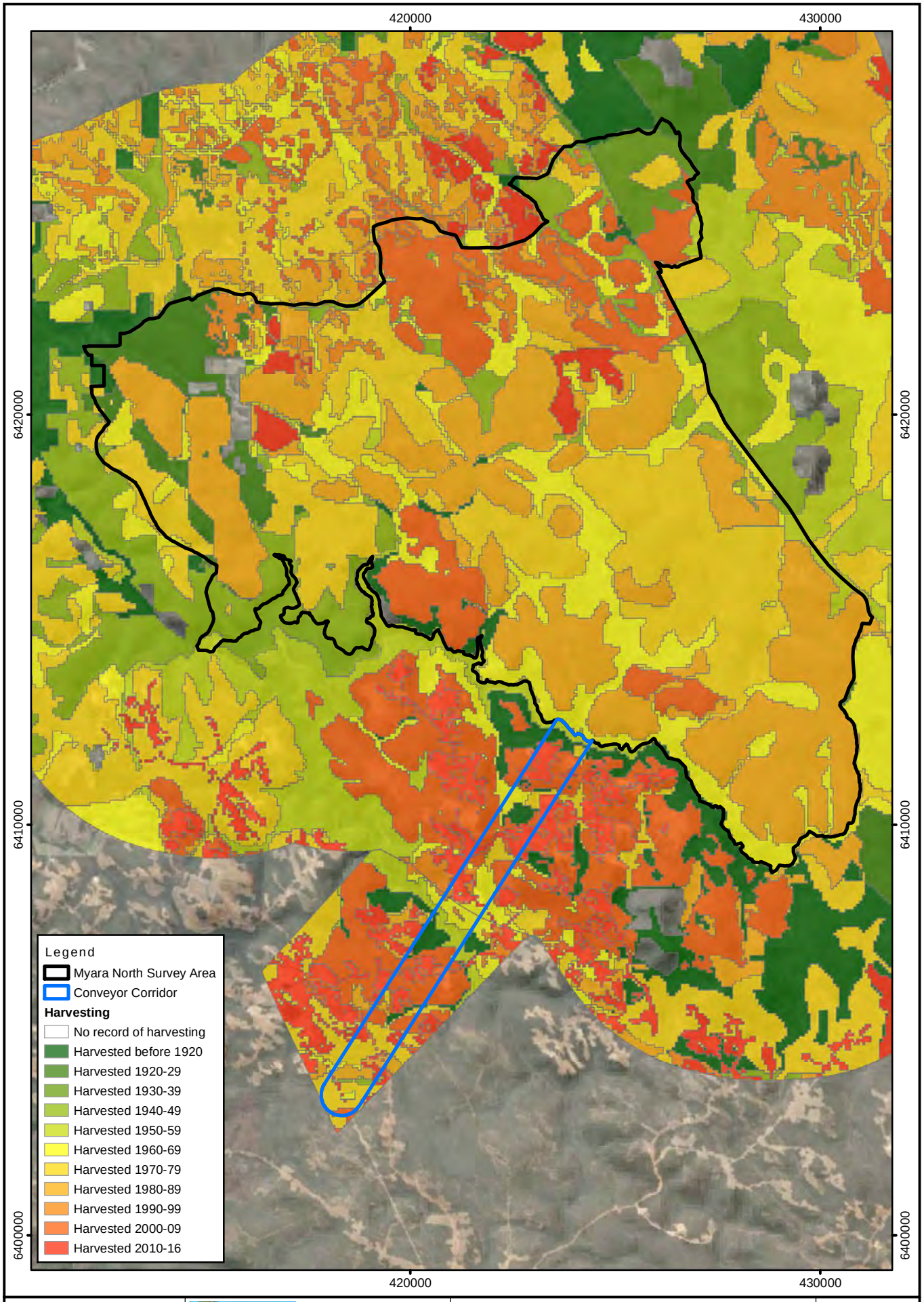
CAD Ref: a1992_MyNth_F01_09

Date: March 2021 | Rev: A | A4

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640
Author: E M Matttiske | MCPL Ref: ALC1901
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Old Growth Forests (as defined by DBCA 2020)

Figure: **9**



N

0 1 2 km

Scale: 1:125,000
MGA94 (Zone 50)

CAD Ref: a1992_MyNth_F01_11

Date: May 2021 | Rev: A | A4

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640
Author: E M Matttiske | MCPL Ref: ALC1901
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Harvest History (as defined by DBCA 2020)

Figure: **10**

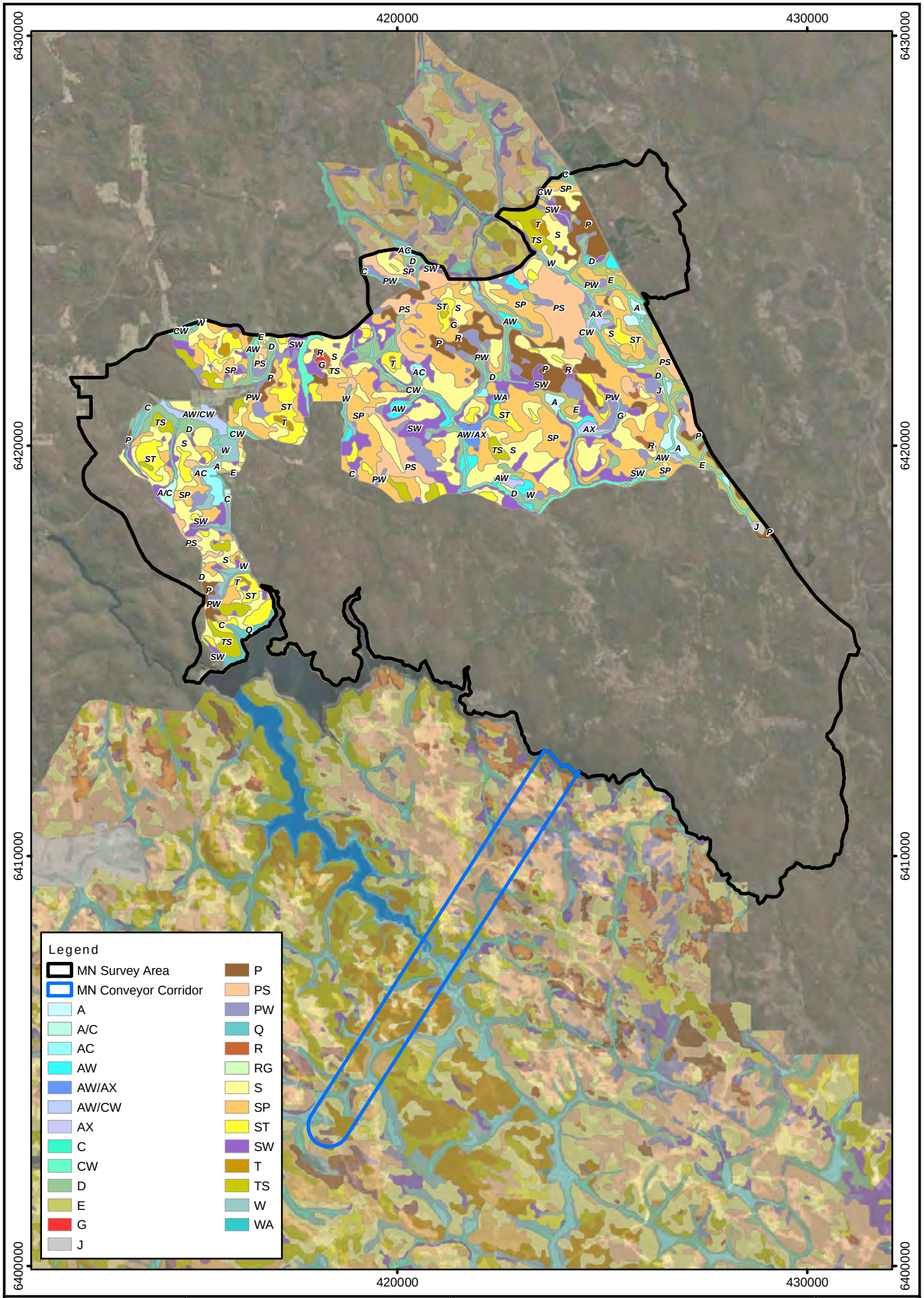
4.8. Previous Surveys

Over the past forty years, Mattiske Consulting has previously mapped the vegetation associated with the Jarrahdale, Huntly (including previous eastern Myara extensions) (E.M. Mattiske and Associates 1988, 1992, 1993 and Mattiske Consulting Pty Ltd 2009, 2011, 2012 and 2019). The most recent local and specific flora and vegetation studies relevant to this current survey, were surveys of the Myara region of the Huntly Mine 2012 and 2019. The Myara survey area (Mattiske Consulting Pty Ltd 2012) report, was compiled from field data collected from 2008, 2009, 2010, 2011 and 2012. During the 2012 survey no threatened flora were recorded, but six priority flora were recorded. These priority species were; *Acacia drummondii* subsp. *affinis* (P3), *Calothamnus rupestris* (P4 in 2012, no longer listed as a priority), *Cyathochaeta teretifolia* (P3), *Senecio leucoglossus* (P4), *Stylidium ireneae* (P4) and *Stylidium longitubum* (P4). The 2019 survey identified three priority 4 flora species; *Grevillea pimeleoides*, *Lasiopetalum cardiophyllum* and *Senecio leucoglossus*. Twenty-three vegetation types were defined and mapped within the MN survey area.

A total of 23 site-vegetation types were defined and mapped in the northern section of the MN survey area by E.M. Mattiske and Associated (1992). This mapping covered the Chandler, South Jarrahdale and Kingsbury Drive areas. The dominant site-vegetation types were P, PS, S, SP, ST and SW (Appendix E for descriptions). Together these covered some 66.34% of the survey area reflecting the dominance of lateritic soils supporting varying types of *Eucalyptus marginata - Corymbia calophylla* with mosaics of *Allocasuarina fraseriana*. The more extreme sites associated with swamps (types A, C, AC, AW and AX and variants) or granite outcrops (types G, RG and R) covered less than 11% and 1% of the area respectively, Figure 11 and Table 7. This is likely to change for the eastern part of MN survey area in view the extensive areas of granite outcrops. The potential presence of several threatened and priority flora species associated with these granite areas are more likely to occur in the eastern section of the MN survey area.

Table 7: Summary of Previous Site-vegetation Types (SVT) mapped by E.M. Mattiske and Associates (1992)

SVT Code	Description	Area_ Ha	% Total
A	Open Woodland of *Melaleuca preissiana* with dense understorey of Myrtaceae species, *Hakea varia* and sedge species on swamp areas.	74.85	1.13
A/C	Mosaic of A and C site-vegetation types.	19.74	0.30
AC	Open Woodland of *Melaleuca preissiana - Banksia littoralis* with dense understorey of Myrtaceae species on swamps and creeklines.	52.07	0.79
AW	Open woodland of *Eucalyptus patens - Corymbia calophylla – Eucalyptus marginata – Banksia littoralis* with low mixed understorey on sandy to loam soils on valley floors.	120.49	1.82
AW/AX	Mosaic of AW and AX site-vegetation types.	21.19	0.32
AW/CW	Mosaic of AW and CW site-vegetation types.	37.87	0.57
AX	Open Woodland *of Eucalyptus rudis – Melaleuca preissiana* with dense understorey of mixed *Melaleuca* species on clay soils in swamps.	43.44	0.66
C	Woodland of *Melaleuca* species - *Banksia littoralis* with dense *Taxandria linearifolia* and *Astartea scoparia* in understorey on creek-lines.	55.11	0.83
CW	Woodland to Open Forest of *Eucalyptus patens - Corymbia calophylla - Banksia littoralis* with dense *Taxandria linearifolia* and *Astartea scoparia* in understorey on creek-lines and water-courses.	298.95	4.52
D	Open Forest of *Eucalyptus marginata - Corymbia calophylla* on lower slopes with mixed low understorey species, including *Babingtonia camphorosmae* and *Acacia extensa* on clay loams to gravelly clay-loams.	371.80	5.62
E	Open Forest to Woodland of *Eucalyptus marginata - Corymbia calophylla* with scattered understorey, including *Kingia australis, Mesomelaena tetragona* and *Babingtonia camphorosmae* on sandy gravels on lower slopes.	268.80	4.06
G	Mosaic of Open Woodland of *Eucalyptus marginata – Corymbia calophylla*, mixed Proteaceae – Myrtaceae heath and Lithic Complex associated with granite outcrops.	8.88	0.13
J	Open Woodland to open forest of *Eucalyptus marginata, Corymbia calophylla* and *Eucalyptus patens* over *Mesomelaena tetragona, Leptocarpus scariosus, Babingtonia camphorosmae* and *Stirlingia latifolia* on broad sandy-loam flats valley slopes.	9.47	0.14
P	Open Forest of *Allocasuarina fraseriana - Eucalyptus marginata - Corymbia calophylla* with scattered understorey, including *Grevillea wilsonii* and *Adenanthos barbiger* and low shrubs, herbs and sedges on sandy gravels.	412.19	6.23
PS	Open Forest of *Allocasuarina fraseriana - Eucalyptus marginata - Corymbia calophylla - Banksia grandis* with scattered understorey, including *Adenanthos barbiger* and *Grevillea wilsonii* on sandy gravel soils.	505.96	7.65
PW	Open Forest of *Allocasuarina fraseriana - Eucalyptus marginata - Corymbia calophylla* with scattered understorey, including *Grevillea wilsonii, Adenanthos barbiger, Babingtonia camphorosmae* and *Hypocalymma angustifolium* on moister sandy gravels.	364.41	5.51
Q	Open Forest of *Eucalyptus marginata - Corymbia calophylla – Eucalyptus patens* on lower slopes with mixed understorey species, including *Trymalium odoratissimum* subsp. *odoratissimum, Acacia extensa* and *Phyllanthus calycinus* on seasonally moister loamy soils.	37.62	0.57
R	Open Woodland of *Eucalyptus marginata - Corymbia calophylla* on fringes of granite outcrops or shallow soils.	33.38	0.50
RG	Open Woodland of *Eucalyptus marginata - Corymbia calophylla* with patches of Heath of Proteaceae – Myrtaceae species on fringes of granite outcrops or shallow soils.	0.65	0.01
S	Open Forest of *Eucalyptus marginata - Banksia grandis – Allocasuarina fraseriana* with scattered understorey, including *Adenanthos barbiger, Leucopogon capitellatus* and *Styphelia tenuiflora* on gravels and sandy-gravels.	1174.78	17.76
SP	Open Forest of *Allocasuarina fraseriana - Eucalyptus marginata - Banksia grandis* with scattered understorey, including *Adenanthos barbiger* and *Leucopogon capitellatus* on sandy-gravels to gravelly soils.	1300.38	19.65
ST	Open Forest of *Eucalyptus marginata - Corymbia calophylla* with scattered understorey, including *Leucopogon capitellatus, Leucopogon verticillatus, Lasiopetalum floribundum* and *Styphelia tenuiflora* on sandy-gravelly soils.	400.01	6.05
SW	Open Forest of *Eucalyptus marginata - Corymbia calophylla – Banksia grandis* with scattered understorey, including *Adenanthos barbiger, Hypocalymma angustifolium* and *Styphelia tenuiflora* on seasonally moister sandy-gravelly soils.	595.63	9.00
T	Open Forest of *Eucalyptus marginata - Corymbia calophylla* with scattered understorey, including *Leucopogon verticillatus, Pteridium esculentum, Clematis pubescens* and *Bossiaea aquifolium* subsp. *aquifolium* on sandy-loam gravelly soils.	38.23	0.58
TS	Open Forest of *Eucalyptus marginata - Corymbia calophylla – Banksia grandis* with scattered understorey, including *Leucopogon verticillatus, Pteridium esculentum, Clematis pubescens* and *Bossiaea aquifolium* subsp. *aquifolium* on sandy-loam gravelly to gravelly soils.	216.91	3.28
W	Open Forest of *Eucalyptus marginata - Eucalyptus patens – Corymbia calophylla* on lower slopes with mixed low understorey species, including *Acacia extensa* and *Hypocalymma angustifolium* on seasonally moister sandy-loam gravelly soils.	144.45	2.18
WA	Open woodland of *Eucalyptus patens - Corymbia calophylla – Eucalyptus marginata – Banksia littoralis* including *Hypocalymma angustifolium* and range of *Myrtaceae* species on sandy loam lower slopes.	8.82	0.13
Total		6618.08 Ha	



N

0 1 2 km

Scale: 1:125,000
MGA94 (Zone 50)

CAD Ref: a1992_MyNth_F03_01

Date: April 2021 | Rev: A | A4

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640
Author: E M Matttiske | MCPL Ref: ALC1901
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Previous Site-Vegetation Type Mapping in Myara North survey area

Figure: **11**

4.9. Potential Threatened and Priority Ecological Communities

There are four threatened ecological communities (TECs) listed at Commonwealth level pursuant to sections 181 and 182 of the *EPBC Act* and listed by the DAWE (2020e) or at State level pursuant to Part 2 of the *BC Act* and as listed by DBCA (2018b) with the potential to occur within the MN survey area.

The threatened ecological communities with the potential to occur within the survey area are:

- Banksia Woodlands of the Swan Coastal Plain ecological community
- *Corymbia calophylla* - *Kingia australis* woodlands on heavy soils of the Swan Coastal Plain
- *Corymbia calophylla* - *Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain
- Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain Ecological Community

None of the above mentioned TECs would occur in the MN survey area, as these threatened ecological communities are restricted to the Swan Coastal Plain and as such do not extend into the Jarrah forest area on the Darling Ranges.

There are two priority ecological communities (PECs), as listed at State level by DBCA (2020a) that occur within the MN survey area (Figure 8); only one of these is a botanical PEC. The PEC on the granite outcrops has potential to occur elsewhere in the survey area. The litter dependent invertebrate PEC is not a botanical community and is not addressed further in this report.

The priority ecological communities that occur in the MN survey area are:

- Granite communities of the northern Jarrah forest (P3)
    - Jarrahdale area – Monadnocks, Blue Rock; insufficient information to distinguish discrete community type/s (DBCA 2020a).
- Litter Dependant Invertebrate Community of the northern Jarrah Forest (P2)
    - Chandler Block, Northern Jarrah Forest; insufficient evidence that this is a discrete community type (DBCA 2020a).

4.10. Wetlands of International Importance (Ramsar)

The Peel-Yalgorup System, a listed Ramsar Wetland of International Importance, is located in the City of Mandurah local government area and consists of shallow estuaries, freshwater marshes and coastal saline lakes that include the Harvey Estuary, Peel Inlet, Lake McLarty, Lake Mealup and ten Yalgorup National Park wetlands (DAWE 2020f). The fringing vegetation is mainly samphire, rushes, sedges and paperbark communities. The Peel-Yalgorup System supports a wide variety of waterbirds, invertebrates and estuarine and marine fish and is considered the most important area for waterbirds in south-western Australia (DAWE 2020f). Whilst these potential values were recognized in the PMST database search (DAWE 2020b) these wetlands occur west of the survey area and not in the MN survey area.

5. FIELD STUDIES FINDINGS

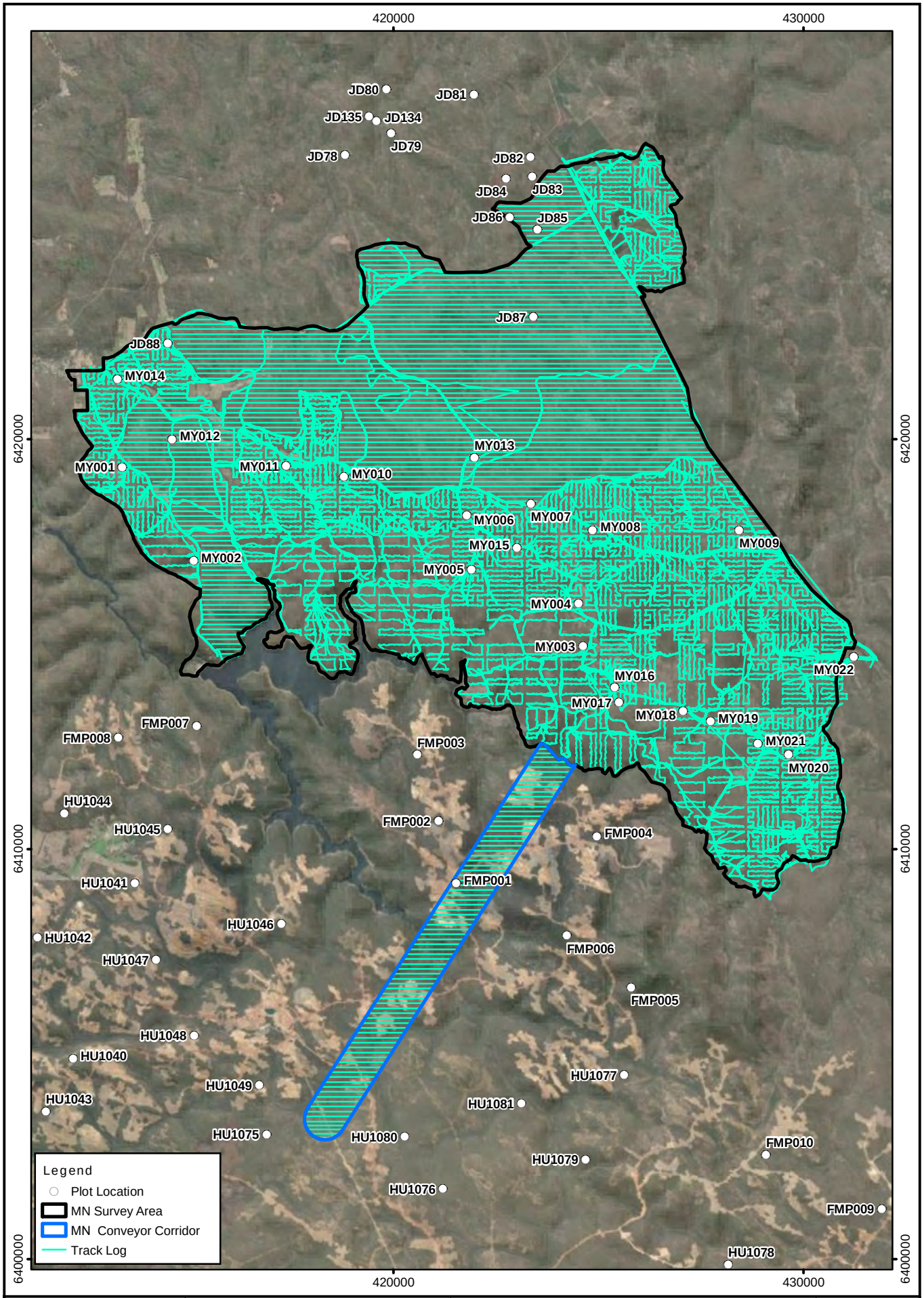
The following text summarises the key findings from recent studies in 2020 as well as the previous datasets collected from flora and vegetation studies within and near the MN survey area; which includes recording sites for vegetation mapping, vegetation plot measurements and opportunistic and targeted assessments.

5.1 Survey Effort

The survey efforts has been undertaken over a decade from multiple studies with the major effort in 2020 which when combined with the depth of previous studies in adjacent areas for both Alcoa and also other clients leads to the conclusion that the work exceeds the current EPA Guidance Statement (2016a and 2016b) expectations for flora and vegetation studies.

The survey effort to date has included (see Figure 12):

- A total of 302 field assessment days in 2020 which when combined with earlier studies in the northern section and on the corridor amounts to more than 360 field assessment days and as such provides a comprehensive coverage of all areas;
- 13,556.79 kilometres of foot transects which includes all previous mapping efforts in the MN survey area;
- 6121 recording sites in 2020 on a grid system which varied slightly from 120m x 120m with some sites closer than this average and some slightly wider. If all sites on the northern section and those on the corridor are included the number of recording sites exceeds 6400 recording sites. This pattern of recording is consistent with previous ecological studies in the northern Jarrah forest for both Alcoa but also other clients in nearby areas such as 31 Mile Creek on the southern edges of the Canning River (north-west of current survey area), the Wungong catchment to the west and the extensive mapping undertaken for Alcoa over several decades to the west and south of the MN survey area;
- 22 permanent plots within the recently mapped MN area, 74 permanent plots in the Myara and Huntly area, 10 forest permanent plots in the wider Myara and Huntly areas and 14 in the Jarrahdale area (including those within the northern section of the current MN survey area); resulting in a total of 120 plots within the Myara/Huntly Region. These plots covered replicates of the dominant forest areas and representative plots in other key site-vegetation types. Nineteen plots from nearby MN survey area were included with the previous plots and the Myara plots as established in 2020 within the MM survey area. As indicated in the previous section the recording sites enabled increased coverage of the outcrop, swamp and valley systems for the flora than the plots;
- targeted searches were undertaken throughout the survey area during the broader vegetation mapping but also on additional extreme sites that were variable within the broader Yarragil and Swamp vegetation complexes and on the granite and outcropping areas in the MN survey area. The coverage of the flora on the granite and swamp areas relied on the recording sites rather than plots as these areas were locally variable and patchy in both structural and floristic components;
- detailed and consistent data collection on position in the landscape, soils, flora, vegetation and vegetation condition; and
- consistent interpretation in line with previous site-vegetation studies where there is a greater reliance on key indicator species and a series of site parameters rather than the accepted clustering and groupings. Such an approach differs from the EPA guidance statement, but if the NVIS approach was followed the dominance of some tree and understorey species in the analyses would lead to a less comprehensive delineation of biodiversity values and also be inconsistent with the approach adopted on all other Alcoa leases where detailed flora and vegetation studies have been undertaken in the past by the Mattiske team and site personnel. In summary, the survey effort easily exceeds the expectations of the EPA Guidance Statement (2016a, 2016b).



N

0 1 2 km

Scale: 1:125,000
MGA94 (Zone 50)

CAD Ref: a1992_MyNth_F05_01

Date: March 2021 | Rev: B | A4

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640

Author: E M Matttiske | MCPL Ref: ALC1901

Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Tracks and Plots in North Myara survey area

Figure: **12**

5.2 Flora

The range of flora collected to date on the MN survey area is summarized in Table 8, Appendices F, H and I. As the survey efforts were undertaken over multiple years and also seasons the coverage of the flora was considered to exceed the EPA (2016a and 2016b) guidance statements expectations. The recent vegetation plots were established in the spring months and as the recordings on the grids was undertaken over a 6 month period the coverage of the flora in more diverse and spatially more complex areas such as the swamps, broad valley systems and the outcrops was considered to be comprehensive.

From the field studies associated with mapping and the plots a total of 543 taxa and 438 taxa respectively (see Table 8) were recorded. A total of 681 taxa from 69 families, 231 genera were recorded in the MN survey area in 2020 on the basis of plots, targeted searches and recording sites.

Table 8: Summary of Flora Species on the Myara North survey areas

(see Appendices F, H and I)

Source	Families	Genera	Native Taxa	Introduced Taxa
Myara Plots 2020	55	172	438	17
Myara/Huntly Regional Forest Plots	55	160	360	18
Myara Vegetation Mapping 2020	65	199	543	15
Myara/Huntly Regional Mapping	73	246	731	38
Nature Map Potential Flora Species (Appendix B)	94	351	1168	149
Nature Map and Additional Potential and recorded Species (see Appendix B)	108	412	1454	192

The occurrence of species in the respective site-vegetation types within the plots and the recordings sites are summarized in Appendices H and I.

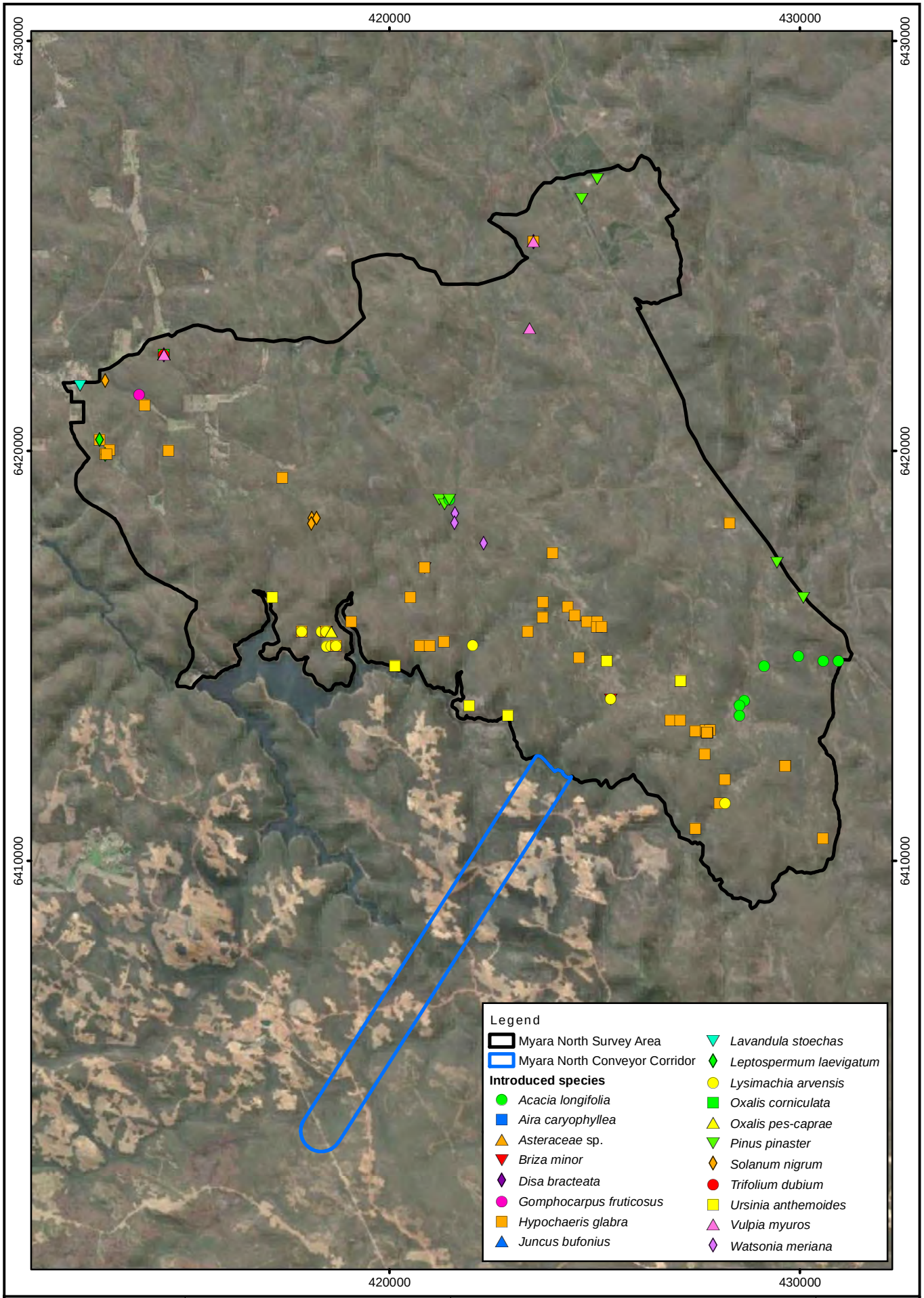
5.3 Introduced Flora Species

The detailed flora and vegetation survey included baseline weed mapping. A total of 58 introduced were recorded in the MN survey. One of the introduced species are declared pest organisms pursuant to section 22 of the BAM Act, namely:**Gomphocarpus fruticosus,* Appendix G (DPIRD 2020), Figure 13. None of the introduced species are listed as a Weed of National Significance (WONS) (DAWE 2020d). Of the 58 introduced species, 8 have been ranked as High Ecological Impact by DPAW (2014), Appendix G, and Table 9. Of the 58 introduced species, 24 have been ranked as Rapid Invasiveness by DPAW (2014) Appendix G.

Many of these species are short lived annuals or associated with the cleared or plantation areas. The species that are either declared weeds (DPIRD 2020) or have a High Ecological Impact are summarised in Table 9. Of these the **Gomphocarpus fructicosus* is found near cleared and degraded areas, **Leptospermum laevigatum* is found within previous disturbance and tracks,**Watsonia meriana* is associated with valley floors and creek lines. The remainder are associated with degraded and completely degraded areas and fringes of road and tracks.

Table 9: Summary of Weeds of National Significance, Declared Weeds or Introduced Flora with a High Ecological Impact (see Appendix G)

	SPECIES	WONS Weeds (DAWE 2020d)	Weeds Status (DPIRD 2020)	EI (DPAW 2014)
*	*Gomphocarpus fruticosus*	N	Declared Pest - s22(2)	U
*	*Acacia dealbata* subsp. *dealbata*	N	Permitted -s11	H
*	*Leptospermum laevigatum*	N	Permitted -s11	H
*	*Watsonia meriana*	N	Permitted -s11	H
*	*Avena fatua*	N	Permitted -s11	H
*	*Cynodon dactylon*	N	Permitted -s11	H
*	*Oxalis pes-caprae*	N	Permitted -s11	H
*	*Plantago lanceolata*	N	Permitted -s11	H
*	*Romulea rosea*	N	Permitted -s11	H



N

0 1 2 km

Scale: 1:125,000
MGA94 (Zone 50)

CAD Ref: a1992_MyNth_F09_01

Date: April 2021 | Rev: A | A4

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640
Author: E M Matttiske | MCPL Ref: ALC1901
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Introduced Species

Myara North Survey Area

Figure: **13**

5.4 Threatened and Priority Flora

No Threatened flora species, pursuant to section 179 of the *EPBC Act* and as listed by DAWE (2020a) or pursuant to Part 2, Division 1 and Subdivision 2 of the *BC Act* and as listed by DBCA (2018a) were recorded during the detailed flora and vegetation survey of the MN survey area. The location of known populations from DBCA (WAH and TPFL 2020c) records and from recent assessments are illustrated on Figures 16.3 to 16.9 and overlain on the site-vegetation types. The lack of threatened flora is key outcome of the survey effort and as such reinforces the desktop assessment which found a moderate to low likelihood of threatened flora occurrence and the occurrence of the threatened in the western area on the Swan Coastal Plain, rather than the Darling Ranges on the Darling Plateau.

Fourteen Priority flora species as listed by DBCA (2018c) have been recorded in the MN survey area (Appendices H and I), Table 10, Figures 16.3 to 16.9. Additional Priority flora species (*Acacia oncinophylla* subsp. *oncinophylla, Boronia tenuis, Bossiaea modesta, Banksia recurvistylis, Grevillea crowleyae, Grevillea manglesii* subsp. *dissectifolia* and *Grevillea pimeleoides*) were recorded on the fringes of the MN survey area, Table 10, Figures 16.3 to 16.9. The populations and numbers of plants are summarized in Table 10.

The results summarized reflect the importance of the granite outcrop areas (G) and the sandier and sandy-gravel soils (D, DA, E, P, PW, PS), Table 10. A few of the Priority species occur on the more gravelly soils (S, SP and T). A further summary for all of these species is provided in Appendices C, H and I and Table 10. Several species (*Pimelea* sp., *Thysanotus* sp. and *Stylidium* sp.) lacked definitive flowering and fruiting material and as such could not be confirmed that these were not Priority species.

There is a higher concentration of the Priority flora species on the eastern fringes of the MN survey area supports species that are more tolerant of sandier soils and outcrops.

TABLE 10: SUMMARY OF THREATENED AND PRIORITY FLORA RECORDED IN THE MYARA NORTH SURVEY AREA

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; DAWE 2020a) conservation code definitions. The absence in the Vegetation Complex and Site-Vegetation Type (SVT) columns reflects the absence within the Myara North survey area. A range of species were included in the 20km radius desktop search and depending on location (based collections in State Herbarium - Florabase) and also site conditions were ranked as likelihood of Low, Moderate or High. SVT Code – site-vegetation code based on Havel (1975a and 1975b).

Species	Family	SCC	FCC	Likelihood of Occurrence	20km Radius Search Vegetation complex outside Occurrence	Vegetation complex Occurrence within Myara North survey area	SVT Codes within Myara Survey Area	No. Populations & No. Plants
Anthocercis gracilis	Solanaceae	T	V	Moderate	Not recorded within MN area previously or during 2020 and earlier studies. Recorded in Dwellingup 1 in wider Jarrah forest. Mainly near granites (Florabase records) and less likely in lateritic gravels.			
Diuris drummondii	Orchidaceae	T	V	Moderate	Not recorded within MN area previously or during 2020 and earlier studies. On swamps and not likely in lateritic soils.			
Diuris micrantha	Orchidaceae	T	V	Moderate	Not recorded within MN area previously or during 2020 and earlier studies. On swamps and not likely in lateritic soils.			
Eleocharis keigheryi	Cyperaceae	T	V	Moderate	Not recorded within MN area previously or during 2020 and earlier studies. On seasonally wetter areas and not likely in lateritic soils.			
Grevillea flexuosa	Proteaceae	T	V	Moderate	Recorded in Cooke, Ce in wider Jarrah forest. Mainly associated with granites.			
Lasiopetalum pterocarpum	Malvaceae	T	E	Moderate	Recorded on Darling Scarp, DS2, Murray 1, My1 and Helena 1, He1, so may extend to granite outcrops. Not in lateritic soils.			
Verticordia fimbrilepis subsp. *fimbrilepis*	Myrtaceae	T	E	Moderate	Recorded in Swamps, S in wider Jarrah forest. Some potential in lateritic soils.			
Verticordia plumosa var. *ananeotes*	Myrtaceae	T	E	Moderate	Not recorded within MN area North previously or during 2020 and earlier studies. Not likely in lateritic soils.			

TABLE 10: SUMMARY OF THREATENED AND PRIORITY FLORA RECORDED IN THE MYARA NORTH SURVEY AREA (continued)

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; DAWE 2020a) conservation code definitions. The absence in the Vegetation Complex and Site-Vegetation Type (SVT) columns reflects the absence within the Myara North survey area. A range of species were included in the 20km radius desktop search and depending on location (based collections in State Herbarium - Florabase) and also site conditions were ranked as likelihood of Low, Moderate or High. SVT Code – site-vegetation code based on Havel (1975a and 1975b).

Species	Family	SCC	FCC	Likelihood of Occurrence	20km Radius Search Vegetation complex outside Occurrence	Vegetation complex Occurrence within Myara North survey area	SVT Codes within Myara Survey Area	No. Populations & No. Plants
Andersonia sp. Saxatilis (F. & J. Hort 3324)	Ericaceae	P1	-	High	Recorded on Dwellingup 2, D2 and Cooke, Ce	Recorded in Dwellingup 2, D2 and Cooke, Ce. Potential on granites and lateritic soils.	G	4 (Estimated 6270)
Calytrix simplex subsp. *simplex*	Myrtaceae	P1	-	Moderate	Recorded in Dwellingup 2, D2 within wider Jarrah forest. Potential in lateritic soils.			
Paracaleana gracilicordata	Orchidaceae	P1	-	High	Not likely in lateritic soils as associated mainly with outcrops (may be localised small occurrences in Dwellingup 2, D2, Pindalup, Pn) but more likely in Cooke, Ce.	Recorded on Dwellingup 2, D2 on mainly granite.	G S	6 (Estimated 567)
Paracaleana granitica	Orchidaceae	P1	-	High	Mainly on granite outcrops, not in lateritic soils, may be in other complexes if small localised outcrops that are small in size (Dwellingup 2, D2).	Recorded on Dwellingup 2, D2, Pindalup, Pn, and Murray 1, My1 mainly on granite.	G T D P	7 (Estimated 759)
Banksia recurvistylis	Proteaceae	P2	-	High	Recorded in Cooke, Ce and Dwellingup 2, D2 within wider Jarrah forest. Less likely in deeper lateritic soils. Recorded just east of survey area.			
Grevillea crowleyae	Proteaceae	P2	-	High	Not recorded within MN previously or during 2020 and earlier studies. East of area in Dwellingup 2, D2 and just south of Jarrahdale.			
Grevillea manglesii subsp. *ornithopoda*	Proteaceae	P2	-	High	Recorded in Dwellingup 1, D1 and Murray 1, My1, less likely in deeper lateritic soils.	Recorded on Dwellingup 1, D1, mainly on granite.	G	1 (unknown)

TABLE 10: SUMMARY OF THREATENED AND PRIORITY FLORA RECORDED IN THE MYARA NORTH SURVEY AREA (continued)

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; DAWE 2020a) conservation code definitions. The absence in the Vegetation Complex and Site-Vegetation Type (SVT) columns reflects the absence within the Myara North survey area. A range of species were included in the 20km radius desktop search and depending on location (based collections in State Herbarium - Florabase) and also site conditions were ranked as likelihood of Low, Moderate or High. SVT Code – site-vegetation code based on Havel (1975a and 1975b).

Species	Family	SCC	FCC	Likelihood of Occurrence	20km Radius Search Vegetation complex outside Occurrence	Vegetation complex Occurrence within Myara North survey area	SVT Codes within Myara Survey Area	No. Populations & No. Plants
Millotia tenuifolia var. *laevis*	Asteraceae	P2	-	Moderate	Recorded in Dwellingup 2, D2. Potential in lateritic and granite soils.			
Tetratheca phoenix	Elaeocarpaceae	P2	-	Moderate	Recorded in mainly Cooke, Ce and occasionally in Dwellingup 4, D4 in wider Jarrah forest area. Most likely on granite. Not likely in deeper lateritic soils.			
Acacia drummondii subsp. *affinis*	Fabaceae	P3	-	Moderate	Potential in lateritic soils. Recorded in Yarragil 1 within wider Jarrah forest.	Recorded on Dwellingup 1, D1, mainly on lateritic soils associated with Dwellingup 2, D2, Cooke, Ce and Yarragil, Yg2	S PS D	3 (Estimated 5 to 10)
Acacia horridula	Fabaceae	P3	-	Moderate	Recorded in Dwellingup2, D2, Yarragil 1, Yg1, and Darling Scarp, DS2 in wider Jarrah forest. Potential in lateritic soils.	Recorded in Swamp, S.	AD	1 (Estimated 2-5)
Acacia oncinophylla subsp. *oncinophylla*	Fabaceae	P3	-	High	Recorded in Dwellingup 1, D1 in wider Jarrah forest. More likely on granites (Florabase, WAH 1998-). On northern fringes of MN.			
Andersonia sp. Audax (F. Hort, B. Hort & J. Hort 3179)	Ericaceae	P3	-	High	Recorded on Dwellingup 1, D1, Dwellingup 2, D2, Dwellingup 4, D4, Yarragil 2, Yg2, Swamp, S, Yarragil 2, Yg2 and Cooke, Ce. Potential in lateritic soils.	Recorded on Cooke, Ce, Dwellingup 2, D2, and Swamp, S in wider range of soils.	G E P PL	4 (Estimated 17646)
Conospermum scaposum	Proteaceae	P3	-	Moderate	Recorded in Yarragil 2, Yg2. Not likely in lateritic soils.	Recorded on Yarragil, Yg2 in broad valleys.	DA	1 (Estimated 2-5)

TABLE 10: SUMMARY OF THREATENED AND PRIORITY FLORA RECORDED IN THE MYARA NORTH SURVEY AREA (continued)

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; DAWE 2020a) conservation code definitions. The absence in the Vegetation Complex and Site-Vegetation Type (SVT) columns reflects the absence within the Myara North survey area. A range of species were included in the 20km radius desktop search and depending on location (based collections in State Herbarium - Florabase) and also site conditions were ranked as likelihood of Low, Moderate or High. SVT Code – site-vegetation code based on Havel (1975a and 1975b).

Species	Family	SCC	FCC	Likelihood of Occurrence	20km Radius Search Vegetation complex outside Occurrence	Vegetation complex Occurrence within Myara North survey area	SVT Codes within Myara Survey Area	No. Populations & No. Plants
Grevillea manglesii subsp. *dissectifolia*	Proteaceae	P3	-	Moderate	Recorded in in Dwellingup, D1, Murray 1, My1, Cooke, Ce and Pindalup, Pn. Potential in lateritic soils. Recorded just east of survey area in D site-vegetation type.			
Halgania corymbosa	Boraginaceae	P3	-	Moderate	Recorded in Darling Scarp 2, DS2. Potential in lateritic soils.			
Lasiopetalum glutinosum subsp. *glutinosum*	Malvaceae	P3	-	Moderate	Recorded in Dwellingup 1, Darling Scarp 2, DS2 and Murray 1, My1 in wider area. Potential in lateritic soils.			
Petrophile filifolia subsp. *laxa*	Proteaceae	P3	-	Moderate	Recorded in Yarragil 1, Yg1 in wider area. Not likely in lateritic soils.			
Pithocarpa corymbulosa	Asteraceae	P3	-	Moderate	Recorded in Yarragil 2, Yg2, Dwellingup 2, D2 and Swamp, S. Not likely in deeper lateritic soils.			
Stackhousia sp. Red-blotched corolla (A. Markey 911)	Celastraceae	P3	-	Moderate	Recorded north of MN in Dwellingup 2, D2 in wider Jarrah forest. Potential for occurrence in lateritic soils.	Dwellingup 2, D2.	PS	1 (unknown)
Synaphea pandurata	Proteaceae	P3	-	Moderate	Recorded in Pindalup, Pn, Swamp, S and Dwellingup 2, D2 in wider Jarrah forest and earlier studies.			
Thysanotus anceps	Asparagaceae	P3	-	Moderate	Recorded in Murray 1, My1 and Dwellingup 1, D1 in wider Jarrah forest. Potential for occurrence in lateritic soils. Recorded south of survey area in SP site-vegetation type.			
Boronia tenuis	Rutaceae	P4	-	High	Recorded in Dwellingup 2, D2, Yarragil 1, Yg1 and Murray 1, My1 in wider Jarrah forest. Potential in lateritic soils in valleys and on granite outcrops.	Recorded on Dwellingup 2, D2 on Kinsella Road on fringes of survey area.	PL	1 (on fringes of survey area)
Chorizema ulotropis	Fabaceae	P4	-	Moderate	Recorded in Dwellingup 1, D1 and Dwelllingup 2, D2 within wider Jarrah forest. Potential in lateritic soils.			

TABLE 10: SUMMARY OF THREATENED AND PRIORITY FLORA RECORDED IN THE MYARA NORTH SURVEY AREA (continued)

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; DAWE 2020a) conservation code definitions. The absence in the Vegetation Complex and Site-Vegetation Type (SVT) columns reflects the absence within the Myara North survey area. A range of species were included in the 20km radius desktop search and depending on location (based collections in State Herbarium - Florabase) and also site conditions were ranked as likelihood of Low, Moderate or High. SVT Code – site-vegetation code based on Havel (1975a and 1975b).

Species	Family	SCC	FCC	Likelihood of Occurrence	20km Radius Search Vegetation complex outside Occurrence	Vegetation complex Occurrence within Myara North survey area	SVT Codes within Myara Survey Area	No. Populations & No. Plants
Grevillea pimeleoides	Proteaceae	P4	-	High	Recorded in Murray 1, My1, Dwellingup1, D1, Dwellingup2, D2, Pindalup, Pn and Cooke, Ce in wider Jarrah forest. Although on outcrops, there is potential in lateritic soils. Recorded just east and south-west of survey area.			
Hemigenia platyphylla	Lamiaceae	P4	-	High	Recorded in Dwellingup 1, D1. Less likely in deeper lateritic soils. Potential in sandy-gravels.	Recorded in Dwellingup, D1.	PW	1 (Estimated 100)
Lasiopetalum cardiophyllum	Malvaceae	P4	-	Moderate	Recorded on sandy gravels and further east in wider Jarrah forest. May occur in lateritic soils.			
Parsonsia diaphanophleba	Apocynaceae	P4	-	Moderate	Recorded in Murray 1, My1 and Yarragil 1, Yg1 in wider Jarrah forest. Less likely in lateritic soils.			
Pimelea rara	Thymelaeaceae	P4	-	High	Recorded in Dwellingup, D1, Dwellingup 2, D2, Murray 1, My1, Yarragil 1, Yg1, Yarragil 2, Yg2, and to a lesser degree Cooke, Ce in wider Jarrah forest. Potential to occur in lateritic soils.	Recorded on Yarragil 1, Yg1, Dwellingup, D2, and Yarragil 2, Yg2 on slopes and valleys.	D ST S	3 (Estimated 132)
Stylidium ireneae	Stylidiaceae	P4	-	Moderate	Recorded in Yarragil 1, Yg1 and Yarragil 2, Yg2 in wider Jarrah forest ranked as moderate. Not likely in lateritic soils.	Recorded in Yarragil 1, Yg1	CW	1 (Estimated2-5)
Stylidium scabridum	Stylidiaceae	P4	-	Moderate	Less likely in lateritic soils, although was recorded in Dwellingup complexes.	Recorded on Dwellingup 1, D1, Dwellingup 2, D2, Yarragil, Yg2, Goonaping, G in range of soils and site conditions.	D S PS P CW	6 (Estimated 107)

5.5 Potential Range Extensions

The following flora species occur as range extensions to current records on Florabase (WAH 1998-):

- *Xanthosia tasmanica* occurs mainly south of the MN survey area;
- *Stachystemon virgatus* occurs to the north-east of the MN survey area;
- *Acacia browniana* var. *endlicheri* and *Acacia browniana* var. *intermedia* occurs to the east of the MN survey area;
- *Cyrtostylis robusta* has been recorded in monitoring plots in Jarrahdale and Huntly/Myara area. As such this species occurs east of a population on the escarpment and also as an extension from southern forest areas and the identification may have been misapplied in plots in the past in the wider Huntly/Myara area.
- *Conospermum scaposum* (P3) occurs mainly to the north-east of the MN area and as such are potential range extensions to the populations as defined on Florabase.
- *Empodisma gracillimum* has been recorded in the wider Huntly/Myara plots near the MN survey area. As such this species is an extension from southern forest areas and the identification may have been misapplied in plots in the past in the wider Huntly/Myara area.
- *Chorizema ilicifolium* has been recorded in the wider Huntly/Myara plots near the MN survey area. As such this species is a large extension from southern forest coastal areas and the identification may have been misapplied in plots in the past in the wider Huntly/Myara area.

All of these species are either range extensions from the east or the south and as such warrant further study in coming years. Of these species the Priority flora species *Conospermum scaposum* (P3) occurred in the DA site-vegetation type associated with lower slopes on the broad valley systems.

5.6 Site-vegetation Types

The interpretation of the vegetation in relation to underlying landforms, soils and climate is further analysed and summarized in Havel (2000). This approach has been used for some 45 years and as such to deviate from such an approach and rely on other approaches would negate the effort to date and the ability to align the findings with other areas in the northern Jarrah forest. This approach was discussed with representatives of the EPA, DWER and DBCA prior to commencement of the survey. It is acknowledged that the approach deviates somewhat from the strict application of EPA (2016) guidance statements, however the continuation of the site-vegetation approach ensures a consistent delineation of the biodiversity values across the Huntly Mine, and provides adequate information to support impact assessment. So whilst such an approach might be perceived by assessors to deviate from the EPA guidance statements, to not adopt the site-vegetation approach would diminish the delineation of the biodiversity values in the MN survey area. In addition the ranking of species and condition of species in the field has increased the intensity and coverage of the sites within the MN survey area.

The Jarrah forest on the slopes and ridges consists of a continuum of species that change in response to subtle changes in the underlying landform, soils and local site conditions. An analysis of the respective plots within the MN area and adjacent areas was analysed using Primer 7 with the Bray-Curtis algorithm (Clarke and Gorey 2015), Figures 14 and 15. The plots on the more marked extreme sites such as swamps and broad sandy valleys reflected lower similarity than the site-vegetation types (P, S, T and their variants) on the slopes and ridges. The approach adopted in the cluster analysis is usually applied to floristic analyses rather than the approach adopted defining site-vegetation types where subtle differences in keystone species and site conditions which were defined by Havel (1975a and 1975b) in earlier studies of the northern Jarrah forest and later refined and developed by Mattiske since 1979. The concentration of plots occurred on the more dominant site-vegetation types on the lateritic sandy-gravels and gravels on the slopes and ridges and as such reflect the continuum nature of the vegetation with subtle changes in underlying site conditions being reflected by changes in rankings and presence or absence of respective keystone species, Figures 14. As indicated on the MDS there is a shift from those on the sandier drier sites of the S and PS types (grouping "c") to the sites associated with the moister and wetter sites (A, CW, E/D and DA types in groupings "m" and "a"). The other key factor appears to relate to the shift from the

sandier types such as PS, SP and DA (groupings "b" and "e" and "c" to the TS and ST types and CW on loamier soils (groupings "d" and "h" and "k"). The species occurrence, density and foliage cover for the respective plots within the main site-vegetation types is summarised in Appendix J. The maps as presented in Figures 16.3 to 16.9 reflect the shift from west to east with more undulating slopes and valley systems in the western and southern areas and less undulating slopes and valley systems in the eastern and north-eastern areas.

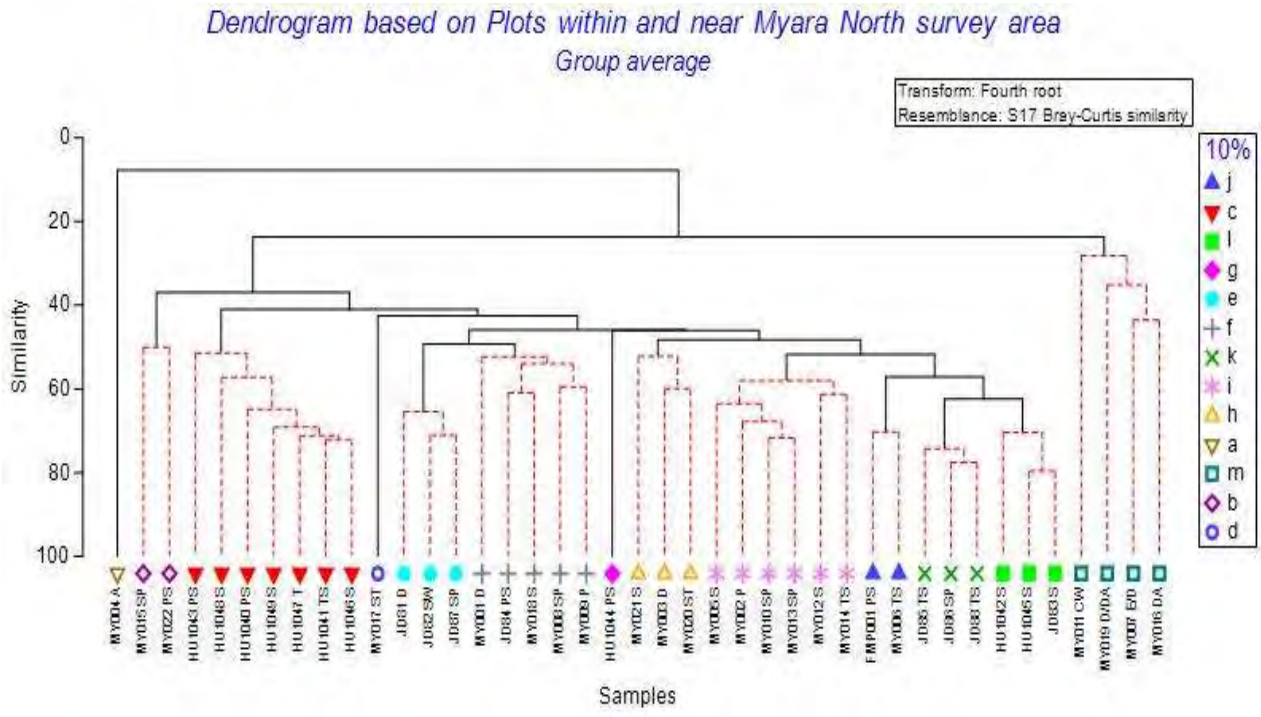


Figure 14: Dendrogram based on Plots within and near Myara North survey area

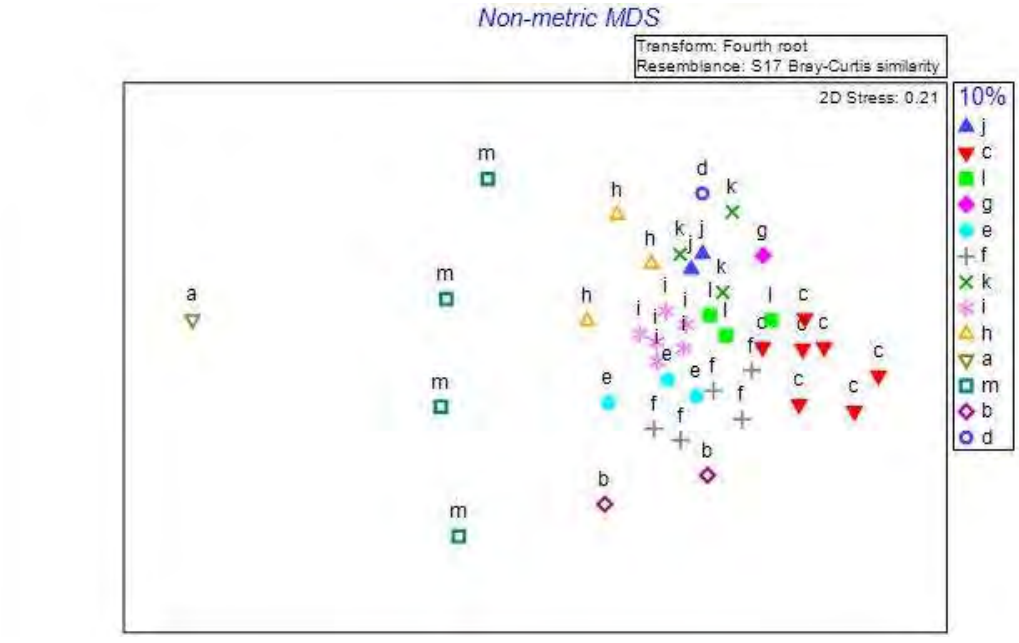


Figure 15: Non-Metric MDS based on Plots within and near Myara North survey area

Context mapping is provided for the conveyor corridor, in accordance with EPA (2016) guidance. The mapping is based on pre-mining mapping for the Myara region and Alcoa mapping of mined and rehabilitated areas, and has not been subject to detailed survey as part of the MN survey. A total of 32 site-vegetation types have been recorded at specific sites in the MN survey area, Table 11 and Figures 16.1 to 16.9.

The site-vegetation types were subdivided into six main groupings associated with site conditions which reflected landforms, soils and soil moisture levels, Table 11. The site-vegetation types on the extreme sites such as granite outcrops and broad valley systems and swamps differ markedly from the forest and woodland areas on the slopes and ridges. The delineation of the site-vegetation types was based on the earlier work of Havel (1975a and 1975b) and as such rely on key site and species indicators. Whilst Mattiske has refined these initial site-vegetation types there is still a reliance on the original work of Havel (1975a and 1975b). The initial code is the dominant site-vegetation type code and the second code (where added) reflects some local influence of secondary key stone species. These site-vegetation types were developed in consultation with Dr David Goodall. In the 1970's Dr Havel and Dr Goodall undertook extensive analyses to delineate and differentiate the key species and site parameters that assist in the division of the continuum of the dominant trees of *Eucalyptus marginata* (Jarrah) and *Corymbia calophylla* (Marri).

The G, G1, G2, RG and R site-vegetation types are associated with the granite outcrop areas as indicated in 5.4 above these areas support a range of conservation significant species. The larger more spatially extensive areas of granite outcrops were integrated and mapped as the Cooke vegetation complex by Heddle et al. (1950) and Mattiske and Havel (1998). . On a local scale the outcrop areas are locally very variable from lithic complexes to heaths to open woodlands. The species as recorded by Markey (1997) on the granite outcrops were compared with those recorded in the site-vegetation types G and R by Mattiske Consulting team in 2020. Of these the main keystone species include *Calothamnus quadrifidus, Borya sphaerocephala, Grevillea bipinnatifida, Allocasuarina humilis* and *Babingtonia camphorosmae*. Of these species the initial four species are associated with shallow soils and granite outcrops. The *Babingtonia camphorosmae* is associated with seasonally moister soils which may occur in a range of site conditions including near run-off areas near granite outcrops. The other native species recorded by Markey (1997) are more widespread and less site specific. The only current Priority Ecological Community is associated with the G, G1, G2, RG and R site-vegetation types. Not all of the areas as delineated and mapped by Mattiske in 2020 have been high-lighted by DBCA (2020a), see Figure 8. There is a lack of clarity on the values that determine the presence of the Priority Ecological Community other than the association with the outcrops.

The series of site-vegetation types associated with the broader valley systems which dominate the Yarragil 2 and Swamp vegetation complexes as defined by Mattiske and Havel (1998) provide a spatial diversity that supports a range of species (see Appendix H). There is potential for some of these site-vegetation types to be groundwater dependent ecosystems. The dominant site-vegetation types on the lateritic slopes and ridges include types P, PS, SP, S, ST, T and TS. Although these areas tend to be more extensive in local areas, these types also support other values associated with fauna habitat values (e.g. Black Cockatoos in the larger Jarrah, Blackbutt and Marri trees in these areas). The other areas of significance are the localised site-vegetation types that support specific and localised flora species. Examples of these more restricted communities are the site-vegetation types E and J that occur in more restricted areas within the broader valleys.

The remaining codes (CL, CL Other, Rehab, Dam and PL) are associated with modified environments.

Table 11: Summary of Site-vegetation Types (SVT) on the Myara North Survey Area

Note: where no area designated this site-vegetation type has been recorded at the isolated site but the area was too localised to map separately at the scale required for presentation.

	SVT Code	SVT Description	Myara North Survey Area (ha)	Myara North Corridor Area (ha)	Proportion of Survey Area (%)
Swamps and Broad Valleys	A	Tall shrubland of mixed *Melaleuca* spp., *Taxandria linearifolia, Hypocalymma angustifolium, Pericalymma ellipticum* with emergent *Melaleuca preissiana* on clay-loams in seasonally wet valley floors.	130.27	-	0.70
	AC	Open Woodland of *Eucalyptus rudis – Melaleuca preissiana - Eucalyptus patens - Banksia littoralis* with dense *Taxandria linearifolia* and *Astartea scoparia* in understorey on broad swamps and water-courses.	341.32	51.47	2.12
	AD	Low open woodland of *Eucalyptus rudis* and *Eucalyptus marginata* over *Banksia littoralis, Hakea prostrata* and *Pericalymma ellipticum* over low shrubs and herbs on leached sands over sandy-gravel on lower slopes.	289.73	-	1.56
	AW	Low open woodland of *Eucalyptus patens* and *Melaleuca preissiana* over *Banksia littoralis, Hakea prostrata* and *Taxandria linearifolia* over low shrubs and herbs on leached sands over sandy-gravel on lower slopes.	115.09	-	0.62
	AW/AX	Localized patchy mosaic of AW and AX.	21.19	-	0.11
	AW/CW	Localized patchy mosaic of AW and CW.	20.27	-	0.11
	WA	Open Forest of *Eucalyptus megacarpa - Eucalyptus patens – Corymbia calophylla* on lower slopes with mixed low understorey species, including *Banksia littoralis* and occasional *Melaleuca preissiana* over *Acacia extensa* and *Hypocalymma angustifolium* on seasonally moister sandy-loam gravelly soils.	8.82	-	0.05
	AX	Open woodland of *Eucalyptus rudis* over *Acacia saligna, Melaleuca incana* subsp. *incana* and *Hypocalymma angustifolium* on clay- loams on valley floors.	43.44	-	0.23
	D	Open Forest of *Eucalyptus marginata -Corymbia calophylla – Eucalyptus patens - Alllocasuarina fraseriana - Hakea prostrata* with *Xylomelum occidentale* on lower slopes with mixed low understorey species, including *Babingtonia camphorosmae, Daviesia decurrens, Davieisa preissii* and *Acacia extensa* on clay loams to gravelly clay-loams.	1106.58	0.81	5.97
	DA	Open Forest of *Eucalyptus marginata -Corymbia calophylla – Eucalyptus patens - Alllocasuarina fraseriana - Hakea prostrata* and *Xylomelum occidentale* on lower slopes with patches of *Melaleuca preissiana, Banksia littoralis* over mixed low understorey species, including *Babingtonia camphorosmae* and *Astartea scoparia* on clay loams to gravelly clay-loams.	168.88	-	0.91
	DG	Open forest of *Corymbia calophylla* and *Eucalyptus marginata* over *Hakea lissocarpha, Macrozamia riedlei, Pericalymma ellipticum, Grevillea bipinnatifida, Acacia alata, Babingtonia camphorosmae, Hypocalymma angustifolium* and *Phyllanthus calycinus* on clay-loams on lower slopes with localized patches of outcropping.	11.77	1.75	0.07
	E	Open woodland of *Eucalyptus marginata* and *Corymbia calophylla* over *Mesomelaena tetragona, Kingia australis, Leptospermum erubescens* and *Babingtonia camphorosmae* on sandy to sandy-loam soils on slopes.	328.34	-	1.77
	J	Open Woodland to open forest of *Eucalyptus marginata, Corymbia calophylla* and *Eucalyptus patens* over *Mesomelaena tetragona, Leptocarpus scariosus, Babingtonia camphorosmae* and *Stirlingia latifolia* on broad sandy-loam flats valley slopes.	34.05	-	0.18
Valley Floors and Lower Slopes	C	Woodland to Open Forest of *Eucalyptus patens – Corymbia calophylla - Banksia littoralis* with dense *Taxandria linearifolia* and *Astartea scoparia* in understorey on creek-lines and water-courses.	51.34	-	0.28
	CW	Woodland to Open Forest of *Eucalyptus patens – Eucalyptus megacarpa - Corymbia calophylla - Banksia littoralis* with dense *Taxandria linearifolia* and *Astartea scoparia* in understorey on creek-lines and water-courses.	472.83	56.05	2.85
	W	Open Forest of *Eucalyptus megacarpa - Eucalyptus patens – Corymbia calophylla* on lower slopes with mixed low understorey species, including *Hypocalymma angustifolium* on seasonally moister sandy-loam gravelly soils.	230.37	108.97	1.83
	Q	Open Forest of *Eucalyptus marginata - Corymbia calophylla - Eucalyptus patens* with mixed understorey species, including *Trymalium odoratissimum* subsp. *odoratissimum*, *Acacia extensa* and *Phyllanthus calycinus* on loam soils on lower slopes.	28.91	-	0.16

Table 11: Summary of Site-vegetation Types (SVT) on the Myara North Survey Area (continued)

	SVT Code	SVT Description	Myara North Survey Area (ha)	Myara North Corridor Area (ha)	Proportion of Survey Area (%)
Tahom	M	Open woodland of *Eucalyptus wandoo* over *Trymalium ledifolium, Macrozamia riedlei* and *Hakea lissocarpha* on clay loams with some gravel on mid to upper slopes and ridges.	3.43	-	0.02
	P	Open Forest of *Allocasuarina fraseriana - Eucalyptus marginata - Corymbia calophylla - Banksia grandis* with scattered understorey, including *Adenanthos barbiger, Styphelia nitens, Grevillea wilsonii, Leucopogon capitellatus* on sandy gravels.	1225.88	1.70	6.62
	PG	Open Forest of *Allocasuarina fraseriana - Eucalyptus marginata - Corymbia calophylla - Banksia grandis* with scattered understorey, including *Adenanthos barbiger, Grevillea wilsonii, Leucopogon capitellatus Grevillea bipinnatifida, Allocasuarina humilis, Babingtonia camphorosmae* and *Hypocalymma angustifolium* on sandy gravels.	-	-	-
	PJ	Open woodland of *Eucalyptus marginata - Corymbia calophylla – Allocasuarina fraseriana* over *Stirlingia latifolia* and *Lepidosperma* spp. on sandier patches on sandy-loam soils on slopes.	-	-	-
	PT	Open Forest of *Allocasuarina fraseriana - Eucalyptus marginata - Corymbia calophylla - Banksia grandis* with scattered understorey, including *Adenanthos barbiger, Leucopogon verticillatus, Pteridium esculentum* and *Bossiaea aquifolium* subsp. *aquifolium* on sandy-loam gravels.	102.54	15.86	0.64
	TP	Open Forest of *Eucalyptus marginata - Corymbia calophylla – Allocasuarina fraseriana - Banksia grandis* on sandy-loams to sandy-gravels with scattered understorey, including *Clematis pubescens, Adenanthos barbiger, Leucopogon verticillatus, Pteridium esculentum* and *Bossiaea aquifolium* subsp. *aquifolium* on sandy-loam gravels.	-	-	-
	PS	Open Forest of *Allocasuarina fraseriana - Eucalyptus marginata - Corymbia calophylla - Banksia grandis* with scattered understorey, including *Adenanthos barbiger, Leucopogon capitellatus* on gravels and sandy gravels.	3450.48	127.10	19.30
	SP	Open Forest of *Allocasuarina fraseriana - Eucalyptus marginata - Corymbia calophylla - Banksia grandis* with scattered understorey, including *Adenanthos barbiger, Grevillea wilsonii* and *Leucopogon capitellatus* on sandy-gravels to gravelly soils.	1304.55	58.30	7.35
	S	Open Forest of *Eucalyptus marginata - Banksia grandis – Allocasuarina fraseriana* with scattered understorey, including *Adenanthos barbiger, Leucopogon capitellatus* and *Styphelia tenuiflora* on gravels and sandy-gravels.	3165.01	106.50	17.64
	ST	Open Forest of *Eucalyptus marginata - Corymbia calophylla* with scattered understorey, including *Leucopogon capitellatus, Leucopogon verticillatus, Pteridium esculentum, Lasiopetalum floribundum* and *Styphelia tenuiflora* on sandy-gravelly soils.	969.45	0.09	5.23
	TS	Open Forest of *Eucalyptus marginata - Corymbia calophylla – Banksia grandis* with scattered understorey, including *Leucopogon verticillatus, Pteridium esculentum, Clematis pubescens* and *Bossiaea aquifolium* subsp. *aquifolium* on sandy-loam gravelly to gravelly soils.	779.46	87.36	4.68
	T	Open Forest of *Eucalyptus marginata - Corymbia calophylla* with scattered understorey, including *Leucopogon verticillatus, Pteridium esculentum, Clematis pubescens* and *Bossiaea aquifolium* subsp. *aquifolium* on sandy-loam gravelly soils.	304.74	125.36	2.32

Table 11: Summary of Site-vegetation Types (SVT) on the Myara North Survey Area (continued)

	SVT Code	SVT Description	Myara North Survey Area (ha)	Myara North Corridor Area (ha)	Proportion of Survey Area (%)
Slopes with higher seasonal soil moisture	SW	Open Forest of *Eucalyptus marginata - Corymbia calophylla – Banksia grandis* with scattered understorey, including *Adenanthos barbiger, Hypocalymma angustifolium* and *Styphelia tenuiflora* on seasonally moister sandy-gravelly soils.	774.52	12.64	4.25
	PW	Open Forest of *Allocasuarina fraseriana - Eucalyptus marginata - Corymbia calophylla* with scattered understorey, including *Grevillea wilsonii, Adenanthos barbiger, Babingtonia camphorosmae* and *Hypocalymma angustifolium* on sandy gravels.	582.62	22.89	3.27
Outcrop Areas	R	Open Woodland of *Eucalyptus marginata - Corymbia calophylla* on fringes of granite outcrops or shallow soils over mixed understorey species reflecting shallow soils over granite.	365.69	12.30	2.04
	RG	Localised patchy mosaic of R and G site-vegetation types.	0.65	-	0.004
	G/G1	Mosaic of Open Woodland of *Eucalyptus marginata – Corymbia calophylla* on the fringes of outcrops ranging to open heath communities of Proteaceae-Myrtaceae species and lithic complexes on the outcrop areas.	268.17	20.27	1.56
	G2	Woodland of *Allocasuarina huegeliana* and associated herbs and low shrubs on shallow granite outcrops.	-	-	-
Other Areas	CL	Cleared		224.26	1.21
	CL Other	Cleared Other	198.83	-	1.07
	PL	Plantation	162.22	-	0.87
	Rehab	Rehabilitation Areas	387.47	53.07	2.38
	DAM	Dam	-	5.02	-

Code	Description of Site-Vegetation Types
A	Tall shrubland of mixed *Melaleuca* spp., *Taxandria linearifolia, Hypocalymma angustifolium, Pericalymma ellipticum* with emergent *Melaleuca preissiana* on clay-loams in seasonally wet valley floors.
AC	Open Woodland of *Eucalyptus rudis – Melaleuca preissiana - Eucalyptus patens - Banksia littoralis* with dense *Taxandria linearifolia* and *Astartea scoparia* in understorey on broad swamps and water-courses.
AD	Low open woodland of *Eucalyptus rudis* and *Eucalyptus marginata* over *Banksia littoralis, Hakea prostrata* and *Pericalymma ellipticum* over low shrubs and herbs on leached sands over sandy-gravel on lower slopes.
AW	Low open woodland of *Eucalyptus patens* and *Melaleuca preissiana* over *Banksia littoralis, Hakea prostrata* and *Taxandria linearifolia* over low shrubs and herbs on leached sands over sandy-gravel on lower slopes.
AW/AX	Localized patchy mosaic of AW and AX.
AW/CW	Localized patchy mosaic of AW and CW.
WA	Open Forest of *Eucalyptus megacarpa - Eucalyptus patens – Corymbia calophylla* on lower slopes with mixed low understorey species, including *Banksia littoralis* and occasional *Melaleuca preissiana* over *Acacia extensa* and *Hypocalymma angustifolium* on seasonally moister sandy-loam gravelly soils.
AX	Open woodland of *Eucalyptus rudis* over *Acacia saligna, Melaleuca incana* subsp. *incana* and *Hypocalymma angustifolium* on clay- loams on valley floors.
D	Open Forest of *Eucalyptus marginata -Corymbia calophylla – Eucalyptus patens - Alllocasuarina fraseriana - Hakea prostrata* with *Xylomelum occidentale* on lower slopes with mixed low understorey species, including *Babingtonia camphorosmae, Daviesia decurrens, Davieisa preissii* and *Acacia extensa* on clay loams to gravelly clay-loams.
DA	Open Forest of *Eucalyptus marginata -Corymbia calophylla – Eucalyptus patens - Alllocasuarina fraseriana - Hakea prostrata* and *Xylomelum occidentale* on lower slopes with patches of *Melaleuca preissiana, Banksia littoralis* over mixed low understorey species, including *Babingtonia camphorosmae* and *Astartea scoparia* on clay loams to gravelly clay-loams.
DG	Open forest of *Corymbia calophylla* and *Eucalyptus marginata* over *Hakea lissocarpha, Macrozamia riedlei, Pericalymma ellipticum, Grevillea bipinnatifida, Acacia alata, Babingtonia camphorosmae, Hypocalymma angustifolium* and *Phyllanthus calycinus* on clay-loams on lower slopes with localized patches of outcropping.
E	Open woodland of *Eucalyptus marginata* and *Corymbia calophylla* over *Mesomelaena tetragona, Kingia australis, Leptospermum erubescens* and *Babingtonia camphorosmae* on sandy to sandy-loam soils on slopes.
J	Open Woodland to open forest of *Eucalyptus marginata, Corymbia calophylla* and *Eucalyptus patens* over *Mesomelaena tetragona, Leptocarpus scariosus, Babingtonia camphorosmae* and *Stirlingia latifolia* on broad sandy-loam flats valley slopes.
C	Woodland to Open Forest of *Eucalyptus patens – Corymbia calophylla - Banksia littoralis* with dense *Taxandria linearifolia* and *Astartea scoparia* in understorey on creek-lines and water-courses.
CW	Woodland to Open Forest of *Eucalyptus patens – Eucalyptus megacarpa - Corymbia calophylla - Banksia littoralis* with dense *Taxandria linearifolia* and *Astartea scoparia* in understorey on creek-lines and water-courses.
W	Open Forest of *Eucalyptus megacarpa - Eucalyptus patens – Corymbia calophylla* on lower slopes with mixed low understorey species, including *Hypocalymma angustifolium* on seasonally moister sandy-loam gravelly soils.
Q	Open Forest of *Eucalyptus marginata - Corymbia calophylla - Eucalyptus patens* with mixed understorey species, including *Trymalium odoratissimum* subsp. *odoratissimum, Acacia extensa* and *Phyllanthus calycinus* on loam soils on lower slopes.
M	Open woodland of *Eucalyptus wandoo* over *Trymalium ledifolium, Macrozamia riedlei* and *Hakea lissocarpha* on clay loams with some gravel on mid to upper slopes and ridges.
P	Open Forest of *Allocasuarina fraseriana - Eucalyptus marginata - Corymbia calophylla - Banksia grandis* with scattered understorey, including *Adenanthos barbiger, Styphelia nitens, Grevillea wilsonii, Leucopogon capitellatus* on sandy gravels.
PG	Open Forest of *Allocasuarina fraseriana - Eucalyptus marginata - Corymbia calophylla - Banksia grandis* with scattered understorey, including *Adenanthos barbiger, Grevillea wilsonii, Leucopogon capitellatus Grevillea bipinnatifida, Allocasuarina humilis, Babingtonia camphorosmae* and *Hypocalymma angustifolium* on sandy gravels.
PJ	Open woodland of *Eucalyptus marginata - Corymbia calophylla – Allocasuarina fraseriana* over *Stirlingia latifolia* and *Lepidosperma* spp. on sandier patches on sandy-loam soils on slopes.

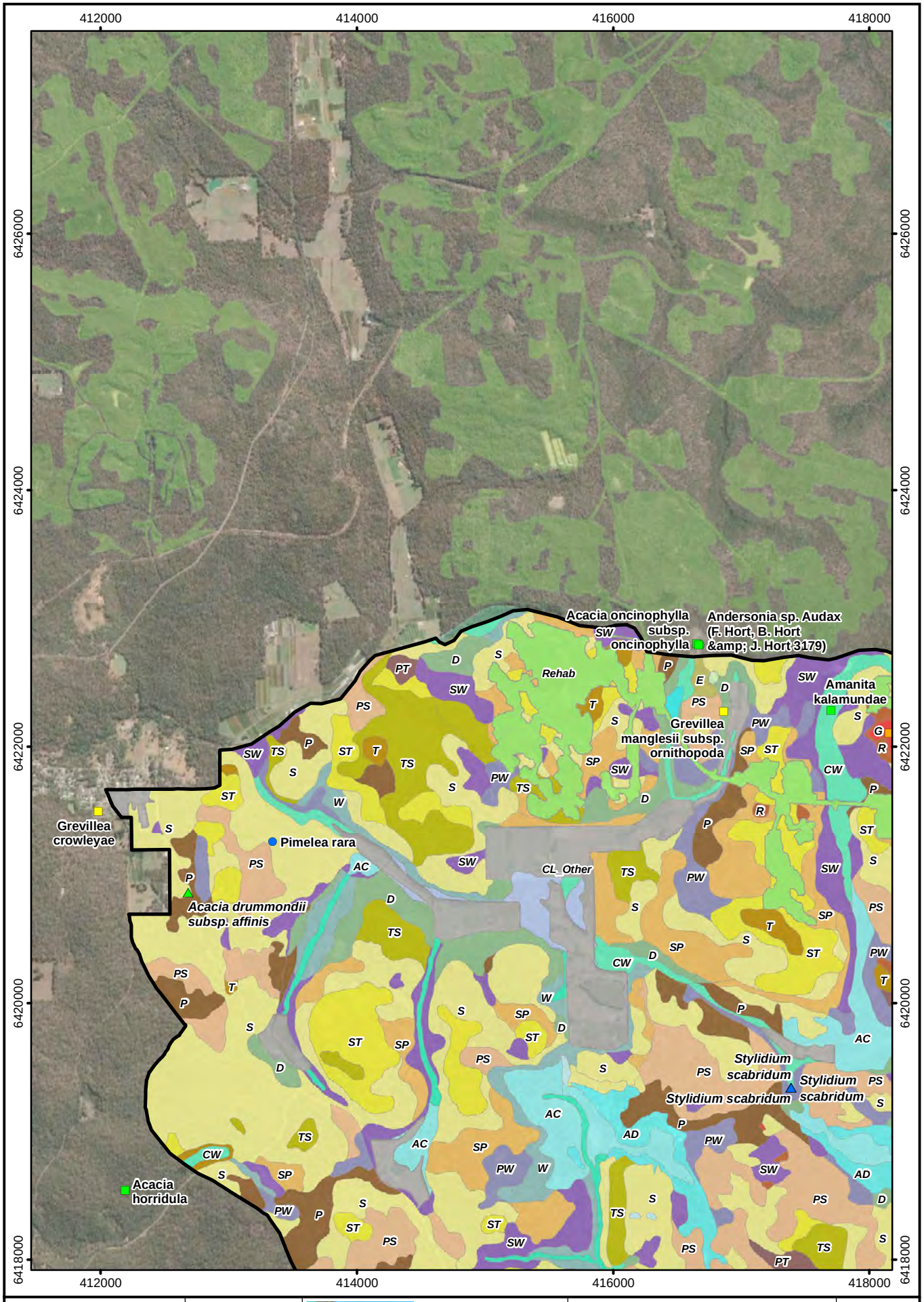
CAD Ref: a1992_MyNth_F06_03_01
Date: May 2021 | Rev: A | A4

ALCOA

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640
Author: E M Matttiske | MCPL Ref: ALC1901
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Myara North Survey Area
Vegetation Legend

Figure:
16.1



N

0 300 600 m

Scale: 1:40,000
MGA94 (Zone 50)

CAD Ref: a1992_MyNth_F06_01

Date: May 2021 | Rev: B | A4

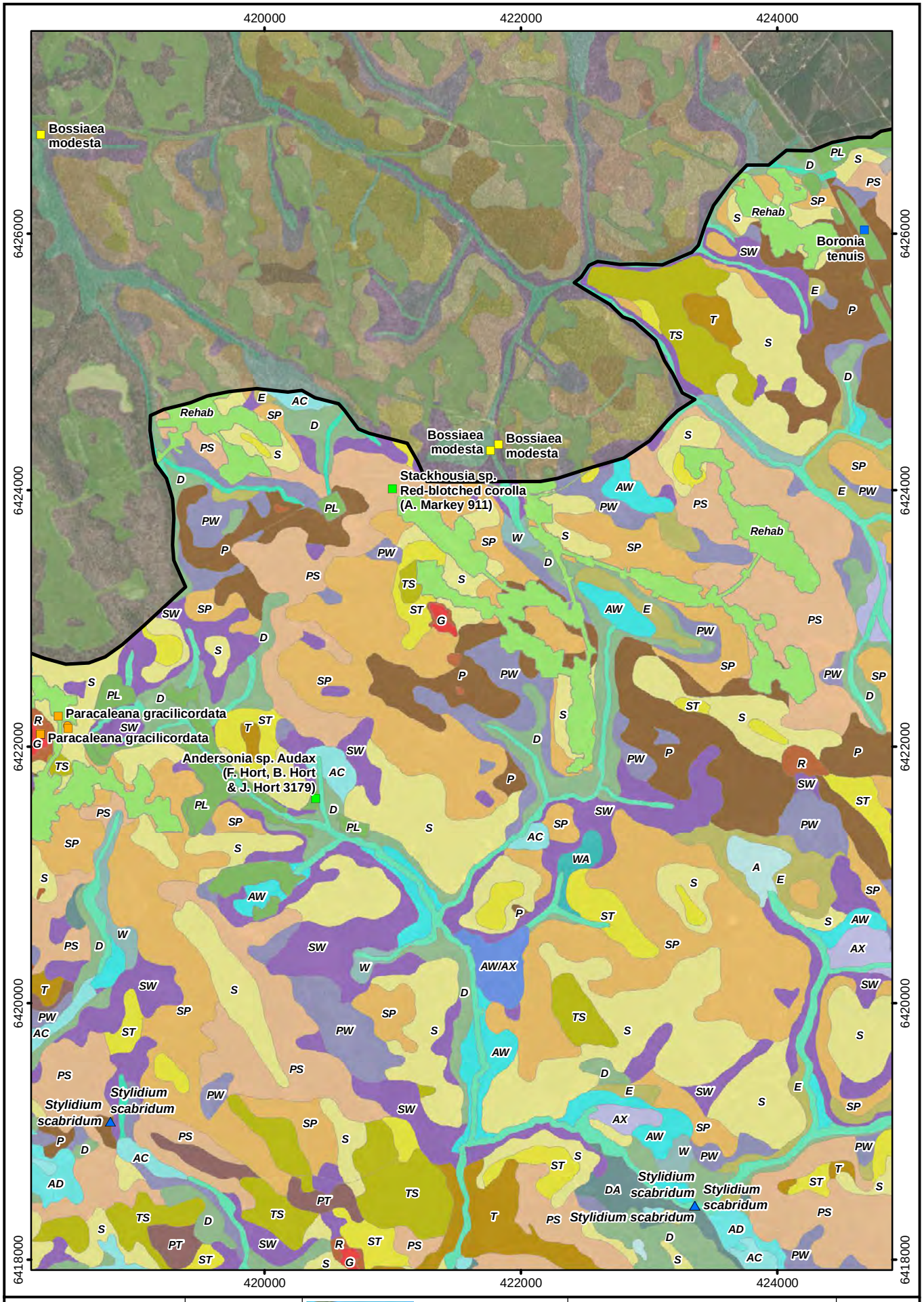
Sheet Layout:

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640
Author: E M Matttiske | MCPL Ref: ALC1901
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Site-vegetation Types in North Myara Area

Sheet 4 of 10

Figure: **16.3**



N

0 300 600 m

Scale: 1:40,000
MGA94 (Zone 50)

CAD Ref: a1992_MyNth_F06_01

Date: May 2021 | Rev: B | A4

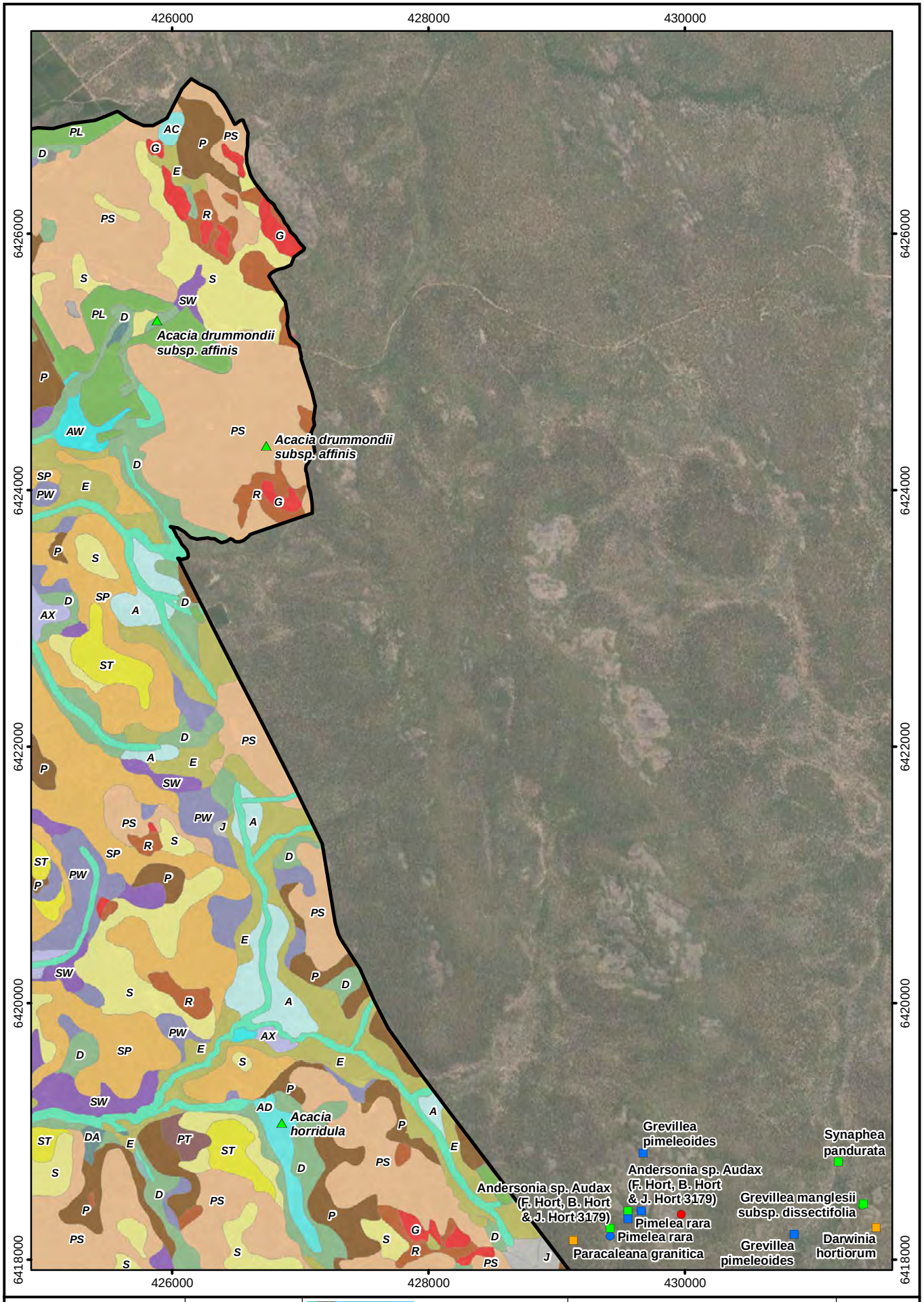
Sheet Layout:

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640
Author: E M Matttiske | MCPL Ref: ALC1901
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Site-vegetation Types in North Myara Area

Sheet 5 of 10

Figure: **16.4**



N

0 300 600 m

Scale: 1:40,000
MGA94 (Zone 50)

CAD Ref: a1992_MyNth_F06_01

Date: May 2021 | Rev: B | A4

Sheet Layout:

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640

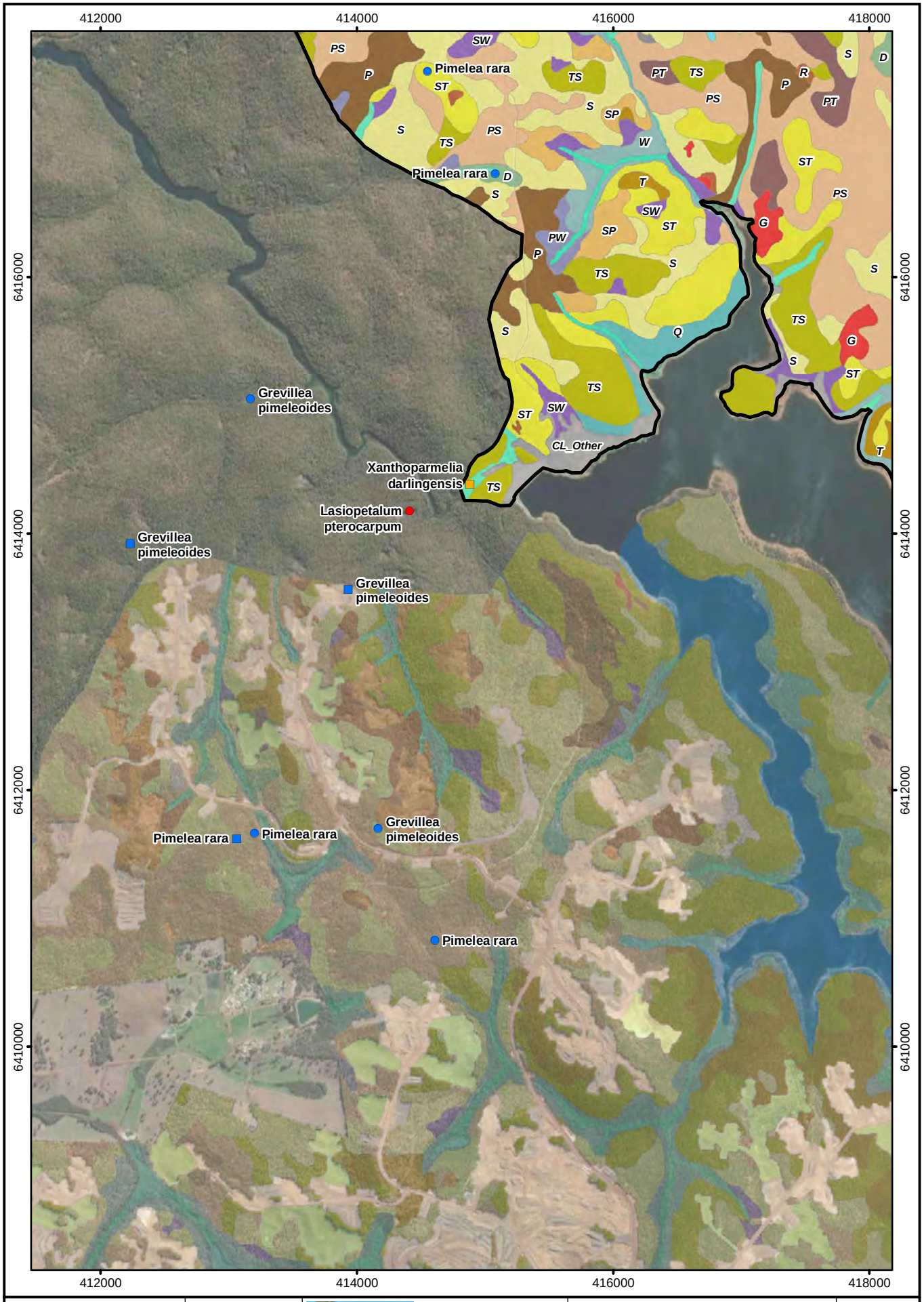
Author: E M Matttiske | MCPL Ref: ALC1901

Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Site-vegetation Types in North Myara Area

Sheet 6 of 10

Figure: **16.5**



N

0 300 600 m

Scale: 1:40,000
MGA94 (Zone 50)

CAD Ref: a1992_MyNth_F06_01

Date: May 2021 | Rev: B | A4

Sheet Layout:

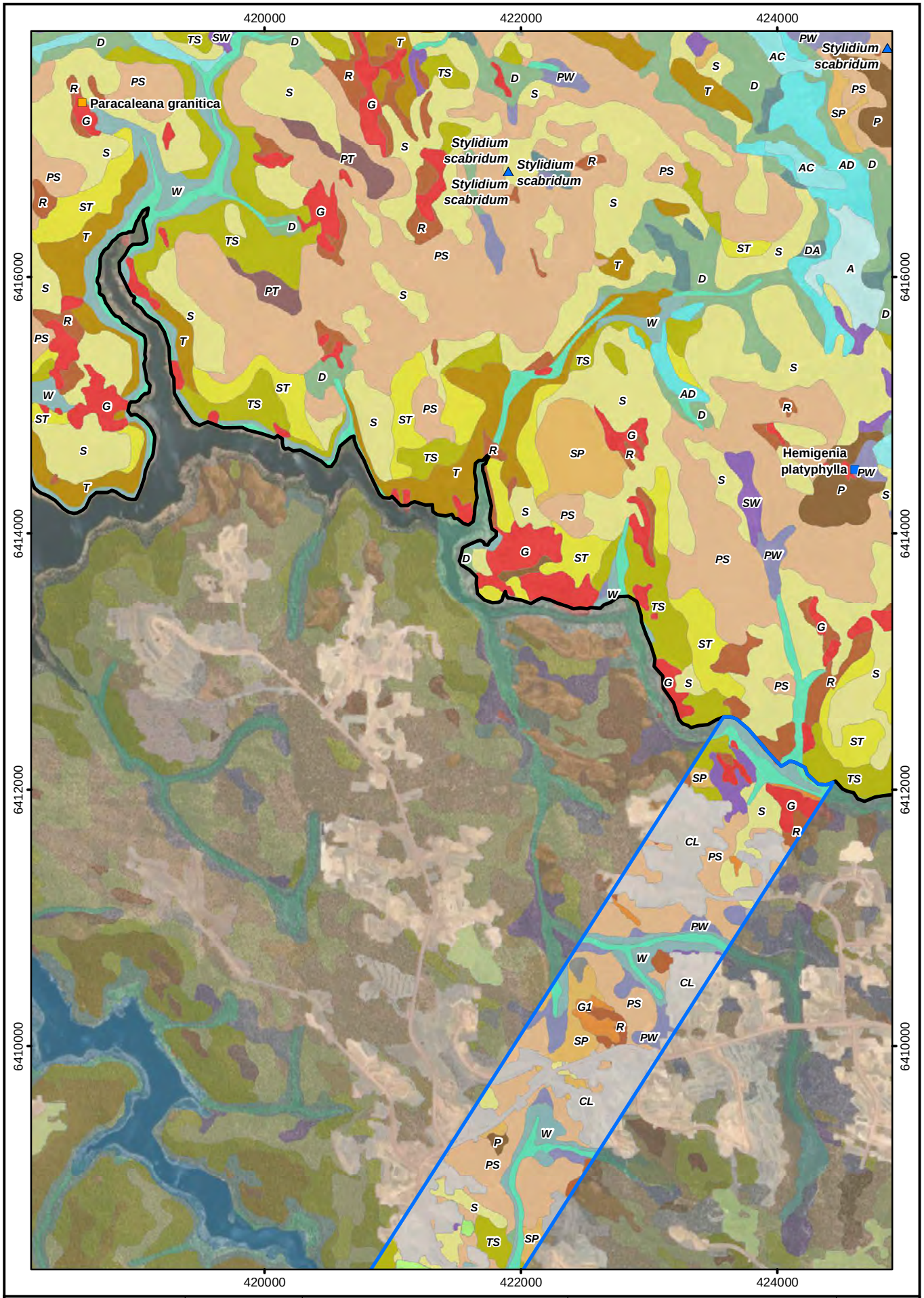
Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640
Author: E M Matttiske | MCPL Ref: ALC1901
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Site-vegetation Types in North Myara Area

Sheet 7 of 10

Figure:

16.6



N

0 300 600 m

Scale: 1:40,000
MGA94 (Zone 50)

CAD Ref: a1992_MyNth_F06_01

Date: May 2021 | Rev: B | A4

Sheet Layout:

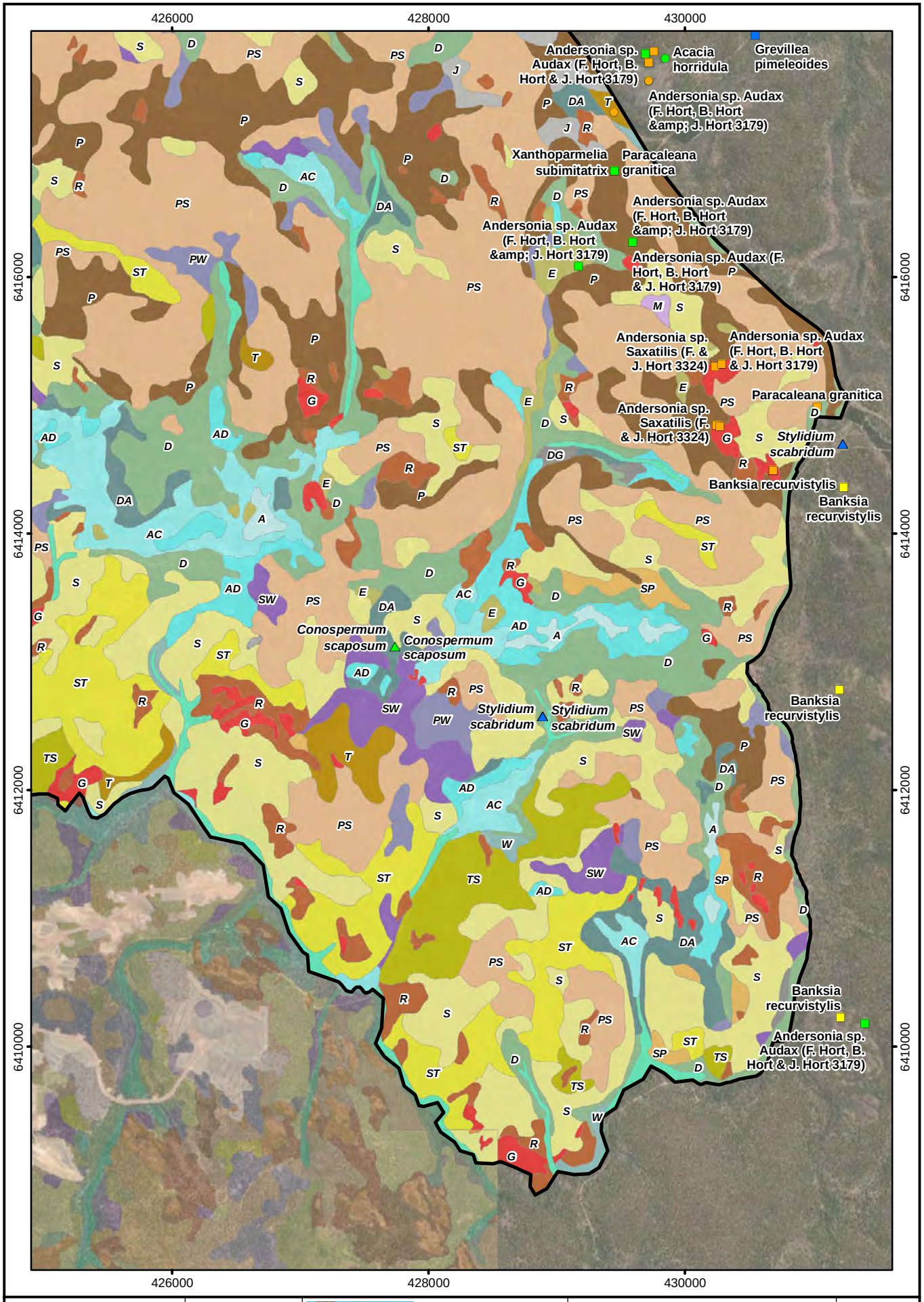
Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640
Author: E M Matttiske | MCPL Ref: ALC1901
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Site-vegetation Types in North Myara Area

Sheet 8 of 10

Figure:

16.7



N

0 300 600 m

Scale: 1:40,000
MGA94 (Zone 50)

CAD Ref: a1992_MyNth_F06_01

Date: May 2021 | Rev: B | A4

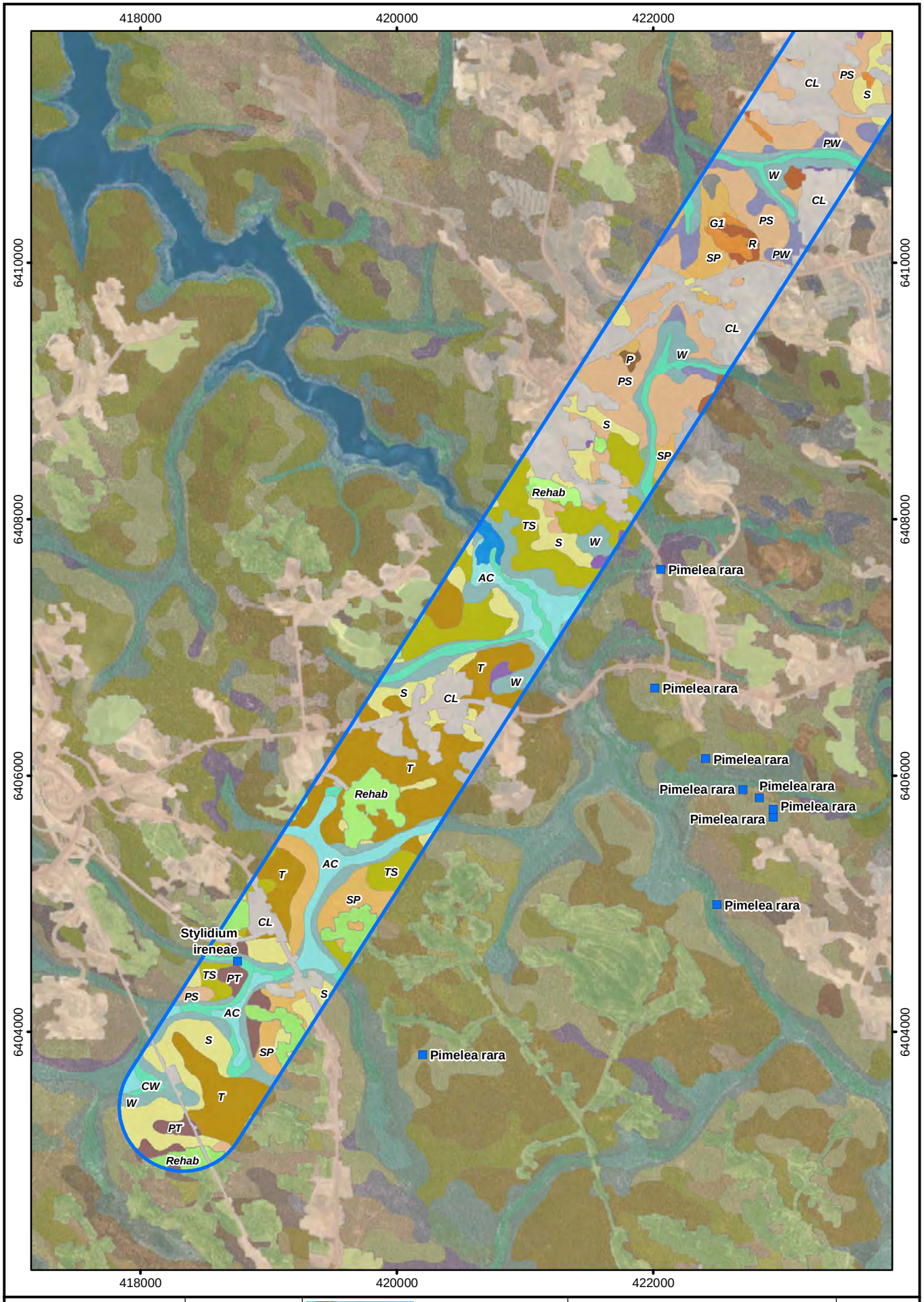
Sheet Layout:

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640
Author: E M Matttiske | MCPL Ref: ALC1901
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Site-vegetation Types in North Myara Area

Sheet 9 of 10

Figure: **16.8**



N

0 300 600 m

Scale: 1:40,000
MGA94 (Zone 50)

CAD Ref: a1992_MyNth_F06_01

Date: May 2021 | Rev: B | A4

Sheet Layout:

Mattiske Consulting Pty Ltd

28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640

Author: E M Matttiske | MCPL Ref: ALC1901

Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Site-vegetation Types in North Myara Area

Sheet 10 of 10

Figure:

16.9

5.7. Vegetation Condition

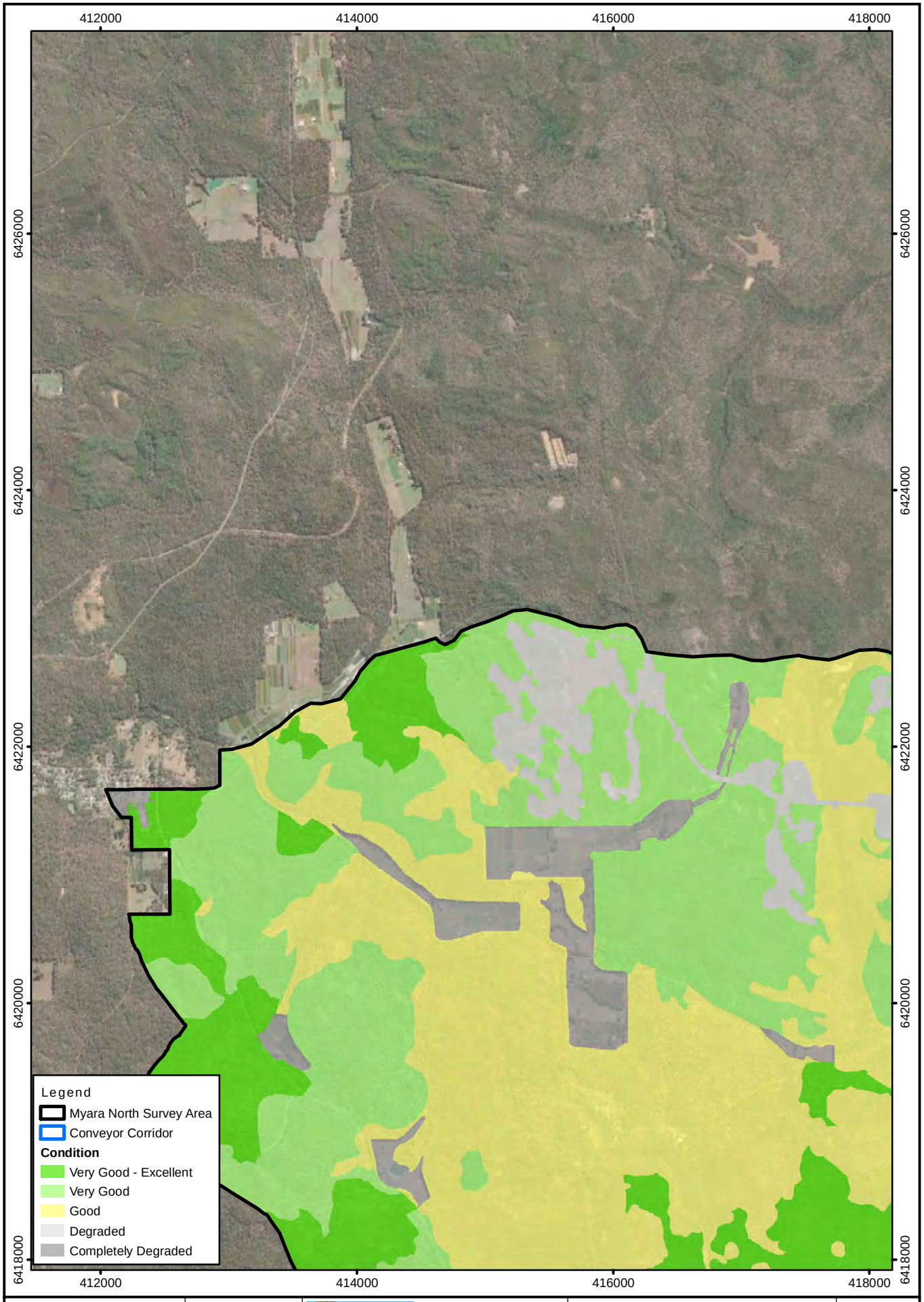
The extent of the respective condition ratings are summarised in Table 12. The extent of the respective condition ratings are summarized in Table 10. The vegetation and condition conditions rating was based on EPA Guidance Statement (2016b) which was adapted from Keighery (1994) and Trudgen (1988), Appendix A5.

The majority of the vegetation was ranked as very good and very good-excellent (50.41%) despite historical harvesting activities and local pressures from recreational activities with 15.23% being designated as Very-Good to Excellent. The biodiversity values have persisted in many areas instances. Some areas have been influence by the Jarrah Dieback disease and although the composition of the understorey has been modified as a result of the *Phytophthora cinnanomi* infections these areas still provide a range of native species towards the forest values. The degraded and completely degraded (5.57%) areas are associated with cleared, older rehabilitation areas and plantation areas, Figures 17.1 to 17.7.

Less stumps and logging activities were recorded within the swamp areas and on lower sandier soils in the broader valley types; although dieback disease from *Phytophthora cinnanomi* has influenced many of the valley systems in the MN survey area (Glevan Consulting 2020). A few areas supporting patches of larger trees were designated as potential fauna habitats. The recording sites designated on Figure 18 supported more than one tree with a diameter at breast height greater than 50cm, Figure 18.

Table 12: Summary of Condition Ratings in Myara North survey area

Condition Rating	Survey Area	Area (ha)	% Survey Area
Very Good - Excellent	Myara North	2823.31	15.23
Very Good	Myara North	6022.67	32.48
Good	Myara North	7854.43	42.36
Degraded	Myara North	387.47	2.09
Completely Degraded	Myara North	361.06	1.95
Very Good	Conveyor Corridor	500.17	2.70
Good	Conveyor Corridor	309.23	1.67
Degraded	Conveyor Corridor	53.07	0.29
Completely Degraded	Conveyor Corridor	229.29	1.24
Total		18540.71	100.00



N

0 300 600 m

Scale: 1:40,000
MGA94 (Zone 50)

CAD Ref: a1992_MyNth_F08_01

Date: May 2021 | Rev: C | A4

Sheet Layout:

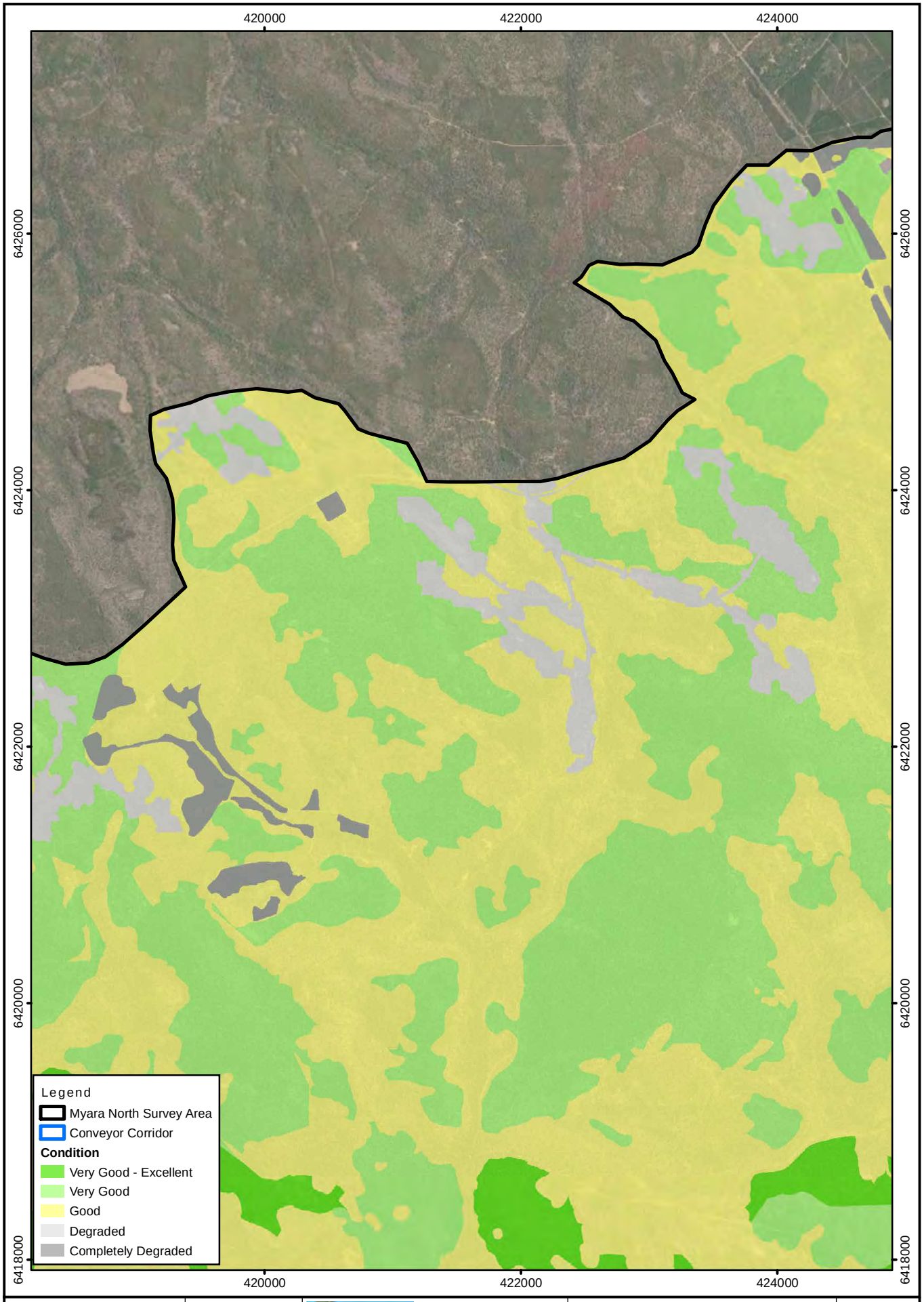
Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640
Author: E M Matttiske | MCPL Ref: ALC1901
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Vegetation Condition in Myara North Area

Sheet 1 of 7

Figure:

17.1



N

0 300 600 m

Scale: 1:40,000
MGA94 (Zone 50)

CAD Ref: a1992_MyNth_F08_01

Date: May 2021 | Rev: C | A4

Sheet Layout:

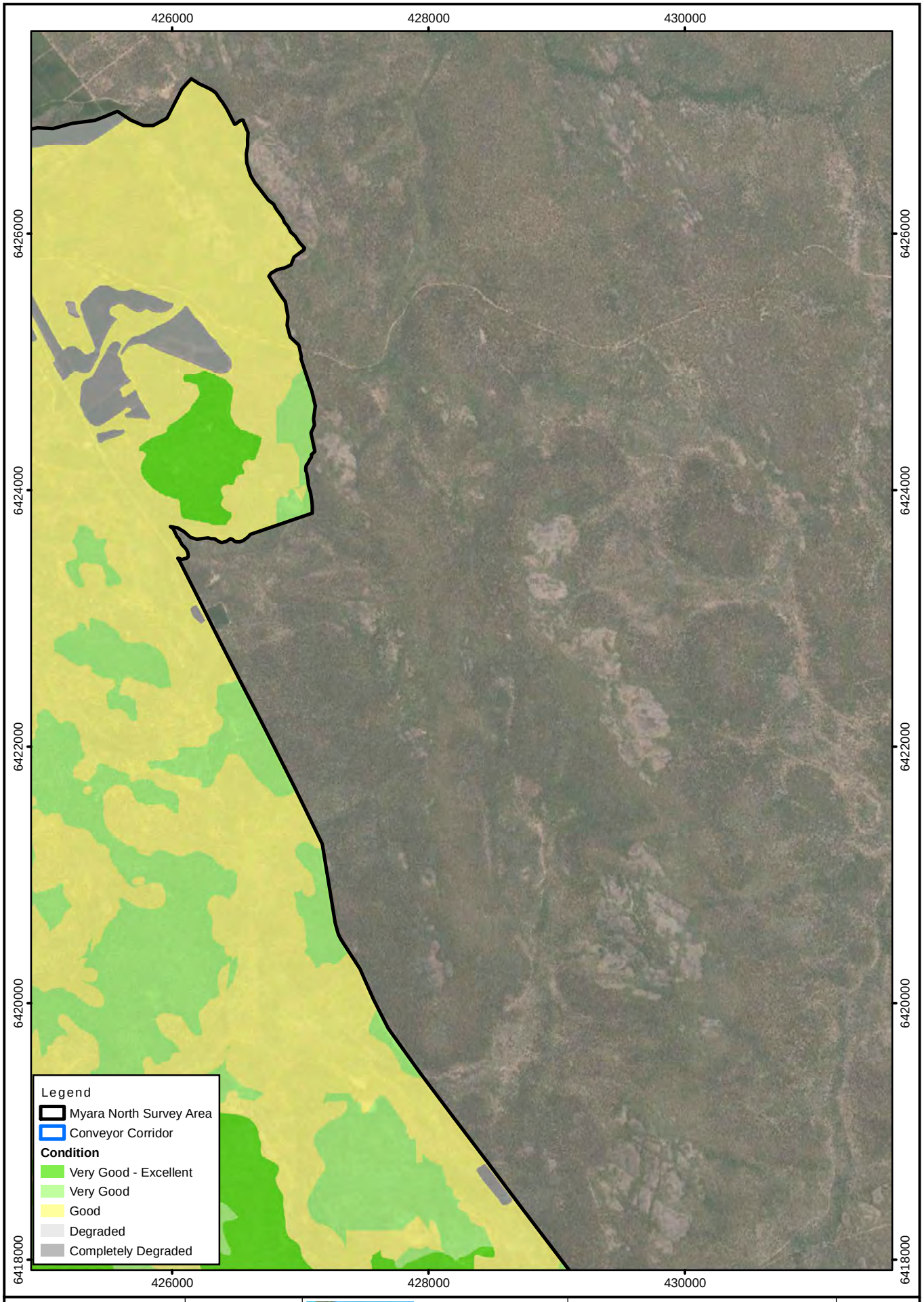
Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640
Author: E M Matttiske | MCPL Ref: ALC1901
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Vegetation Condition in Myara North Area

Sheet 2 of 7

Figure:

17.2



N

0 300 600 m

Scale: 1:40,000
MGA94 (Zone 50)

CAD Ref: a1992_MyNth_F08_01

Date: May 2021 | Rev: C | A4

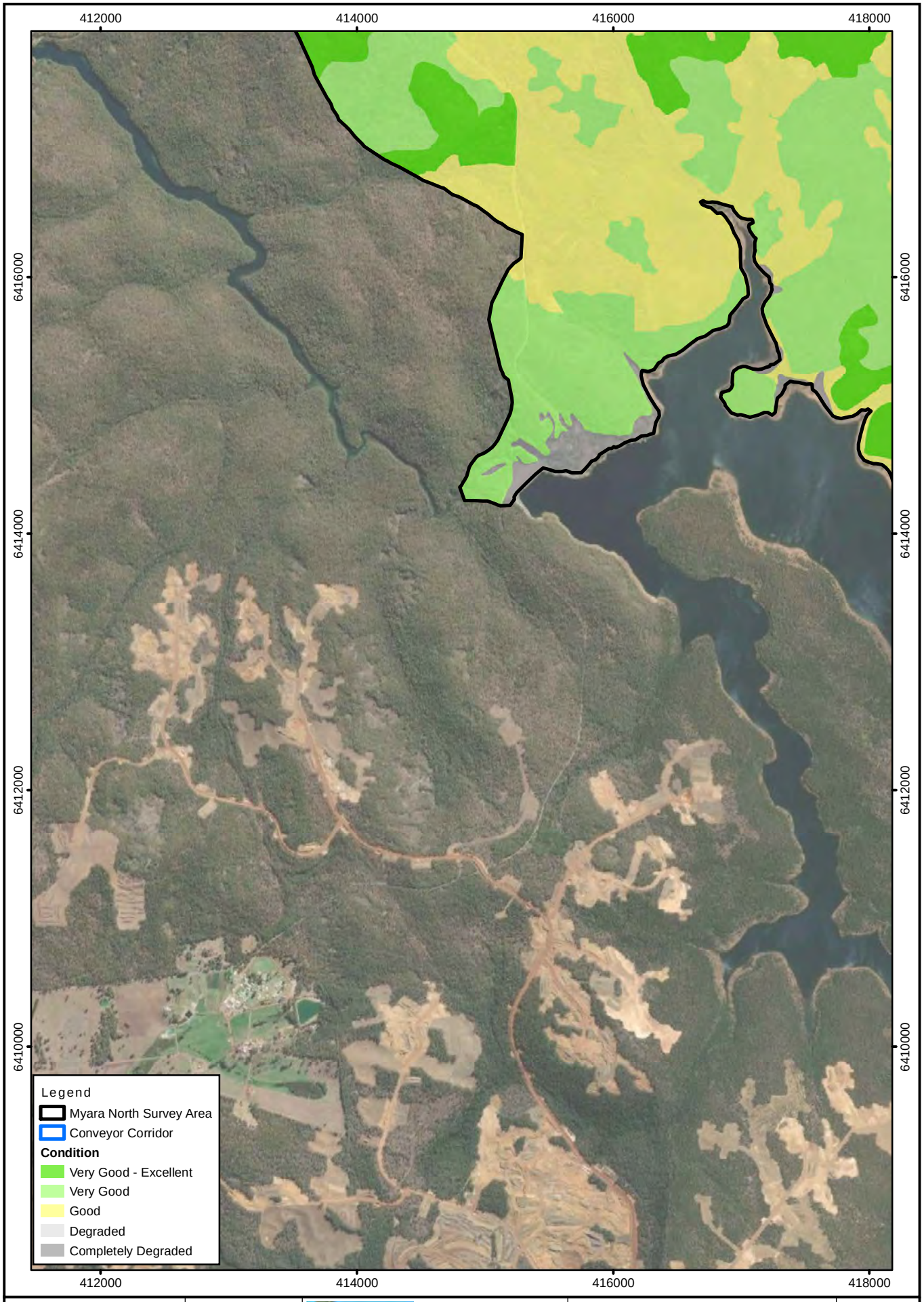
Sheet Layout:

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640
Author: E M Matttiske | MCPL Ref: ALC1901
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Vegetation Condition in Myara North Area

Sheet 3 of 7

Figure: **17.3**



N

0 300 600 m

Scale: 1:40,000
MGA94 (Zone 50)

CAD Ref: a1992_MyNth_F08_01

Date: May 2021 | Rev: C | A4

Sheet Layout:



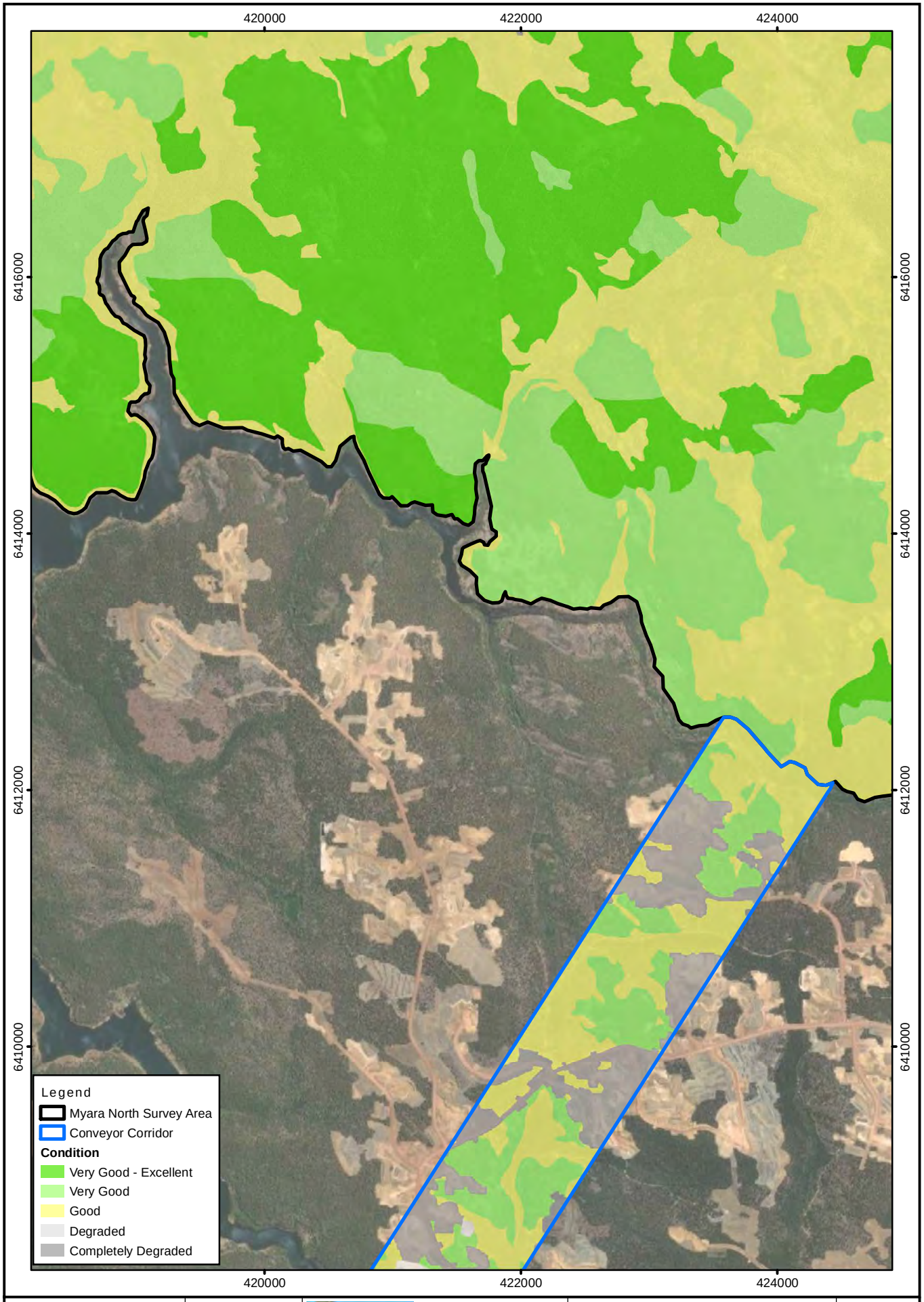
Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640
Author: E M Matttiske | MCPL Ref: ALC1901
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Vegetation Condition in Myara North Area

Sheet 4 of 7

Figure:

17.4



N

0 300 600 m

Scale: 1:40,000
MGA94 (Zone 50)

CAD Ref: a1992_MyNth_F08_01

Date: May 2021 | Rev: C | A4

Sheet Layout:

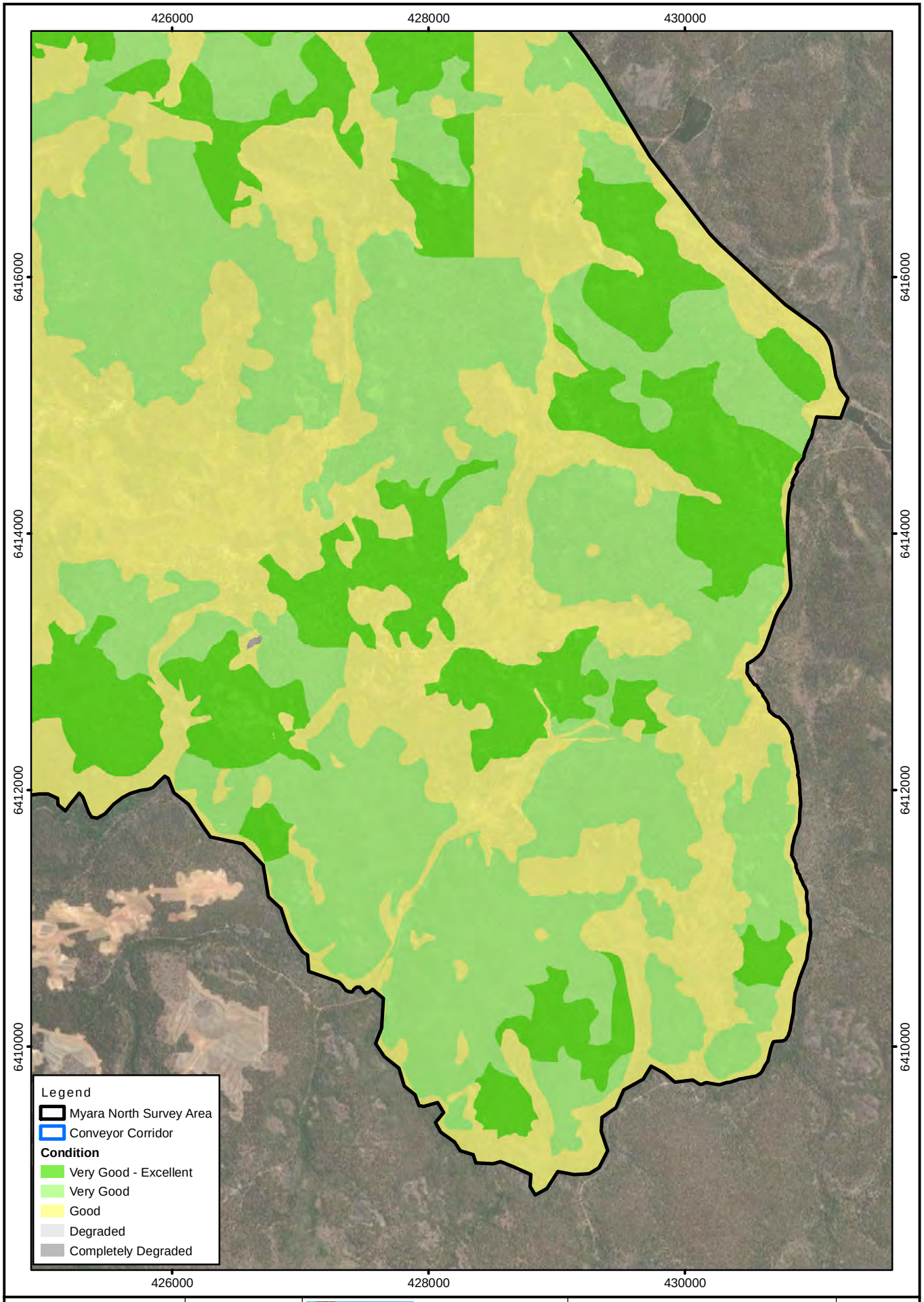
Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640
Author: E M Matttiske | MCPL Ref: ALC1901
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Vegetation Condition in Myara North Area

Sheet 5 of 7

Figure:

17.5



N

0 300 600 m

Scale: 1:40,000
MGA94 (Zone 50)

CAD Ref: a1992_MyNth_F08_01

Date: May 2021 | Rev: C | A4

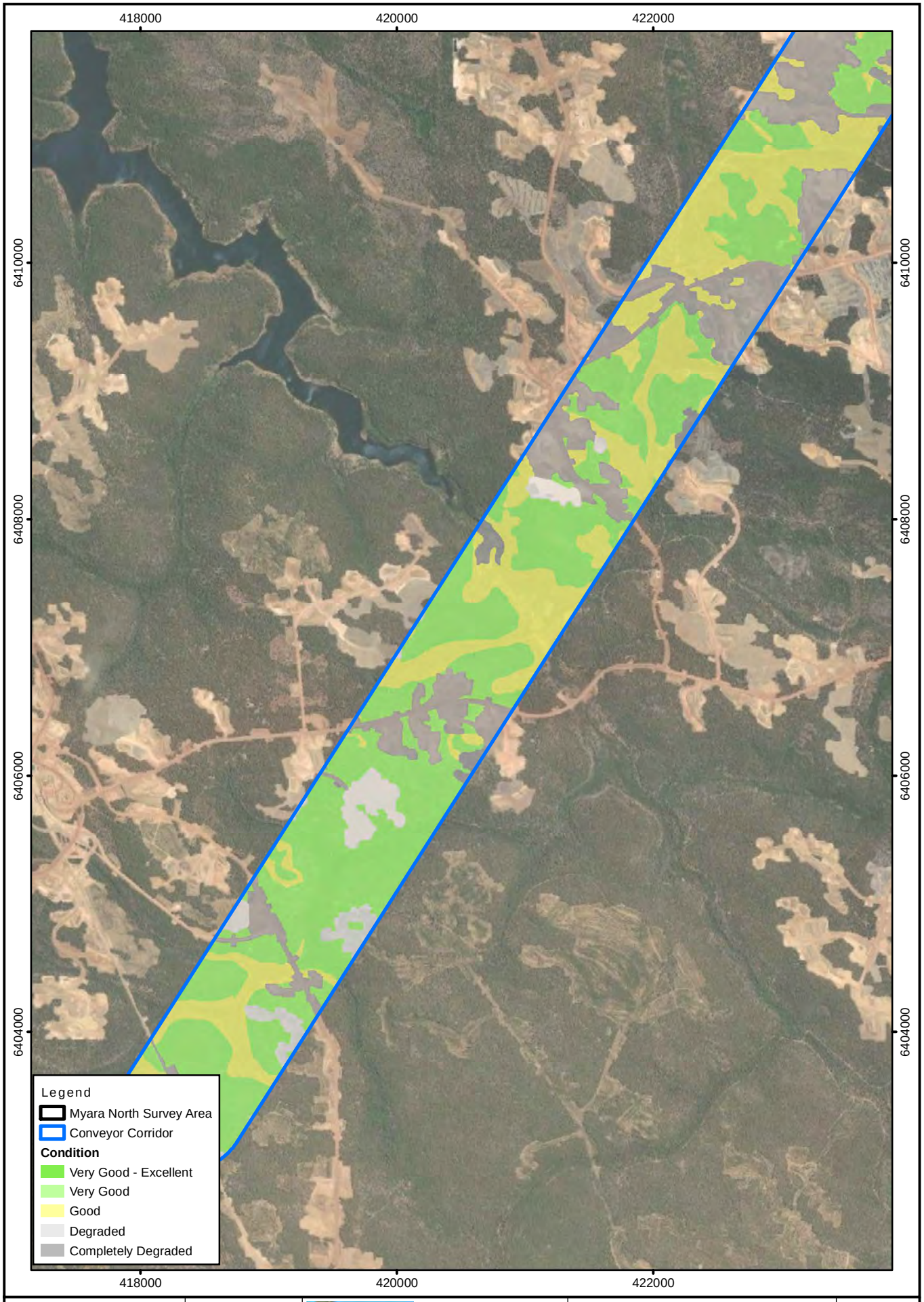
Sheet Layout:

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640
Author: E M Matttiske | MCPL Ref: ALC1901
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Vegetation Condition in Myara North Area

Sheet 6 of 7

Figure: **17.6**



N

0 300 600 m

Scale: 1:40,000
MGA94 (Zone 50)

CAD Ref: a1992_MyNth_F08_01

Date: May 2021 | Rev: C | A4

Sheet Layout:



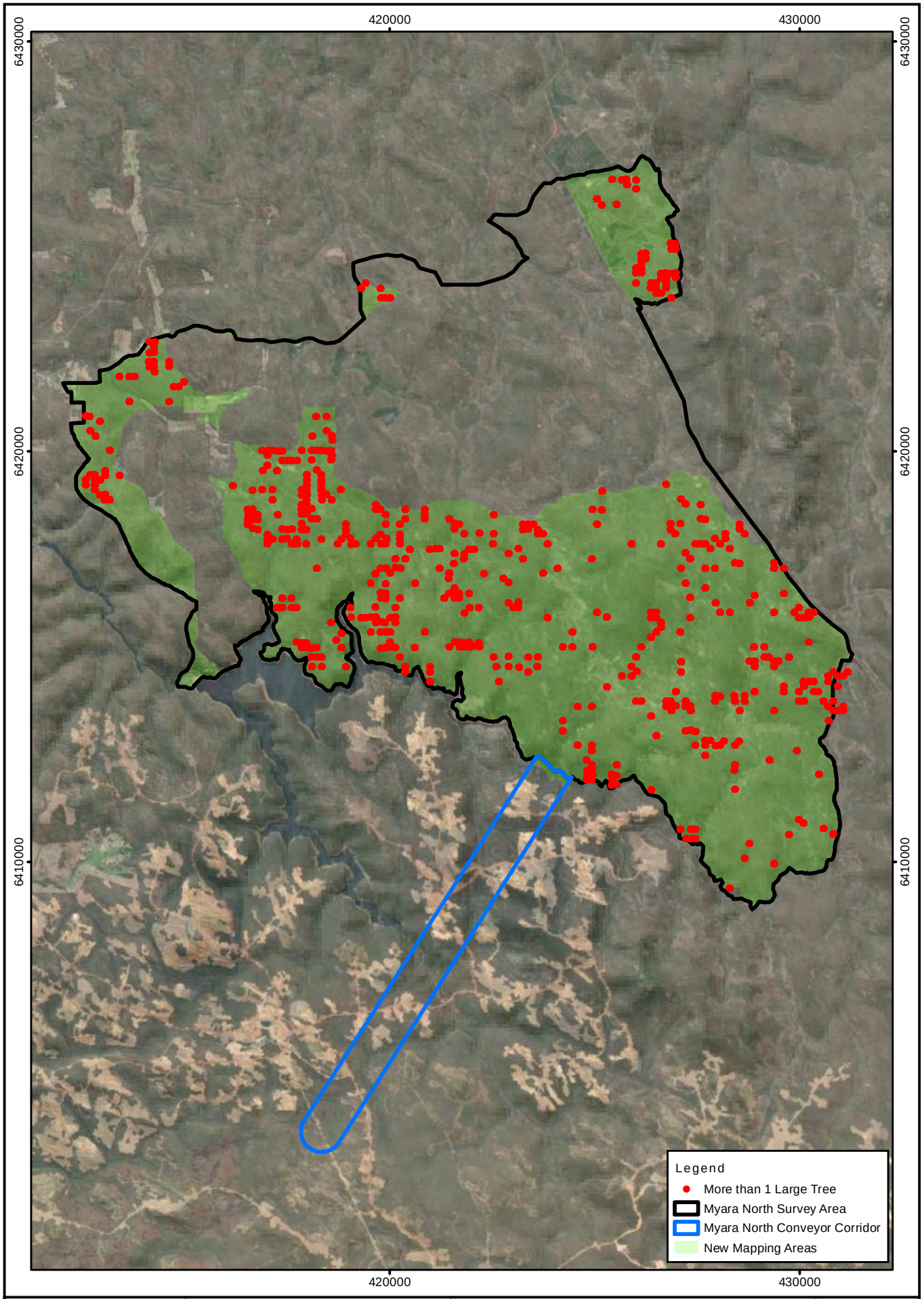
Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640
Author: E M Matttiske | MCPL Ref: ALC1901
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Vegetation Condition in Myara North Area

Sheet 7 of 7

Figure:

17.7



N

0 1 2 km

Scale: 1:125,000
MGA94 (Zone 50)

CAD Ref: a1992_MyNth_F13_01

Date: May 2021 | Rev: A | A4

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640
Author: E M Matttiske | MCPL Ref: ALC1901
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Myara North Survey Area

Patches of Large Trees > 50cm

Figure: **18**

5.8. Threatened and Priority Ecological Communities

No Threatened Ecological Communities (TECs) occur in the MN survey area. The desktop assessment highlighted several potential TECs; however these are restricted to the Swan Coastal Plain and as such do not extend into the Jarrah forest area on the Darling Ranges.

One of the priority ecological communities (PECs), as listed at State level by DBCA (2020a) occurs within the MN survey area, namely:

- Granite communities of the northern Jarrah forest (P3)
    - Jarrahdale area – Monadnocks, Blue Rock; insufficient information to distinguish discrete community type/s (DBCA 2020a).

There is one botanical PEC, listed at State level (Granite Communities of the northern Jarrah Forest), which is likely to occur in the MN survey area. This Priority Ecological Community has some affinities with the values in G and R (and variants). There is a lack of clarity on the values that determine the presence of the Priority Ecological Community other than the species that occur on granite outcrops on the Darling Scarp as defined by Markey (1997) (pers comm. J Pryde, DBCA). On a local scale the outcrop areas are locally very variable from lithic complexes to heaths to open woodlands. The species as recorded by Markey (1997), on the granite outcrops to the west on the Darling Scarp, were compared with those recorded in the site-vegetation types G and R by Mattiske Consulting team in 2020. Of these the main keystone species include *Calothamnus quadrifidus, Borya sphaerocephala, Grevillea bipinnatifida, Allocasuarina humilis* and *Babingtonia camphorosmae*. Of these species the initial four species are associated with shallow soils and granite outcrops. The *Babingtonia camphorosmae* is associated with seasonally moister soils which may occur in a range of site conditions including near run-off areas near granite outcrops. There is a lack of local data within the MN survey area to confirm the extent of the PEC other than to refer to the studies by Markey (1997) on the Darling Scarp. One limitation associated with such a comparison was relate to the degree of disturbance of the granite sampling sites on the Darling Scarp as reflected in the range of introduced species recorded in the Markey (1997) sampling areas.

The MN survey area occurs within the Regional Forest Agreement (RFA) area of the southwest forests DAWE (2020b) and as such was considered during the RFA process.

5.9. Potential Groundwater Dependent Ecosystems

The potential groundwater dependent ecosystems were determined on the basis of the site-vegetation types as mapped in Figures 16.3 to 16.9 above, see Figure 19. In view of the extensive flora and vegetation studies in the northern Jarrah Forest these vegetation complexes support species and site-vegetation types that prefer and occur on seasonally moister and wetter soils on the swamps and lower slopes of the valley systems. This approach was considered to represent a precautionary approach in the absence of detailed groundwater level data at the time of selecting the potential groundwater dependent ecosystems at this juncture.

Key site-vegetation types with the potential for groundwater dependent ecosystems included the following site-vegetation types, namely:

Swamps and Broad Valleys – A, AC, D, AD, DA and E

Valley Floors and Lower Slopes - CW and W

Slopes with localized higher seasonal soil moisture – SW and PW

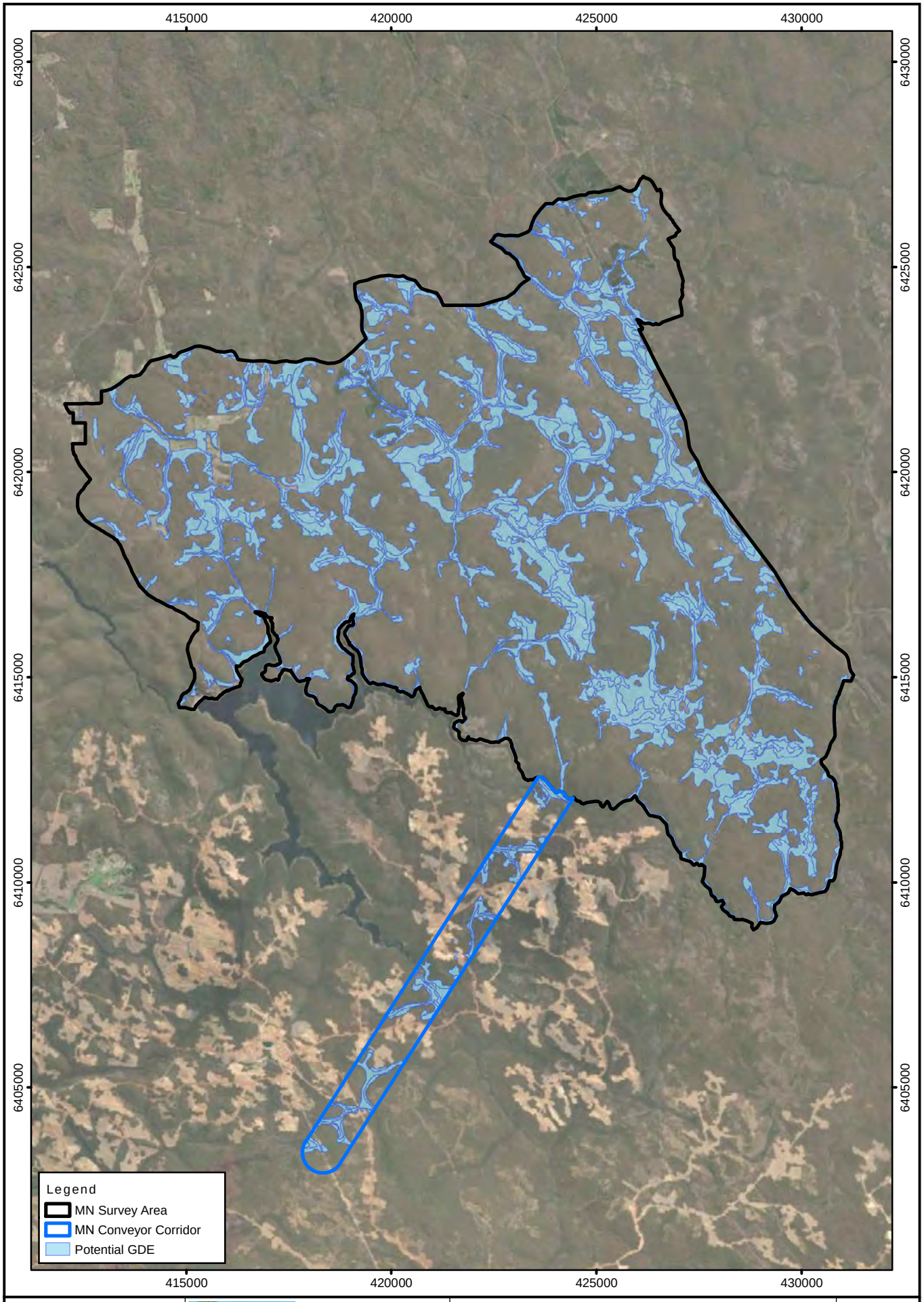
Key indicator plant species that are generally accepted as indicators of moister soils and, hence, potential groundwater dependent ecosystems include – *Banksia littoralis, Hakea varia, Acacia divergens, Pultenaea skinneri, Boronia molloyae, Thomasia paniculata, Astartea scoparia, Eucalyptus rudis, Hypocalymma cordifolium, Melaleuca preissiana, Melaleuca rhaphiophylla, Melaleuca viminea, Baumea* and *Leptocarpus* species and *Taxandria linearifolia. Babingtonia camphorosmae* and *Hypocalymma angustifolium* indicate seasonal moister soils and as such are significant in determining local conditions.

5.10. Old Growth Forests

Based on data as supplied by DBCA (2020) there are a number of patches of Old Growth Forest occurring in the area surrounding the MN survey area, with some occurring within 10 km of the survey area boundary to the north, south, east and west (see Section 4.7). A small section of Old Growth Forest intersects the survey area in the central part of the south-western boundary of the MN survey area. Due to the proximity of the MN survey area to the township of Jarrahdale and the Perth population the areas within MN have been subject to harvesting for many decades.

In reviewing the data as collected within the MN survey area it is apparent that some of the older flora and vegetation survey areas (E.M. Mattiske and Associates 1988, 1992, 1993 and Mattiske Consulting Pty Ltd 2009, 2011, 2012 and 2019) have been logged since the initial surveys were undertaken. The earlier flora and vegetation survey areas (conveyor corridor and previous survey areas within the MN survey area) were not re-assessed in 2020.

The survey did not identify any additional areas within the survey area that could potentially be un-mapped Old Growth Forest, based on Department of Parks and Wildlife criteria (DPAW 2017).



N

0 1 2 km

Scale: 1:125,000
MGA94 (Zone 50)

CAD Ref: a1992_MyNth_F06_02

Date: March 2021 | Rev: A | A4

Mattiske Consulting Pty Ltd

28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640

Author: E M Matttiske | MCPL Ref: ALC1901

Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Potential GDE's based on Site-vegetation Types Myara North survey area

Figure: **19**

6. DISCUSSION AND CONCLUSIONS

6.1. Flora

A total of 681 vascular taxa was recorded in the MN survey area and the adjacent areas. The survey efforts were undertaken over multiple years and seasons and therefore the coverage of the flora was considered to exceed the EPA (2016a and 2016b) guidance statements expectations.

No Threatened flora species, pursuant to section 179 of the *EPBC Act* and as listed by DAWE (2020a) or pursuant to Part 2, Division 1 and Subdivision 2 of the *BC Act* and as listed by DBCA (2018a) were recorded during the detailed flora and vegetation survey of the MN survey area. The lack of threatened flora is key outcome of the survey effort and as such reinforces the desktop assessment which found a moderate to low likelihood of threatened flora occurrence on the MN survey area. The eight Threatened species that had a moderate potential to occur in the MN survey area were largely (seven of the eight) occurred in broader valleys and near granite outcrops.

Fourteen Priority flora species as listed by DBCA (2018c) have been recorded in the MN survey area. During 2020, four Priority species were recorded within the specific MN survey area, namely *Acacia drummondii* subsp. *affinis* (P3), *Acacia horridula* (P3), *Conospermum scaposum* (P3) and *Stylidium scabridum* (P4). Additional Priority flora species (*Acacia oncinophylla* subsp. *oncinophylla, Boronia tenuis, Bossiaea modesta, Banksia recurvistylis, Grevillea crowleyae, Grevillea manglesii* subsp. *dissectifolia* and *Grevillea pimeleoides*) were recorded on the fringes of the MN survey area and in nearby flora and vegetation studies in previous studies.

The Priority flora species occur on the varying landform and soil groupings, namely - 41.9% in swamps, 58.1% on or near granite outcrops and 61.3% with lateritic gravelly soils. Whilst the Priority species occur on the various landform and soil groupings, the vast majority have occurred on the eastern areas of the MN survey area in the broader valley systems and nearer the monadnock areas to the north and east.

Fiifty-eight introduced species were recorded in the MN assessment. One of the introduced species is a declared pest organism pursuant to section 22 of the BAM Act, namely:* *Gomphocarpus fruticosus* (DPIRD 2020). None of the introduced species are listed as a Weed of National Significance (WONS) (DAWE 2020d). Of the 58 introduced species, 8 have been ranked as High Ecological Impact by DPAW (2014) and 24 have been ranked as Rapid Invasiveness by DPAW (2014). **Gomphocarpus fructicosus* is associated with cleared and degraded areas, **Leptospermum laevigatum* is associated with areas near previous disturbance and tracks,**Watsonia meriana* is associated with valley floors and creek lines. The remainder are associated with degraded and completely degraded areas and fringes of road and tracks.

A key characteristic of the survey area is the shift in landforms and soils from west to east across the MN survey area and the latter is reflected in the change in the dominance of flora species that tolerate the broader valley systems, swamps and the outcrop areas. The summary of results from the plots and the recording sites as summarized by the site-vegetation types reflects this shift from species in the lateritic slopes and ridges and the broader valleys and outcrops.

6.2 Vegetation Values

The survey efforts were undertaken over multiple years and seasons and the coverage of the vegetation was considered to exceed the EPA (2016a and 2016b) guidance statements expectations. The vegetation values were recorded in vegetation plots (20m x 20m with 20 x 2m x 2m quadrats within each plot), in regular recording sites and from aerial photographic imagery interpretations. The vegetation plots were established in the spring months of 2020 and these were combined with nearby plots from Jarrahdale (JDL), Myara and Huntly areas (HU) and other forest plots (FMPs). The coverage of the survey area with

regular recording sites was undertaken over a six month period and then the data was merged with previous data sets from the earlier studies near Jarrahdale and the Myara and Huntly areas.

A total of 32 site-vegetation types were defined and mapped on the MN survey area. The delineation of the site-vegetation types was based on the interpretation of the ranking data for the flora species and the underlying landforms and soils. The interpretation of the data from recording sites was based on the previous methods adopted by Mattiske which relied on the interpretation of the keystone species as defined by Havel (1975a and 1975b) and the site parameters as recorded at each recording site. This approach provided consistency with previous approaches adopted in the site-vegetation mapping in the northern Jarrah forest by Havel (1975a and 1975b) and Mattiske on the previous areas near Jarrahdale, Dwellingup and in the eastern Jarrah forests.

A range of analyses were undertaken on the vegetation plot data and after a series of analyses there was a reliance placed on keystone species as defined by Havel (1975a and 1975b) and as modified by Mattiske for the northern Jarrah forest. The continuum nature of the vegetation was reflected in the findings for the site-vegetation types which occur on the lateritic slopes and ridges and the more distinct communities on the swamps and broader valley systems. The statistical approach adopted in other projects was less reliable in the MN survey area as many species occur on all sites or only a few sites and it also does not take into account the site parameters which are critical in the delineation of the site-vegetation types. Whilst the differentiation was evident on the more diverse and different structural and floristic communities in the sites associated with valleys and granite outcrops this was not the case for the site-vegetation types that have subtle shifts in keystone species on the gradients from sandy soils, to sandy-loams to sandy-gravels to gravels and lateritic outcropping areas.

The site-vegetation types were subdivided into six main groupings associated with site conditions which reflected landforms, soils and soil moisture levels. The site-vegetation types on the extreme sites such as granite outcrops and broad valley systems and swamps differ markedly from the forest and woodland areas on the slopes and ridges.

The G, G1, G2, RG and R site-vegetation types are associated with the outcrop areas and are in larger areas associated with the Cooke vegetation complex as defined by Heddle *et al.* (1980) and Mattiske and Havel (1998). These site-vegetation types support a range of conservation significant species. As the mining operations are mainly associated with the lateritic slopes and uplands these areas are unlikely to be impacted to the same degree.

The series of site-vegetation types associated with the broader valley systems which dominate the Yarragil 2 and Swamp vegetation complexes as defined by Mattiske and Havel (1998) provide a spatial diversity that supports a range of species. As the mining operations are mainly associated with the lateritic slopes and uplands these areas are unlikely to be directly impacted to the same degree. There is potential for some of these site-vegetation types to be groundwater dependent ecosystems with the potential for indirect impacts from some operational activities. As some of the key species in these areas are depended on seasonal increases in soil moisture availability in the valley systems there is some potential for indirect impacts.

The dominant site-vegetation types on the lateritic slopes and ridges include types P, PS, SP, S, ST, T and TS. The other areas of significance are the localised site-vegetation types that support specific and localised flora species (e.g. site-vegetation types E and J that occur in more restricted areas within the broader valleys). The remaining codes (CL, CL Other, Rehab, Dam and PL) are associated with modified environments.

No Threatened Ecological Communities (TECs) occur in the MN survey area. The only botanical Priority Ecological Community has some affinities with the values in G and R (and variants). There is a lack of clarity on the values that determine the presence of the Priority Ecological Community other than the association with the outcrops. On a local scale the outcrop areas are locally very variable from lithic

complexes to heaths to open woodlands. The species as recorded by Markey (1997), on the granite outcrops to the west on the Darling Scarp, were compared with those recorded in the site-vegetation types G and R by Mattiske Consulting team in 2020. Of these the main keystone species include *Calothamnus quadrifidus, Borya sphaerocephala, Grevillea bipinnatifida, Allocasuarina humilis* and *Babingtonia camphorosmae*. Of these species the initial four species are associated with shallow soils and granite outcrops. The *Babingtonia camphorosmae* is associated with seasonally moister soils which may occur in a range of site conditions including near run-off areas near granite outcrops. No specific sampling by DBCA was undertaken (pers comm. J Pryde, DBCA) in the areas designated as the PEC granite community within the MN survey area.

The majority of the vegetation was ranked as very good and very good-excellent (50.41%) despite historical harvesting activities and local pressures from recreational activities with 15.23% being designated as Very-Good to Excellent. The biodiversity values have persisted in many areas instances. Some areas have been influence by the Jarrah Dieback disease and although the composition of the understorey has been modified as a result of the *Phytophthora cinnanomi* infections these areas still provide a range of native species towards the forest values. The degraded and completely degraded (5.57%) areas are associated with cleared, older rehabilitation areas and plantation areas. Less stumps and logging activities were recorded within the swamp areas and on lower sandier soils in the broader valley types; although dieback disease from *Phytophthora cinnanomi* has influenced many of the valley systems in the MN survey area (Glevan Consulting 2020). A few areas supporting patches of larger trees were designated as potential fauna habitats.

The potential groundwater dependent ecosystems were determined on the basis of the vegetation complexes and when the more detailed site-vegetation type mapping was available the initial interpretations were updated. The dominant and key indicator species which occur in moister and wetter soils on the swamps and lower slopes of the valley systems underpinned the selection of the potential groundwater dependent ecosystems. Soil moisture levels reflect local site conditions, such as runoff from granite outcrops in wetter seasons and areas where the soil type can hold water for longer periods. Therefore not all areas supporting the latter species are GDEs, but may reflect other specific site conditions not related to the groundwater levels.

State Government mapping indicates that there is a number of patches of old growth forests occurring in the area surrounding the MN survey area, with some occurring within 10 km of the survey area boundary to the north, south, east and west. A small section of old growth forest intersects the survey area in the central part of the south-western boundary of the MN survey area. The survey did not identify any additional areas within the survey area that could potentially be un-mapped old growth forest, based on Department of Parks and Wildlife criteria (DPAW 2017).

7. ACKNOWLEDGEMENTS

The authors would like to thank Alcoa of Australia Ltd and the environment team at GHD for their assistance with this project.

8. PERSONNEL

The following Mattiske Consulting Pty Ltd personnel were involved in this recent project. Thanks also go to previous staff members of the Mattiske Consulting team, the Alcoa Australia environmental team, Mike Hislop from the State Herbarium for assistance with plant identifications and the environmental team at GHD for their support during this project.

NAME	POSITION	PROJECT INVOLVEMENT	FLORA COLLECTION PERMITS
Dr EM Mattiske	Managing Director & Principal Ecologist	Project Management, Planning, Field Studies, Data Collation, Data interpretation, Reporting	FB62000019 TFL 26-1920
L Rowles	Experienced Botanist	Project Leader, Field Studies, Data Collation, Assisting with Reporting	FB62000020-2
S. Ruoss	Experienced Botanist	Field Studies, Data Collation	FB62000031-2 TFL 17-1819
R. Dharmarajan	Experienced Botanist	Field Studies, Data Collation	FB62000028-2
E. Chetwin	Experienced Botanist	Field Studies, Data Collation	FB62000026-2
L. Cockram	Experience Botanist	Field Studies, Assisting with Plant Identifications, Data Collation	FB62000266
A. Barrett	Experience Botanist	Field Studies	FB62000030-2
B. Ellery	Senior Botanist	Assisting with Plant Identifications	FB62000024-2
N. Watson	Botanist	Field Studies, Assisting with Plant Identifications, Data Collation	FB62000146-2
A. Pereira	Botanist	Field Studies, Data Collation	FB62000145-2
Z. Sims	Botanist	Field Studies, Data Collation	FB62000025-2
J. Wescombe	Botanist	Data collation, reporting	FB62000032-2
R. Jones	Botanist	Data collation and Assisting with Reporting	N/A
M. Behn	Biologist	Field Studies, Data Collation and Assisting with Reporting	FB62000264
T. Gregory	Technical Support	Data Collation and Assisting with Reporting	N/A

9. REFERENCES

Beard, J.S. 1979, The vegetation of the Pinjarra Area, Western Australia. Map and Explanatory Memoir,1:250,000 Series. Vegmap Publications, Perth.

Beard, JS 1990, *Plant life of Western Australia*, Kangaroo Press, Kenthurst, NSW.

Biodiversity Conservation Act 2016 (WA).

Biosecurity and Agriculture Management Act 2007 (WA).

Biosecurity and Agriculture Management Regulations 2013 (WA).

Bureau of Meteorology 2021, *Climate averages for specific sites*. Available from: http://www.bom.gov.au/climate/data/.

Churchward, H.M and McArthur, W.M. 1980, Landforms and Soils of the Darling System, Western Australia. In: Department of Conservation and Environment (1980) Atlas of Natural Resources Darling System, Western Australia. Published by the Department of Conservation and Environment, Perth, 1980.

Clarke, KR & Gorley, RN 2015 , *PRIMER v7 - User Manual/Tutorial* , PRIMER-e, Devon, United Kingdom.

Commonwealth of Australia 2013, *Survey Guidelines for Australia's Threatened Orchids.* Guidelines for detecting Orchids listed as "Threatened" under the Environment Protection and Biodiversity Conservation Act 1999. https://www.environment.gov.au/system/files/resources/e160f3e7-7142-4485-9211-2d1eb5e1cf31/files/draft-guidelines-threatened-orchids.pdf

Daws, M.I., Walters, S.J., Harris, R.J., Tibbett, M., Grigg, A.H., Morald, T.K., Hobbs, R.J. and Standish, R.J. 2021, Nutrient enrichment diminishes plant diversity and density, and alters long-term ecological trajectories in a biodiverse forest restoration. Ecological Engineering 165 (2021) 106222.

Dell, B. & Havel, J.J. 1989, *The Jarrah Forest, an Introduction*, Chapter 1. In B. Dell et al. (eds.), *The Jarrah Forest*, pp. 1-10. Kluwer Academic Publishers, Dordrecht – Netherlands.

Dell, B. & Havel, J.J. and Malajczuk, N (Eds.) 1989, *The Jarrah Forest, a Complex Mediterranean Ecosystem.* Kluwer Academic Publishers, Dordrecht – Netherlands.

Department of Agriculture, Water and the Environment 2020a, *EPBC Act list of threatened flora*, Commonwealth of Australia. Available from: http://www.environment.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl?wanted=flora.

Department of Agriculture, Water and the Environment 2020b, *Protected Matters Search Tool*. Available from: http://www.environment.gov.au/epbc/protected-matters-search-tool.

Department of Agriculture, Water and the Environment 2020c, *Australia's bioregions (IBRA).* Available from: http://www.environment.gov.au/topics/land/national-reserve-system/science-maps-and-data/australias-bioregions-ibra.

Department of Agriculture, Water and the Environment 2020d, *Weeds of National Significance*. Available from: www.environment.gov.au/biodiversity/invasive/weeds/weeds/lists/wons.html.

Department of Agriculture, Water and the Environment 2020e, *EPBC Act List of Threatened Ecological Communities*. Available from: http://www.environment.gov.au/cgi-bin/sprat/public/publiclookupcommunities.pl.

Department of Agriculture, Water and the Environment 2020f, *Australian Wetlands Database: Ramsar wetlands – Peel-Yalgorup System.* Available from: http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=36.

Department of Biodiversity, Conservation and Attractions 2007-, *NatureMap - mapping Western Australia's biodiversity*. Available from: http://naturemap.dec.wa.gov.au.

Department of Biodiversity, Conservation and Attractions 2018a, *Wildlife conservation (rare flora) notice 2018*, *11 September 2018*, Minister for the Environment under section 2 of the BC Act. Available from: https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants. 28 May 2020.

Department of Biodiversity, Conservation and Attractions 2018b, *List of Threatened Ecological Communities endorsed by the Western Australian Minister for Environment - 28 June 2018.* Available from: https://www.dpaw.wa.gov.au/images/plants-animals/threatened-species/threatened_ecological_communities_endorsed_by_the_minister_for_the_environment_june_2018.pdf. 28 May 2020.

Department of Biodiversity, Conservation and Attractions 2018c, *Threatened and Priority Flora List – 05 December 2018*. Available from: https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants. 28 May 2020.

Department of Biodiversity, Conservation and Attractions 2019, *Conservation codes for Western Australian flora and fauna, 3 January 2019*. Available from: https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities. 28 May 2020.

Department of Biodiversity, Conservation and Attractions 2020a, *Priority Ecological Communities for Western Australia Version 29, 5 May 2020*. Available from: https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/wa-s-threatened-ecological-communities.

Department of Biodiversity, Conservation and Attractions 2020b, *Threatened flora, fauna and ecological communities database searches*. Available from: https://www.dpaw.wa.gov.au/images/documents/plants-animals/threatened-species/database-search-request-information-sheet.pdf.

Department of Conservation and Environment 1980, Atlas of Natural Resources Darling System, Western Australia. Published by the Department of Conservation and Environment, Perth, 1980.

Department of Environment and Conservation 2013, *Definitions, categories and criteria for threatened and priority ecological communities*, Government of Western Australia. Available from: http://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/wa-s-threatened-ecological-communities. 28 May 2020.

Department of Environment Regulation 2015, *Clearing Regulation Fact Sheet 1: Native vegetation clearing legislation in Western Australia – Environmental Protection Act 1986.* Available from: https://www.der.wa.gov.au/our-work/clearing-permits/49-fact-sheets. 28 May 2020.

Department of Parks and Wildlife 2014, *Ecological impact and invasiveness ratings from the Department of Parks and Wildlife South West Region Species Prioritisation Process*. Available from: https://www.dpaw.wa.gov.au/plants-and-animals/plants/weeds/156-how-do-we-manage-weeds. 28 May 2020.

Department of Parks and Wildlife 2017, *Procedures for the assessment, identification and demarcation of old-growth forest.* Prepared Department of Parks and Wildlife, March 2017.

Department of Planning, Lands and Heritage 2020, Aboriginal Heritage Inquiry System. Available from: https://maps.daa.wa.gov.au/AHIS/. 28 May 2020.

Department of Primary Industries and Regional Development 2020, *Western Australian Organism List*. Available from: https://www.agric.wa.gov.au/organisms.

Environment Protection and Biodiversity Conservation Act 1999 (Cth)

Environmental Protection Act 1986 (WA)

Environmental Protection (Clearing of Native Vegetation) Regulations 2004

Environmental Protection (Environmentally Sensitive Areas) Notice 2005

Environmental Protection Authority 2016a, *Environmental Factor Guideline: Flora and Vegetation*, Environmental Protection Authority, Western Australia.

Environmental Protection Authority 2016b, *Technical Guidance – Flora and vegetation surveys for environmental impact assessment*, Environmental Protection Authority, Western Australia.

Glevan Consulting (2020), Phytophthora Dieback assessments within the Myara North and Holyoake assessment areas, Huntly Mine. Unpublished report prepared for Alcoa of Australia, 2020.

Grant, C and Koch J. 2007, Decommissioning Western Australia's First Bauxite Mine: Co-evolving vegetation restoration techniques and targets. Ecological Management and Restoration Vol 8 (No. 2), pp. 92-105.

Havel, J.J. 1975a, Site-vegetation mapping in the northern jarrah forest (Darling Range). I. Definition of site-vegetation types. Bull. For. Dep. W. Aust. 87.

Havel, J.J. 1975b, Site-vegetation mapping in the northern jarrah forest (Darling Range). II. Location and mapping of site-vegetation types. Bull. For. Dep. W. Aust. 87.

Heddle, E.M., Havel, J.J., and Loneragan, O.W., 1980, Vegetation Complexes of the Darling System, Western Australia. In: Department of Conservation and Environment (1980) Atlas of Natural Resources Darling System, Western Australia. Department of Conservation and Environment, Perth, 1980.

Havel, J.J. (2000). Ecology of the forests of southwestern Australia in relation to climate and landforms. Ph.D. Thesis, Murdoch University, Perth, Western Australia.

Keighery, B.J. (1994). *Bushland Plant Survey: a Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc.), Nedlands, Western Australia.

Mattiske Consulting Pty Ltd 2006, Vegetation Monitoring in the Intermediate Rainfall zone in the Jayrup, Cameron and Gordon Catchments. Unpublished report prepared for Alcoa of Australia Limited.

Mattiske Consulting Pty Ltd 2009, Flora and Vegetation of O'Neill Survey Area. Unpublished report prepared for Alcoa of Australia Limited.

Mattiske Consulting Pty Ltd 2009b, Vegetation Assessment of the Wungong Catchment. Unpublished report prepared for the Water Corporation, May 2009.

Mattiske Consulting Pty Ltd 2011, Flora and Vegetation of Myara Survey Area. Unpublished report prepared for Alcoa of Australia Limited.

Mattiske Consulting Pty Ltd 2011b, Vegetation Assessment of the Wungong Catchment, Treatment Area 4 – Curtis Road, Bedfordale. Unpublished report prepared for the Water Corporation, February 2011.

Mattiske Consulting Pty Ltd 2011c, Flora and Vegetation Assessment of 31 Mile Brook, Unpublished report prepared for the Water Corporation, 2011.

Mattiske Consulting Pty Ltd 2012, Flora and Vegetation of Myara Survey Area. Unpublished report prepared for Alcoa World Alumina Australia Limited.

Mattiske Consulting Pty Ltd 2019, Flora & Vegetation Assessment of the Huntly Expansion Areas. Unpublished report prepared for Alcoa of Australia Limited.

Mattiske, E.M. and Associates 1988, Vegetation Survey - Huntly North. Unpublished report prepared for Alcoa of Australia Limited.-

Mattiske, E.M. and Associates 1992, Site-vegetation Types South Jarrahdale, Chandler and Kingsbury Drive Areas. Unpublished report prepared for Alcoa of Australia Limited.

Mattiske, E.M. and Associates 1993, Botanical Studies Huntly Area. Unpublished report prepared for Alcoa of Australia Limited.

Mattiske, E.M. and Havel, J.J. 1998, Vegetation Complexes of the South-west Forest Region of Western Australia. Maps prepared as part of the Regional Forest Agreement, Western Australia for the Department of Conservation and Land Management and Environment Australia.

Trudgen, M.E. (1988). *A Report on the Flora and Vegetation of the Port Kennedy Area*. Unpublished report prepared for Bowman Bishaw and Associates, West Perth.

Western Australian Herbarium 1998-, FloraBase - the Western Australian Flora. Available from: https://florabase.dpaw.wa.gov.au. 28 May 2020.

Williams, K. and Mitchell, D. 2001, 'Jarrah Forest 1 (JF1 – Northern Jarrah Forest subregion)' in A biodiversity audit of Western Australia's 53 biogeographical subregions in 2002, eds. JE May and NL McKenzie, Department of Conservation and Land Management, Western Australia, pp. 369 – 381.

APPENDIX A1: THREATENED AND PRIORITY FLORA DEFINITIONS

Under section 179 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), threatened flora are categorised as extinct, extinct in the wild, critically endangered, endangered, vulnerable and conservation dependent (Table A1.1).

Table A1.1 Federal definition of threatened flora species

Note: Adapted from section 179 of the EPBC Act.

CODE	CATEGORY	DEFINITION
Ex	Extinct	Species which at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
ExW	Extinct in the Wild	Species which is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or 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.
CE	Critically Endangered	Species which 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.
E	Endangered	Species which is not critically endangered and it is facing a very high risk of extinction in the wild in the immediate or near future, as determined in accordance with the prescribed criteria.
V	Vulnerable	Species which is not critically endangered or endangered and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
CD	Conservation Dependent	Species which at a particular time if, at that time, the species is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.

The *Biodiversity Conservation Act 2016* (BC Act) provides for (amongst other things) the protection of flora that is facing an extremely high risk of extinction in the wild in the immediate, near or medium-term future in Western Australia under Part 10 (Division 2).

Threatened flora are listed in the *Wildlife Conservation (Rare Flora) Notice 2018* (under Part 2, Division 1, Subdivision 2 of the BC Act; Department of Biodiversity, Conservation and Attractions [DBCA] (2018a) and are categorised under Schedules 1-3. A flora species is defined as threatened if it is facing an extremely high risk of extinction in the wild in the immediate, near or medium-term future, pursuant to sections 20, 21 and 22 of the BC Act (DBCA 2019). Threatened species are categorised as critically endangered, endangered, and vulnerable (Table A1.2).

Table A1.2 State definition of threatened flora species

Note: Adapted from DBCA (2019).

CODE	CATEGORY	DEFINITION
CR	Critically endangered	Species considered to be facing an extremely high risk of becoming extinct in the wild (listed under Schedule 1 of the *Wildlife Conservation (Rare Flora) Notice 2018*).
EN	Endangered	Species considered to be facing a very high risk of becoming extinct in the wild (listed under Schedule 2 of the *Wildlife Conservation (Rare Flora) Notice 2018*).
VU	Vulnerable	Species considered to be facing a high risk of becoming extinct in the wild (listed under Schedule 3 of the *Wildlife Conservation (Rare Flora) Notice 2018*).

Priority flora species are defined as "possibly threatened species that do not meet the survey criteria, or are otherwise data deficient" or species that are "adequately known, are rare but not threatened, meet criteria for near threatened or have recently been removed from the threatened species list" for other than taxonomic reasons" (DBCA 2019). Priority species are not afforded the same level of protection under state or federal legislation as the listed Threatened species, however are considered significant under the Environmental Protection Authority's *Environmental Factor Guideline: Flora and Vegetation* (Environmental Protection Authority 2016a). The Department of Biodiversity, Conservation and Attractions categorises priority flora into four categories: Priority 1; Priority 2, Priority 3 and Priority 4 (Table A1.3).

Table A1.3: State definition of priority flora species

Note: Adapted from DBCA (2019).

CODE	CATEGORY	DEFINITION
P1	Priority 1: Poorly-known species	Known from one or a few locations (< 5) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation; or are otherwise under threat of habitat destruction or degradation. In urgent need of further survey.
P2	Priority 2: Poorly-known species	Known from one or a few locations (< 5). Some occurrences are on lands managed primarily for nature conservation. In urgent need of further survey.
P3	Priority 3: Poorly-known species	Known from several locations and the species does not appear to be under imminent threat; or from few but widespread locations with either a large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. In need of further survey.
P4	Priority 4: Rare, Near Threatened, and other species in need of monitoring	a) Rare - Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands. b) Near Threatened - Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. c) Other - Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

APPENDIX A2: THREATENED AND PRIORITY ECOLOGICAL COMMUNITY DEFINITIONS

Under section 181 of the EPBC Act, threatened ecological communities are categorised as critically endangered, endangered and vulnerable (Table A2.1).

Table A2.1 Federal definition of threatened ecological communities

Note: Adapted from section 181 and section 182 of the EPBC Act.

CATEGORY	DEFINITION
Critically Endangered	If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future.
Endangered	If, at that time, it is not critically endangered and is facing a very high risk of extinction in the wild in the near future.
Vulnerable	If, at that time, it is not critically endangered or endangered, and is facing a high risk of extinction in the wild in the medium-term future.

Threatened ecological communities (TECs) are listed in the *List of Threatened Ecological Communities endorsed by the Western Australian Minister for Environment (28 June 2018)* (under Part 2, Division 2, Subdivision 1 of the BC Act; DBCA 2018b). An ecological community is defined as threatened if it is facing an extremely high risk of collapse in the immediate, near or medium-term future, pursuant to sections 28, 29 and 30 of the BC Act. Threatened ecological communities are categorised as critically endangered, endangered, and vulnerable (Table A2.2).

Currently there is no Western Australian legislation covering the conservation of state listed threatened ecological communities (TECs), however, a non-statutory process is in place, whereby the DBCA (and former equivalent departments) have been identifying and informally listing TECs since 1994. Some of these TECs are also endorsed by the Federal Minister as threatened, and some of these are listed under the EPBC Act and therefore afforded legislative protection at the Commonwealth level.

Table A2.2 State definition of threatened ecological communities

Note: Adapted from Department of Environment and Conservation (2013).

CODE	CATEGORY	DEFINITION
CR	Critically Endangered	An ecological community will be listed as CR when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future, meeting any one or more of the following criteria: 1. The estimated geographic range and distribution has been reduced by at least 90% and is either continuing to decline with total destruction imminent, or is unlikely to be substantially rehabilitated in the immediate future due to modification; 2. The current distribution is limited i.e. highly restricted, having very few small or isolated occurrences, or covering a small area; or 3. The ecological community is highly modified with potential of being rehabilitated in the immediate future.
EN	Endangered	An ecological community will be listed as EN when it has been adequately surveyed and is not CR, but is facing a very high risk of total destruction in the near future. The ecological community must meet any one or more of the following criteria: 1. The estimated geographic range and distribution has been reduced by at least 70% and is either continuing to decline with total destruction imminent in the short term future, or is unlikely to be substantially rehabilitated in the short term future due to modification; 2. The current distribution is limited i.e. highly restricted, having very few small or isolated occurrences, or covering a small area; or 3. The ecological community is highly modified with potential of being rehabilitated in the short term future.
VU	Vulnerable	An ecological community will be listed as VU when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing high risk of total destruction in the medium to long term future. The ecological community must meet any one or more of the following criteria: 1. The ecological community exists largely as modified occurrences that are likely to be able to be substantially restored or rehabilitated; 2. The ecological community may already be modified and would be vulnerable to threatening process, and restricted in range or distribution; or 3. The ecological community may be widespread but has potential to move to a higher threat category due to existing or impending threatening processes.

Priority ecological communities (PECs) are defined as possible threatened ecological communities that do not meet the stringent survey criteria for the assessment of threatened ecological communities, and are listed by the DBCA (2020a) in the *Priority Ecological Communities for Western Australia – Version 29 (05 May 2020)*. Similarly to priority flora, PECs are not afforded legislative protection, however are considered significant under the Environmental Protection Authority's (2016a) *Environmental Factor Guideline: Flora and Vegetation*. The Department of Biodiversity, Conservation and Attractions categorises priority ecological communities into five categories: Priority 1; Priority 2, Priority 3, Priority 4 and Priority 5 (Table A2.3).

Table A2.3 State definition of priority ecological communities

Note: Adapted from Department of Environment and Conservation (2013).

CODE	CATEGORY	DEFINITION
P1	Priority 1 (Poorly known ecological communities)	Ecological communities that are known from very few, restricted occurrences (generally ≤ 5 occurrences or a total area of ≤ 100 ha). Most of these occurrences are not actively managed for conservation (e.g. located within agricultural or pastoral lands, urban areas, or active mineral leases) and for which immediate threats exist.
P2	Priority 2 (Poorly known ecological communities)	Communities that are known from few small occurrences (generally ≤ 10 occurrences or a total area of ≤ 200 ha). At least some occurrences are not believed to be under immediate threat of destruction or degradation.
P3	Priority 3 (Poorly known ecological communities)	1. Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation; 2. Communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat; or 3. Communities made up of large, and/or widespread occurrences, that may or not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing and inappropriate fire regimes.
P4	Priority 4 (Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring)	1. Rare – Communities known from few occurrences that are considered to have been adequately surveyed, sufficient knowledge is available, and are considered not to be currently threatened. 2. Near Threatened – Communities considered to have been adequately surveyed and do not qualify for Conservation Dependent, but are close to qualifying for Vulnerable. 3. Communities that have been removed from the list of threatened communities during the past five years.
P5	Priority 5 (Conservation Dependent ecological communities)	Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

APPENDIX A3: CATEGORIES AND CONTROL MEASURES OF DECLARED PEST (PLANT) ORGANISMS IN WESTERN AUSTRALIA

Section 22 of Western Australia's *Biosecurity and Agriculture Management Act 2007* (BAM Act) makes provision for a plant taxon to be listed as a declared pest organism in respect to parts of, or the entire State. According to the BAM Act, a declared pest is defined as a prohibited organism (section 12), or an organism for which a declaration under section 22 (2) of the Act is in force.

Under the *Biosecurity and Agriculture Management Regulations 2013* (WA), declared pest plants are placed in one of three control categories, C1 (exclusion), C2 (eradication) or C3 (management), which determines the measures of control which apply to the declared pest (Table A4.1). The current listing of declared pest organisms and their control category is through the Western Australian Organism List (Department of Primary Industries and Regional Development 2020).

Table A3.1 Categories and control measures of declared pest (plant) organisms

Note: Adapted from *Biosecurity and Agriculture Management Regulations 2013*.

CONTROL CATEGORY	CONTROL MEASURES
C1 (Exclusion) '(a) Category 1 (C1) — Exclusion: if in the opinion of the Minister introduction of the declared pest into an area or part of an area for which it is declared should be prevented.' Pests will be assigned to this category if they are not established in Western Australia and control measures are to be taken, including border checks, in order to prevent them entering and establishing in the State.	In relation to a category 1 declared pest, the owner or occupier of land in an area for which an organism is a declared pest or a person who is conducting an activity on the land must take such of the control measures specified in subregulation (1) as are reasonable and necessary to destroy, prevent or eradicate the declared pest.
C2 (Eradication) '(b) Category 2 (C2) — Eradication: if in the opinion of the Minister eradication of the declared pest from an area or part of an area for which it is declared is feasible.' Pests will be assigned to this category if they are present in Western Australia in low enough numbers or in sufficiently limited areas that their eradication is still a possibility.	In relation to a category 2 declared pest, the owner or occupier of land in an area for which an organism is a declared pest or a person who is conducting an activity on the land must take such of the control measures specified in subregulation (1) as are reasonable and necessary to destroy, prevent or eradicate the declared pest.
C3 (Management) '(c) Category 3 (C3) — Management: if in the opinion of the Minister eradication of the declared pest from an area or part of an area for which it is declared is not feasible but that it is necessary to: (i) alleviate the harmful impact of the declared pest in the area; or (ii) reduce the number or distribution of the declared pest in the area; or (iii) prevent or contain the spread of the declared pest in the area.' Pests will be assigned to this category if they are established in Western Australia but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size or density or moving from an area in which it is established into an area which currently is free of that pest.	In relation to a category 3 declared pest, the owner or occupier of land in an area for which an organism is a declared pest or a person who is conducting an activity on the land must take such of the control measures specified in subregulation (1) as are reasonable and necessary to: (a) alleviate the harmful impact of the declared pest in the area for which it is declared; or (b) reduce the number or distribution of the declared pest in the area for which it is declared; or (c) prevent or contain the spread of the declared pest in the area for which it is declared.

APPENDIX A4: OTHER DEFINITIONS

Environmentally sensitive areas

Environmentally sensitive areas are declared by the State Minister under section 51B of the *Environmental Protection Act 1986* (EP Act) and are listed in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005*, gazetted 8 April 2005. Specific environmentally sensitive areas relevant to this report include: a defined wetland and the area within 50 metres of the wetland; the area covered by vegetation within 50 metres of rare flora; the area covered by a threatened ecological community; a Bush Forever site – further areas and information are described in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005*.

Conservation significant flora

Under the *Environmental Factor Guideline: Flora and Vegetation* (Environmental Protection Authority 2016a), flora may be considered significant for a range of reasons, including, but not limited to the following:

- being identified as threatened or priority species;
- 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;
- representative of the range of a species (particularly, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range);
- unusual species, including restricted subspecies, varieties or naturally occurring hybrids; or
- relictual status, being representative of taxonomic groups that no longer occur widely in the broader landscape.

Conservation significant vegetation

Under the *Environmental Factor Guideline: Flora and Vegetation* (Environmental Protection Authority 2016a), vegetation may be considered significant for a range of reasons, including, but not limited to the following:

- being identified as threatened or priority ecological communities;
- restricted distribution;
- degree of historical impact from threatening processes;
- a role as a refuge; or
- providing an important function required to maintain ecological integrity of a significant ecosystem.

APPENDIX A5: VEGETATION CONDITION SCALE (adapted from Keighery 1994 and Trudgen 1988 and as summarized in EPA Guidance Statement 2016b and modified to adjust to "forest" areas)

Vegetation Condition	EPA Definition (2016b) - South West and Interzone Botanical Provinces	Comments reflecting condition **ratings for "Forest" areas** (including diversity of structural and floristic composition areas)	Clearing Agriculture Residential	Post-Mining & Rehabilitation	Tracks & Roads	Logging Harvest Records, Stumps	Dieback	Introduced Flora Species
Pristine	Pristine or nearly so, no obvious signs of disturbances caused by human activities since European settlement.	Very restricted areas as most areas been subject to some disturbance.	None	None	None	No Logging (old growth forest)	None obvious, limited / no vulnerable species	Limited / no presence
Excellent	Vegetation Structure intact, disturbance affecting individual species and weeds are non-aggressive. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional tracks.	Very little evidence of logging in past. Occasional tracks, past burning, no obvious dieback, presence of short-lived non-aggressive weed.	None	None	Occasional tracks	Predominantly mature forest (last harvest > 70 years ago)	None obvious, limited / no vulnerable species	Non aggressive weeds
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.	Some modification to structural components through past logging activities, repeated fires. Grazing only by native animals in forests. No obvious dieback, presence of short-lived non-aggressive weed.	None	None	Occasional tracks	Immature forest (last harvest > 20, < 70 years ago)	Limited dieback infestation on localised areas, limited vulnerable species	Non-aggressive weeds
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 frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.	Some modification to structural and floristic components through past mining and logging activities. Occurrence of repeated fires that have impacted vegetation. Grazing mainly by native animals in forests and occasional feral animal (e.g. pigs).	Localised partial clearing near past logging activities and tracks and previous facilities	Rehabilitation areas with structural and/or floristic components developing and persisting (post 2000, Grant and Koch 2007)	Occasional tracks and informal roads	Juvenile forest (last harvest < 20 years ago)	Extensive dieback infestation, prevalent vulnerable species, some structural impact	Aggressive weeds and non-aggressive weeds reflecting disturbance
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.	Basic vegetation structure severely impacted by disturbance. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing.	Partial clearing near past logging activities and tracks and previous facilities	Rehabilitation areas with lower species diversity (pre 2000, Grant and Koch 2007) and/or early phases of regrowth and establishment of tree species with potential for shift to Good	Extensive tracks, informal roads	Logged land is expected to recover to Good (juvenile forest)	Extensive dieback infestation, dominant vulnerable species, severe structure impact	High density of aggressive weeds or presence of introduced crop species or plantation species
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 crops species with isolated native trees and shrubs.	Mostly cleared areas supporting only occasional native trees or planted trees, mainly small agricultural holdings or residential and highly modified areas.	Cleared agricultural and residential areas.	Recently cleared mine areas, rehabilitation not completed.	Extensive tracks and roads	Logged land is expected to recover to Good if rehabilitation undertaken	Extensive dieback infestation, dominant vulnerable species, structure no longer intact.	Plantations, understorey is predominantly introduced species.

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
AIZOACEAE	* *Aizoon pubescens*				x							
AMARANTHACEAE	*Ptilotus drummondii*							x		x		
	Ptilotus drummondii var. *drummondii*				x							
	Ptilotus esquamatus				x							
	Ptilotus manglesii				x	x	x	x		x		
	Ptilotus polystachyus				x							
	Ptilotus sp.					x		x				
ANARTHRIACEAE	*Anarthria humilis*				x							
	Lyginia barbata					x	x	x				
	Lyginia sp.						x					
APIACEAE	*Actinotus glomeratus*				x							
	Actinotus leucocephalus				x							
	Apium prostratum						x	x				
	Centella asiatica									x		
	Daucus glochidiatus				x	x				x		
	Eryngium pinnatifidum				x							
	Eryngium pinnatifidum subsp. *pinnatifidum*				x							
	Homalosciadium homalocarpum				x	x						
	Pentapeltis peltigera				x	x	x	x	x	x		
	Platysace compressa				x		x	x	x	x		
	Platysace filiformis				x		x	x	x	x		
	Platysace juncea				x							
	Platysace tenuissima						x	x	x	x		
	Schoenolaena juncea				x							
	Xanthosia atkinsoniana				x	x	x	x	x	x		
	Xanthosia candida				x	x	x	x	x	x		
	Xanthosia ciliata				x					x		
	Xanthosia fruticulosa				x							
	Xanthosia huegelii				x	x	x	x	x	x		
	Xanthosia singuliflora				x		x	x		x		
	Xanthosia tasmanica					x						
	Xanthosia sp.					x						
	Apiaceae sp.						x					
APOCYNACEAE	* *Asclepias curassavica*				x							
	* *Gomphocarpus fruticosus*				x							
	Parsonsia diaphanophleba	P4			x							
	* *Vinca major*				x							
ARACEAE	* *Zantedeschia aethiopica*				x							
ARALIACEAE	*Hydrocotyle alata*				x							
	Hydrocotyle callicarpa				x	x				x		
	Hydrocotyle diantha					x						
	Trachymene coerulea subsp. *coerulea*				x							
	Trachymene pilosa				x	x	x	x		x		

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
ARECACEAE	* *Washingtonia filifera*				x							
ASPARAGACEAE	*Acanthocarpus canaliculatus*				x							
	Acanthocarpus preissii				x							
	* *Asparagus asparagoides*			x								
	Dichopogon capillipes				x	x				x		
	Dichopogon preissii								x			
	* *Lachenalia aloides*				x							
	Laxmannia grandiflora								x			
	Laxmannia minor				x							
	Laxmannia squarrosa				x	x	x	x				
	Lomandra brittanii				x	x	x	x		x		
	Lomandra caespitosa				x	x	x	x		x		
	Lomandra drummondii				x		x	x	x	x		
	Lomandra hermaphrodita				x	x	x	x	x	x		
	Lomandra integra				x		x			x		
	Lomandra micrantha				x		x	x	x	x		
	Lomandra micrantha subsp. *micrantha*				x	x	x	x				
	Lomandra nigricans				x	x	x	x		x		
	Lomandra odora				x	x				x		
	Lomandra pauciflora						x					
	Lomandra preissii				x	x	x	x	x	x		
	Lomandra purpurea				x		x	x	x	x		
	Lomandra sericea				x		x	x	x	x		
	Lomandra sonderi				x	x	x	x	x	x		
	Lomandra spartea				x	x	x	x	x	x		
	Lomandra suaveolens				x	x						
	Lomandra sp.				x	x	x	x	x	x		
	Sowerbaea laxiflora				x	x				x		
	Thysanotus anceps	P3			x					x		
	Thysanotus arbuscula				x							
	Thysanotus asper				x							
	Thysanotus dichotomus				x	x	x	x	x	x		
	Thysanotus fastigiatus				x		x	x	x	x		
	Thysanotus gracilis									x		
	Thysanotus manglesianus				x	x	x	x		x		
	Thysanotus multiflorus				x	x	x	x	x	x		
	Thysanotus patersonii				x					x		
	Thysanotus sparteus				x		x	x		x		
	Thysanotus tenellus				x	x	x			x		
	Thysanotus thyrsoideus				x	x	x			x		
	Thysanotus triandrus				x			x				
	Thysanotus sp.					x	x	x		x		
	Asparagaceae sp.					x						
ASPHODELACEAE	*Bulbine semibarbata*				x					x		
ASTERACEAE	* *Arctotheca calendula*				x		x					
	Asteridea pulverulenta				x							

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
ASTERACEAE (continued)	*Blennospora drummondii*				x							
	Brachyscome ciliaris				x							
	Brachyscome iberidifolia				x	x	x					
	Brachyscome perpusilla				x							
	* *Chrysanthemoides monilifera*			x								
	* *Chrysanthemoides monilifera* subsp. *monilifera*			x								
	* *Cichorium intybus*				x							
	* *Conyza sumatrensis*									x		
	* *Conyza* sp.								x			
	Cotula australis				x							
	* *Cotula coronopifolia*				x							
	* *Cotula turbinata*				x							
	Craspedia variabilis				x	x	x	x				
	* *Crepis foetida*				x							
	* *Crepis foetida* subsp. *foetida*				x							
	* *Dittrichia graveolens*								x			
	Euchiton sphaericus				x					x		
	Gnephosis tenuissima					x						
	Hyalosperma cotula				x	x	x	x				
	Hyalosperma demissum				x	x						
	* *Hypochaeris glabra*				x	x	x	x		x		
	* *Hypochaeris radicata*				x			x				
	* *Hypochaeris* sp.							x				
	Lagenophora huegelii				x	x	x	x		x		
	* *Logfia gallica*				x							
	Millotia tenuifolia				x					x		
	Millotia tenuifolia var. *laevis*	P2			x							
	Millotia tenuifolia var. *tenuifolia*				x	x						
	Olearia cassiniae				x							
	Olearia lehmanniana				x							
	Olearia paucidentata				x	x						
	Olearia rudis				x							
	Pithocarpa corymbulosa	P3			x							
	Pithocarpa pulchella				x							
	Pithocarpa pulchella var. *pulchella*				x							
	Podolepis gracilis				x	x	x					
	Podolepis lessonii				x		x					
	Podolepis sp.					x						
	Podotheca angustifolia				x	x						
	Podotheca gnaphalioides						x					
	Pseudognaphalium luteoalbum					x	x			x		
	Pterochaeta paniculata				x	x	x	x	x	x		
	Quinetia urvillei				x							
	Rhodanthe citrina				x	x	x					
	Rhodanthe corymbosa				x							
	Rhodanthe manglesii				x							
	Senecio diaschides				x	x	x	x	x	x		
	Senecio gilbertii	P1			x							
	Senecio glossanthus				x							

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
ASTERACEAE (continued)	*Senecio hispidulus*					x	x	x		x		
	Senecio leucoglossus	P4			x		x	x	x			
	Senecio multicaulis subsp. *multicaulis*				x							
	Senecio pinnatifolius					x	x					
	Senecio pinnatifolius var. *latilobus*				x							
	Senecio quadridentatus				x	x	x	x	x	x		
	* *Senecio vulgaris*						x	x				
	* *Senecio* sp.							x				
	Senecio sp.					x	x	x	x			
	Siloxerus filifolius				x	x						
	Siloxerus humifusus				x	x	x					
	Siloxerus multiflorus				x							
	* *Sonchus asper*				x							
	* *Sonchus oleraceus*				x	x	x			x		
	* *Sphaeromorphaea australis*				x							
	* *Symphyotrichum squamatum*				x							
	* *Tagetes erecta*				x							
	* *Tolpis barbata*				x							
	Trichocline spathulata				x	x	x	x	x	x		
	* *Ursinia anthemoides*				x		x					
	* *Ursinia anthemoides* subsp. *anthemoides*				x							
	* *Vellereophyton dealbatum*				x	x						
	Waitzia suaveolens var. *suaveolens*					x		x				
	Waitzia sp.						x					
	Xerochrysum macranthum				x							
	* Asteraceae sp.						x					
	Asteraceae sp.					x	x		x			
BERBERIDACEAE	* *Nandina domestica*				x							
BORAGINACEAE	*Halgania corymbosa*	P3			x							
BORYACEAE	*Borya constricta*				x							
	Borya scirpoidea				x			x				
	Borya sphaerocephala				x	x		x	x			
BRASSICACEAE	* *Brassica tournefortii*						x					
	* *Raphanus raphanistrum*				x							
BYBLIDACEAE	*Byblis gigantea*	P3			x							
CAMPANULACEAE	*Isotoma hypocrateriformis*				x	x	x	x		x		
	Lobelia anceps				x							
	Lobelia gibbosa				x		x	x		x		
	Lobelia heterophylla				x		x					
	Lobelia rarifolia				x							
	Lobelia rhombifolia				x		x					
	Lobelia rhytidosperma				x							
	Lobelia tenuior					x						

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
CAMPANULACEAE	*Lobelia* sp.							x	x			
(continued)	* *Monopsis debilis* var. *depressa*				x							
	Wahlenbergia gracilenta				x							
	Wahlenbergia multicaulis				x							
	Wahlenbergia preissii				x					x		
	Wahlenbergia stricta subsp. *stricta*				x							
	Wahlenbergia sp.					x						
CAPRIFOLIACEAE	* *Lonicera japonica*				x							
CARYOPHYLLACEAE	* *Petrorhagia dubia*				x							
	* *Silene gallica*				x							
	* *Silene gallica* var. *quinquevulnera*				x							
	* *Stellaria media*				x							
CASUARINACEAE	*Allocasuarina fraseriana*				x		x	x	x	x		
	Allocasuarina huegeliana				x			x				
	Allocasuarina humilis				x	x	x	x	x			
	Allocasuarina sp.							x	x			
CELASTRACEAE	*Stackhousia monogyna*				x		x	x		x		
	Stackhousia pubescens				x							
	Stackhousia scoparia				x							
	Stackhousia sp. Red-blotched corolla (A. Markey 911)	P3			x							x
	Stackhousia sp.					x		x				
	Tripterococcus brunonis				x	x	x	x		x		
CENTROLEPIDACEAE	*Aphelia brizula*				x							
	Aphelia cyperoides				x	x				x		
	Aphelia sp. Albany (B.G. Briggs 596)				x							
	Centrolepis aristata				x	x				x		
	Centrolepis caespitosa				x							
	Centrolepis drummondiana				x					x		
	Centrolepis glabra				x							
	Centrolepis inconspicua				x							
	Centrolepis pilosa				x	x						
	Centrolepis polygyna				x							
	Centrolepis sp.					x			x			
COLCHICACEAE	*Burchardia congesta*				x	x	x	x	x	x		
	Burchardia multiflora				x							
	Wurmbea dioica				x					x		
	Wurmbea dioica subsp. *alba*				x	x						
	Wurmbea sp.					x						
CONVOLVULACEAE	* *Cuscuta epithymum*				x							
CRASSULACEAE	*Crassula colorata* var. *colorata*				x							
	Crassula decumbens var. *decumbens*				x							

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
CRASSULACEAE (continued)	*Crassula exserta*				x							
	Crassula extrorsa				x							
	* *Crassula natans* var. *minus*				x							
CUPRESSACEAE	*Callitris pyramidalis*				x							
CYATHEACEAE	* *Sphaeropteris cooperi*				x							
CYPERACEAE	*Baumea acuta*				x							
	Baumea articulata					x		x		x		
	Baumea juncea				x	x						
	Baumea laxa				x							
	Baumea preissii				x							
	Baumea riparia				x							
	Baumea rubiginosa				x							
	Baumea vaginalis				x		x					
	Chorizandra enodis				x	x						
	Cyathochaeta avenacea				x	x	x	x	x	x		
	Cyathochaeta teretifolia	P3			x							
	* *Cyperus brevifolius*				x							
	* *Cyperus rotundus*									x		
	* *Cyperus tenellus*				x							
	Cyperus vaginatus				x							
	Eleocharis keigheryi	T	V	x								
	Gahnia aristata				x				x			
	Gahnia decomposita				x	x	x	x	x	x		
	Gahnia trifida				x	x	x					
	Isolepis cernua var. *cernua*				x							
	Isolepis cernua var. *setiformis*				x	x						
	Isolepis congrua				x							
	Isolepis cyperoides				x							
	Isolepis marginata				x	x	x					
	Isolepis oldfieldiana				x							
	Isolepis sp.					x						
	Lepidosperma apricola				x							
	Lepidosperma asperatum				x							
	Lepidosperma carphoides				x							
	Lepidosperma costale							x				
	Lepidosperma effusum							x				
	Lepidosperma gracile						x	x		x		
	Lepidosperma leptostachyum				x		x	x		x		
	Lepidosperma longitudinale				x	x						
	Lepidosperma pruinosum				x							
	Lepidosperma pubisquameum				x	x	x	x				
	Lepidosperma pubisquameum sens. lat.								x			
	Lepidosperma scabrum				x							
	Lepidosperma squamatum				x	x	x	x	x	x		
	Lepidosperma striatum				x							
	Lepidosperma tenue					x	x	x	x	x		

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
CYPERACEAE (continued)	*Lepidosperma tetraquetrum*				x	x	x	x	x	x		
	Lepidosperma tuberculatum				x			x	x			
	Lepidosperma sp. Gosnells (A. Markey 1145)				x							
	Lepidosperma sp. Margaret River (B.J. Lepschi 1841)				x							
	Lepidosperma sp.				x	x	x	x	x			
	Mesomelaena graciliceps				x					x		
	Mesomelaena pseudostygia				x							
	Mesomelaena stygia subsp. *stygia*				x							
	Mesomelaena tetragona				x	x	x	x	x	x		
	Schoenus armeria				x							
	Schoenus asperocarpus				x							
	Schoenus bifidus				x	x						
	Schoenus brevisetis				x							
	Schoenus caespititius				x							
	Schoenus clandestinus				x	x						
	Schoenus discifer				x							
	Schoenus efoliatus				x							
	Schoenus grammatophyllus				x							
	Schoenus laevigatus				x							
	Schoenus nanus				x	x						
	Schoenus odontocarpus				x	x						
	Schoenus plumosus				x							
	Schoenus rigens				x							
	Schoenus sculptus				x							
	Schoenus subbulbosus				x							
	Schoenus ?subfascicularis					x						
	Schoenus subflavus				x							
	Schoenus tenellus				x							
	Schoenus unispiculatus				x	x						
	Schoenus variicellae				x							
	Schoenus sp. smooth culms (K.R. Newbey 7823)				x							
	Schoenus sp.					x	x					
	Tetraria australiensis	T	V	x	x							
	Tetraria capillaris				x	x	x	x	x	x		
	Tetraria octandra				x	x	x	x	x	x		
	Tetraria sp. Jarrah Forest (R. Davis 7391)				x				x			
	Tetraria sp.											
	Tricostularia neesii				x							
	Cyperaceae sp.					x						
DASYPOGONACEAE	*Calectasia grandiflora*				x							
	Calectasia narragara				x							
	Dasypogon bromeliifolius				x		x					
	Kingia australis				x			x	x			

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
DENNSTAEDTIACEAE	*Pteridium esculentum*				x	x	x	x	x	x		
	Pteridium esculentum subsp. *esculentum*				x							
	Pteridium sp.									x		
DILLENIACEAE	*Hibbertia acerosa*				x	x	x	x	x	x		
	Hibbertia amplexicaulis				x	x	x	x	x	x		
	Hibbertia aurea				x							
	Hibbertia commutata				x	x	x	x	x	x		
	Hibbertia commutata (hairy form)						x					
	Hibbertia diamesogenos				x	x	x	x		x		
	Hibbertia glomerata subsp. *darlingensis*				x							
	Hibbertia huegelii				x		x	x		x		
	Hibbertia hypericoides				x	x	x	x		x		
	Hibbertia hypericoides subsp. *hypericoides*				x							
	Hibbertia lasiopus				x		x	x		x		
	Hibbertia montana				x							
	Hibbertia mylnei				x							
	Hibbertia nymphaea				x							
	Hibbertia ovata				x	x	x	x	x	x		
	Hibbertia perfoliata				x		x	x	x	x		
	Hibbertia pilosa				x		x					
	Hibbertia polyancistra	P1			x							
	Hibbertia quadricolor				x	x	x			x		
	Hibbertia racemosa									x		
	Hibbertia serrata				x							
	Hibbertia silvestris							x	x			
	Hibbertia spicata				x							
	Hibbertia stellaris				x							
	Hibbertia striata				x							
	Hibbertia subvaginata				x	x						
	Hibbertia vaginata				x		x					
	Hibbertia sp.				x			x	x			
DIOSCOREACEAE	*Dioscorea hastifolia*				x							
DROSERACEAE	*Drosera bulbosa*					x				x		
	Drosera callistos				x							
	Drosera collina				x							
	Drosera drummondii				x							
	Drosera erythrorhiza				x	x		x		x		
	Drosera gigantea				x	x	x	x				
	Drosera glanduligera				x							
	Drosera hyperostigma				x		x					
	Drosera intricata				x							
	Drosera leucoblasta					x						
	Drosera macrantha				x	x		x		x		
	Drosera mannii				x							
	Drosera marchantii				x							
	Drosera menziesii				x	x		x				

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
DROSERACEAE (continued)	*Drosera micrantha*				x							
	Drosera microphylla				x					x		
	Drosera myriantha				x							
	Drosera nitidula				x							
	Drosera occidentalis	P4			x							
	Drosera oreopodion				x							
	Drosera paleacea	P1				x						
	Drosera pallida				x	x				x		
	Drosera platystigma				x	x	x			x		
	Drosera porrecta				x							
	Drosera pulchella				x	x				x		
	Drosera purpurascens				x							
	Drosera rosulata				x	x						
	Drosera scorpioides				x							
	Drosera silvicola				x			x				
	Drosera spilos				x							
	Drosera squamosa				x							
	Drosera stolonifera				x	x				x		
	Drosera stricticaulis				x							
	Drosera subhirtella				x							
	Drosera sp. Branched styles (S.C. Coffey 193)				x							
	Drosera sp. (climbing)						x					
	Drosera sp.					x	x	x	x	x		
ELAEOCARPACEAE	*Tetratheca affinis*				x							
	Tetratheca hirsuta				x	x	x	x	x	x		
	Tetratheca hirsuta subsp. *hirsuta*				x							
	Tetratheca hirsuta subsp. *viminea*				x							
	Tetratheca hispidissima				x		x	x				
	Tetratheca nuda				x	x						
	Tetratheca phoenix	P2			x							
	Tetratheca setigera						x					
	Tremandra diffusa							x				
ERICACEAE	*Andersonia aristata*				x			x				
	Andersonia involucrata				x							
	Andersonia latiflora									x		
	Andersonia lehmanniana				x			x				
	Andersonia lehmanniana subsp. *lehmanniana*				x			x				
	Andersonia sp. Audax (F. Hort, B. Hort & J. Hort 3179)	P3			x						x	x
	Andersonia sp. Saxatilis (F. & J. Hort 3324)	P1			x						x	x
	Andersonia sp.							x	x			
	Astroloma sp.					x						
	Conostephium pendulum				x		x					
	Conostephium preissii				x							
	Leucopogon australis						x					
	Leucopogon capitellatus				x	x	x	x	x	x		
	Leucopogon darlingensis subsp. *darlingensis*				x							

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
ERICACEAE (continued)	*Leucopogon glabellus*				x		x	x				
	Leucopogon gracillimus				x							
	Leucopogon hirsutus						x			x		
	Leucopogon propinquus							x				
	Leucopogon pulchellus				x		x	x				
	Leucopogon sprengelioides				x	x						
	Leucopogon tenuis				x							
	Leucopogon verticillatus				x		x	x	x	x		
	Leucopogon sp. Parkerville (A. Meebold 11654)				x							
	Leucopogon sp.					x	x	x	x	x		
	Lysinema ciliatum				x							
	Styphelia compacta				x							
	Styphelia discolor				x	x	x	x	x	x		
	Styphelia nitens				x	x	x	x	x	x		
	Styphelia pallida				x	x	x	x	x	x		
	Styphelia propinqua					x	x		x	x		
	Styphelia prostata					x						
	Styphelia stricta					x		x				
	Styphelia tenuiflora				x	x	x	x	x	x		
	Styphelia tortifolia				x							
	Styphelia propinqua				x							
	Styphelia stricta				x							
	Styphelia sp.							x	x			
	Ericaceae sp.					x						
EUPHORBIACEAE	*Amperea simulans*				x		x					
	Beyeria lechenaultii				x							
	* *Euphorbia helioscopia*				x							
	* *Euphorbia terracina*				x							
	Monotaxis grandiflora				x		x			x		
	Monotaxis grandiflora var. *grandiflora*				x	x						
	Monotaxis occidentalis					x	x	x	x	x		
	Ricinocarpos graniticus				x							
	Stachystemon vermicularis				x			x		x		
FABACEAE	*Acacia alata*				x		x	x	x	x		
	Acacia alata var. *alata*				x	x	x	x				
	Acacia applanata				x			x				
	Acacia barbinervis				x	x	x		x	x		
	Acacia barbinervis subsp. *barbinervis*				x		x					
	Acacia browniana				x		x	x		x		
	Acacia browniana var. *endlicheri*							x				
	Acacia celastrifolia				x		x	x		x		
	Acacia cuneifolia	P4			x							
	* *Acacia dealbata* subsp. *dealbata*								x			
	* *Acacia decurrens*				x							
	Acacia dentifera				x		x	x				
	Acacia divergens				x	x	x	x	x	x		
	Acacia drewiana subsp. *drewiana*				x							

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
FABACEAE (continued)	*Acacia drummondii*									x		
	Acacia drummondii subsp. *affinis*	P3			x							
	Acacia drummondii subsp. *candolleana*				x	x	x	x	x			
	Acacia drummondii subsp. *drummondii*						x	x				
	Acacia drummondii subsp. *elegans*				x							
	Acacia ephedroides				x			x	x			
	Acacia extensa				x	x	x	x	x	x		
	* *Acacia floribunda*				x							
	Acacia gemina				x							
	Acacia horridula	P3			x							
	Acacia incrassata				x					x		
	Acacia incurva				x	x						
	* *Acacia iteaphylla*				x							
	Acacia lasiocarpa				x							
	Acacia lasiocarpa var. *bracteolata*				x							
	Acacia lateriticola				x	x	x	x	x	x		
	Acacia latipes subsp. *latipes*				x							
	Acacia microbotrya				x							
	* *Acacia mollifolia*				x							
	Acacia multispicata				x			x				
	Acacia nervosa				x	x	x	x	x			
	Acacia obovata				x			x	x			
	Acacia oncinophylla subsp. *oncinophylla*	P3			x							
	* *Acacia podalyriifolia*				x							
	Acacia preissiana				x	x	x	x		x		
	Acacia pulchella				x	x	x	x	x	x		
	Acacia pulchella var. *glaberrima*				x	x	x					
	Acacia pulchella var. *goadbyi*				x							
	Acacia pulchella var. *pulchella*				x	x						
	Acacia pulchella var. *reflexa*				x							
	Acacia saligna				x	x			x	x		
	Acacia saligna subsp. *lindleyi*				x							
	Acacia saligna subsp. *saligna*				x							
	Acacia sclerophylla				x							
	Acacia sessilis				x							
	Acacia stenoptera				x	x		x				
	Acacia ?*sulcata* var. *platyphylla*							x				
	Acacia subflexuosa subsp. *subflexuosa*				x							
	Acacia teretifolia				x							
	Acacia tetragonocarpa				x							
	Acacia trigonophylla				x							
	Acacia ulicina				x							
	Acacia urophylla				x		x	x	x	x		
	Acacia varia							x		x		
	Acacia varia var. *varia*				x		x					
	Acacia willdenowiana				x	x	x	x	x	x		
	Acacia sp.				x	x	x	x	x	x		
	Aotus cordifolia				x	x						
	Bossiaea angustifolia				x							

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
FABACEAE (continued)	*Bossiaea aquifolium*				x		x	x		x		
	Bossiaea aquifolium subsp. *aquifolium*				x	x			x			
	Bossiaea eriocarpa				x		x	x		x		
	Bossiaea modesta	P2			x							
	Bossiaea ornata				x	x	x	x	x	x		
	Bossiaea pulchella				x							
	Bossiaea rufa				x							
	Callistachys lanceolata						x	x				
	Chorizema cordatum				x		x	x	x	x		
	Chorizema dicksonii				x	x						
	Chorizema ilicifolium					x				x		
	Chorizema nanum				x							
	Chorizema rhombeum				x		x			x		
	Chorizema ulotropis	P4			x							
	Cristonia biloba subsp. *biloba*				x							
	Daviesia brachyphylla				x							
	Daviesia cordata				x		x		x			
	Daviesia costata				x							
	Daviesia decipiens				x							
	Daviesia decurrens				x		x	x	x	x		
	Daviesia decurrens subsp. *decurrens*				x							
	Daviesia horrida				x	x	x	x	x	x		
	Daviesia incrassata					x	x	x				
	Daviesia longifolia							x				
	Daviesia nudiflora subsp. *nudiflora*				x							
	Daviesia physodes				x		x	x		x		
	Daviesia preissii				x		x	x	x			
	Daviesia rhombifolia				x		x	x				
	Daviesia sp.						x		x			
	Dillwynia laxiflora				x	x						
	Dillwynia sp.						x					
	Eutaxia parvifolia				x							
	Eutaxia virgata				x			x				
	Gastrolobium asperum				x							
	Gastrolobium bilobum							x				
	Gastrolobium calycinum							x				
	Gastrolobium capitatum				x	x						
	Gastrolobium dilatatum				x							
	Gastrolobium ebracteolatum				x		x	x		x		
	Gastrolobium spathulatum				x							
	Gastrolobium spinosum				x	x		x				
	Gastrolobium villosum				x			x	x			
	* *Genista monspessulana*			x								
	* *Genista* sp. x *Genista monspessulana*			x								
	Gompholobium aristatum				x							
	Gompholobium capitatum				x					x		
	Gompholobium confertum				x	x						
	Gompholobium cyaninum				x			x		x		
	Gompholobium knightianum				x		x	x	x	x		

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
FABACEAE (continued)	*Gompholobium marginatum*				x	x	x	x	x	x		
	Gompholobium polymorphum				x	x	x	x	x	x		
	Gompholobium preissii				x	x	x	x	x	x		
	Gompholobium tomentosum				x			x	x			
	Gompholobium sp.					x				x		
	Hardenbergia comptoniana						x	x				
	Hardenbergia sp.						x					
	Hovea chorizemifolia				x	x	x	x	x	x		
	Hovea pungens				x							
	Hovea trisperma				x		x	x	x	x		
	Hovea trisperma var. *grandiflora*				x							
	Hovea trisperma var. *trisperma*					x						
	Hovea sp.					x						
	Isotropis cuneifolia subsp. *cuneifolia*					x			x			
	Jacksonia alata				x		x					
	Jacksonia furcellata				x		x					
	Jacksonia lehmannii				x							
	Jacksonia restioides				x							
	Jacksonia sternbergiana				x							
	Kennedia carinata				x							
	Kennedia coccinea				x	x	x	x	x	x		
	Kennedia microphylla				x							
	Kennedia prostrata				x	x	x	x	x	x		
	Kennedia stirlingii				x							
	Labichea lanceolata				x							
	Labichea lanceolata subsp. *lanceolata*				x							
	Labichea punctata				x	x	x	x	x	x		
	* *Lathyrus tingitanus*				x							
	Latrobea tenella					x						
	* *Lotus angustissimus*				x							
	* *Lotus subbiflorus*				x							
	* *Lotus uliginosus*				x							
	* *Lupinus cosentinii*				x							
	* *Lupinus luteus*				x							
	* *Medicago* sp.					x						
	Mirbelia dilatata				x	x	x	x	x	x		
	Mirbelia floribunda				x							
	Mirbelia spinosa				x							
	* *Ornithopus pinnatus*				x							
	Paraserianthes lophantha						x	x	x	x		
	Paraserianthes lophantha subsp. *lophantha*				x	x	x	x				
	Paraserianthes sp.							x				
	* *Podalyria sericea*				x							
	Pultenaea ochreata				x							
	* *Robinia pseudoacacia*							x				
	Sphaerolobium linophyllum				x		x			x		
	Sphaerolobium macranthum				x							
	Sphaerolobium medium				x	x	x	x	x	x		
	Sphaerolobium vimineum					x	x					

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
FABACEAE (continued)	*Sphaerolobium* sp.					x						
	Templetonia drummondii				x	x						
	* *Trifolium angustifolium* var. *angustifolium*				x							
	* *Trifolium arvense*					x						
	* *Trifolium arvense* var. *arvense*				x							
	* *Trifolium campestre*				x							
	* *Trifolium cernuum*				x							
	* *Trifolium dubium*				x					x		
	* *Trifolium incarnatum* var. *incarnatum*				x							
	* *Trifolium ornithopodioides*				x							
	* *Trifolium* sp.							x				
	* *Vicia sativa*				x							
	Viminaria juncea				x	x	x	x		x		
	Fabaceae sp.					x						
GENTIANACEAE	* *Centaurium erythraea*				x	x	x	x		x		
	Centaurium sp.							x				
	* *Cicendia filiformis*				x							
GERANIACEAE	* *Erodium botrys*				x							
	Erodium sp.								x			
	Geranium retrorsum				x							
	Geranium sp.					x						
	Pelargonium littorale				x							
	* *Pelargonium* x *domesticum*				x							
GOODENIACEAE	*Anthotium junciforme*				x							
	Anthotium sp. Darling Range (F. Hort & B. Hort 2431)	P1			x							
	Dampiera alata				x	x	x			x		
	Dampiera hederacea				x	x	x	x	x	x		
	Dampiera linearis				x	x	x	x	x	x		
	Dampiera pedunculata									x		
	Goodenia claytoniacea				x							
	Goodenia coerulea				x	x						
	Goodenia drummondii subsp. *megaphylla*				x							
	Goodenia ?filiformis					x						
	Goodenia micrantha				x							
	Lechenaultia biloba				x	x	x	x	x	x		
	Lechenaultia expansa				x							
	Lechenaultia floribunda				x							
	Scaevola calliptera				x	x	x	x	x	x		
	Scaevola glandulifera				x	x						
	Scaevola pilosa				x			x		x		
	Scaevola striata				x							
	Scaevola sp.					x						
	Velleia trinervis				x							
	Verreauxia verreauxii	P4			x							
	Goodeniaceae sp.					x						

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
HAEMODORACEAE	*Anigozanthos bicolor* subsp. *bicolor*				x							
	Anigozanthos manglesii				x							
	Anigozanthos manglesii subsp. *manglesii*				x							
	Anigozanthos viridis				x							
	Anigozanthos viridis subsp. *viridis*				x							
	Anigozanthos sp.				x		x					
	Conostylis aculeata				x					x		
	Conostylis aculeata subsp. *aculeata*				x		x					
	Conostylis aculeata subsp. *preissii*				x							
	Conostylis androstemma				x							
	Conostylis caricina subsp. *caricina*				x							
	Conostylis juncea				x							
	Conostylis laxiflora				x							
	Conostylis pusilla				x		x	x	x			
	Conostylis serrulata				x	x	x	x	x	x		
	Conostylis setigera				x		x	x	x	x		
	Conostylis setigera subsp. *setigera*				x	x						
	Conostylis setosa				x	x	x	x	x	x		
	Conostylis sp.				x	x	x		x			
	Haemodorum discolor				x		x					
	Haemodorum laxum				x					x		
	Haemodorum simplex				x	x						
	Haemodorum sparsiflorum				x							
	Haemodorum spicatum									x		
	Haemodorum sp.					x	x	x		x		
	Phlebocarya ciliata				x			x				
	Tribonanthes australis				x	x						
	Tribonanthes brachypetala				x							
	Tribonanthes longipetala				x	x						
	Tribonanthes violacea				x							
	Haemodoraceae sp.						x					
HALORAGACEAE	*Glischrocaryon angustifolium*				x		x					
	Glischrocaryon aureum				x			x	x	x		
	Glischrocaryon flavescens				x							
	Gonocarpus benthamii				x	x	x			x		
	Gonocarpus benthamii subsp. *benthamii* ms						x		x			
	Gonocarpus cordiger				x	x						
	Gonocarpus diffusus						x			x		
	Gonocarpus nodulosus				x							
	?*Gonocarpus* sp.							x				
	Meionectes tenuifolia	P3			x	x						
HEMEROCALLIDACEAE	*Agrostocrinum hirsutum*				x		x	x	x			
	Agrostocrinum scabrum				x	x				x		
	Agrostocrinum sp.						x					
	Caesia micrantha				x	x						
	Caesia micrantha/occidentalis					x						
	Caesia occidentalis				x							

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
HEMEROCALLIDACEAE	*Caesia* sp.					x						
	Corynotheca micrantha						x	x				
	Dianella revoluta				x	x	x	x	x	x		
	Dianella revoluta var. *divaricata*				x			x				
	Hensmania turbinata				x							
	Johnsonia pubescens subsp. *cygnorum*	P2			x							
	Johnsonia pubescens subsp. *pubescens*				x							
	Stypandra glauca				x			x				
	Tricoryne elatior				x	x	x			x		
	Tricoryne humilis				x	x	x	x		x		
	Tricoryne sp.					x			x			
HYDROCHARITACEAE	*Ottelia ovalifolia*				x							
HYPERICACEAE	* *Hypericum perforatum*						x					
HYPOXIDACEAE	*Hypoxis* sp.					x						
	Pauridia gardneri				x							
	Pauridia glabella					x						
	Pauridia occidentalis				x							
	Pauridia occidentalis ?var. *occidentalis*					x						
	Pauridia occidentalis var. *quadriloba*					x						
	Pauridia vaginata var. *vaginata*				x							
IRIDACEAE	* *Babiana angustifolia*				x							
	* *Freesia alba* x *leichtlinii*				x							
	* *Gladiolus caryophyllaceus*				x							
	* *Gladiolus undulatus*				x							
	* *Ixia maculata*				x							
	* *Ixia polystachya*				x							
	* *Moraea flaccida*				x							
	Orthrosanthus laxus var. *laxus*				x							
	Patersonia babianoides				x	x	x	x		x		
	Patersonia juncea				x	x						
	Patersonia maxwellii				x							
	Patersonia occidentalis				x	x	x	x	x	x		
	Patersonia occidentalis var. *latifolia*				x							
	Patersonia occidentalis var. *occidentalis*				x							
	Patersonia pygmaea				x	x	x	x	x	x		
	Patersonia rudis				x		x	x	x	x		
	Patersonia rudis subsp. *rudis*				x	x		x				
	Patersonia umbrosa							x				
	Patersonia umbrosa var. *xanthina*				x							
	Patersonia sp.							x				
	* *Romulea rosea*				x	x						
	* *Sparaxis bulbifera*				x							
	* *Tritonia crocata*				x							
	* *Watsonia borbonica*				x							
	* *Watsonia meriana*				x							

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
IRIDACEAE	* *Watsonia meriana* var. *bulbillifera*				x							
(continued)	* *Watsonia meriana* var. *meriana*				x							
	Iridaceae sp.											
JUNCACEAE	* *Juncus articulatus*				x							
	* *Juncus bufonius*				x					x		
	* *Juncus capitatus*				x							
	Juncus holoschoenus				x							
	Juncus kraussii subsp. *australiensis*				x							
	* *Juncus microcephalus*				x							
	Juncus pallidus				x	x						
	Juncus planifolius				x					x		
	Juncus subsecundus				x					x		
	* *Juncus usitatus*				x							
	Juncus sp.							x				
JUNCAGINACEAE	*Triglochin nana*				x							
LAMIACEAE	*Hemiandra pungens*				x			x				
	Hemigenia argentea				x							
	Hemigenia humilis				x							
	Hemigenia incana				x			x	x			
	Hemigenia parviflora				x							
	Hemigenia platyphylla	P4			x							x
	Hemigenia pritzelii				x		x	x	x	x		
	Hemigenia rigida	P1				x				x		
	Hemigenia viscida				x							
	Hemiphora bartlingii				x			x	x			
	Lachnostachys verbascifolia				x							
	* *Lavandula stoechas* subsp. *stoechas*				x							
	* *Salvia verbenaca*				x							
	Cassytha glabella				x	x	x			x		
	Cassytha glabella forma *casuarinae*				x							
	Cassytha glabella forma *glabella*						x					
	Cassytha pomiformis				x			x				
	Cassytha racemosa				x	x	x			x		
	Cassytha racemosa forma *pilosa*						x					
	Cassytha racemosa forma *racemosa*				x		x					
	Cassytha sp.					x	x	x	x			
LENTIBULARIACEAE	*Utricularia inaequalis*				x	x						
	Utricularia multifida				x	x	x			x		
	Utricularia petertaylorii				x							
	Utricularia tenella				x	x						
	Utricularia violacea				x							
	Utricularia sp.					x						
LILIACEAE	* Liliaceae sp.					x						

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
LINACEAE	*Linum marginale*				x							
	* *Linum trigynum*				x							
LINDSAEACEAE	*Lindsaea linearis*				x	x	x	x	x	x		
LOGANIACEAE	*Orianthera campanulata*				x			x				
	Orianthera serpyllifolia						x	x		x		
	Orianthera serpyllifolia subsp. *angustifolia*				x	x	x					
	Orianthera serpyllifolia subsp. *serpyllifolia*				x		x					
	Phyllangium divergens				x							
	Phyllangium paradoxum				x	x	x			x		
LORANTHACEAE	*Amyema miquelii*				x							
	Amyema sp.							x				
	Nuytsia floribunda				x		x					
MACARTHURIACEAE	*Macarthuria australis*				x							
MALVACEAE	* *Brachychiton populneus*				x							
	Commersonia corniculata				x							
	Lasiopetalum cardiophyllum	P4							x			
	Lasiopetalum floribundum				x	x	x	x	x	x		
	Lasiopetalum glabratum				x	x	x	x	x	x		
	Lasiopetalum glutinosum									x		
	Lasiopetalum glutinosum subsp. *glutinosum*	P3			x							
	Lasiopetalum glutinosum subsp. *latifolium*				x							
	Lasiopetalum pterocarpum	T	E	x	x							
	Lasiopetalum sp.							x				
	Thomasia foliosa				x							
	Thomasia grandiflora				x							
	Thomasia ?macrocalyx								x			
	Thomasia macrocarpa				x							
	Thomasia paniculata				x	x	x	x		x		
	Thomasia pauciflora				x					x		
	?*Thomasia* sp.								x			
	Malvaceae sp.								x			
MENYANTHACEAE	*Liparophyllum capitatum*									x		
	Ornduffia parnassifolia					x	x					
MONTIACEAE	*Calandrinia calyptrata*				x							
	Calandrinia sp.					x						
MORACEAE	* *Ficus carica*				x							
MYRTACEAE	*Agonis flexuosa*						x					
	Astartea affinis				x							
	Astartea leptophylla				x			x				
	Astartea scoparia				x	x	x	x	x	x		

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
MYRTACEAE (continued)	*Astartea zephyra*				x							
	Babingtonia camphorosmae				x	x	x	x	x			
	Beaufortia macrostemon				x			x				
	Callistemon glaucus				x		x					
	Callistemon phoeniceus				x							
	Calothamnus lateralis				x							
	Calothamnus planifolius					x						
	Calothamnus quadrifidus				x		x		x	x		
	Calothamnus quadrifidus subsp. *homalophyllus*				x							
	Calothamnus quadrifidus subsp. *quadrifidus*				x							
	Calothamnus rupestris				x		x					
	Calothamnus sanguineus				x				x			
	Calothamnus torulosus				x							
	Calothamnus sp.							x				
	Calytrix acutifolia				x							
	Calytrix angulata				x							
	Calytrix aurea				x							
	Calytrix depressa				x			x	x			
	Calytrix flavescens				x		x					
	Calytrix fraseri				x							
	Calytrix glutinosa							x				
	Calytrix simplex subsp. *simplex*	P1			x							
	Calytrix simplex subsp. *suboppositifolia*				x							
	Calytrix variabilis				x							
	Calytrix sp.								x			
	Chamelaucium uncinatum				x							
	Corymbia calophylla				x	x	x	x	x	x		
	Corymbia haematoxylon				x							
	Darwinia citriodora				x		x	x	x			
	Darwinia hortiorum	P1			x							
	Darwinia thymoides				x							
	Darwinia thymoides subsp. *thymoides*				x							
	Eremaea asterocarpa subsp. *asterocarpa*				x							
	Eremaea pauciflora var. *pauciflora*				x							
	Ericomyrtus serpyllifolia				x							
	Eucalyptus x *balanites*	T	E	x								
	Eucalyptus decurva				x							
	Eucalyptus drummondii				x			x				
	Eucalyptus laeliae				x							
	Eucalyptus lane-poolei				x							
	Eucalyptus marginata				x		x	x	x	x		
	Eucalyptus marginata subsp. *marginata*				x	x						
	Eucalyptus marginata subsp. *thalassica*				x							
	Eucalyptus megacarpa				x		x	x	x	x		
	Eucalyptus patens				x	x	x	x	x	x		
	Eucalyptus rudis				x		x	x	x	x		
	Eucalyptus rudis subsp. *rudis*				x	x	x					
	Eucalyptus wandoo				x		x					
	Eucalyptus wandoo subsp. *wandoo*				x							

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
MYRTACEAE (continued)	*Eucalyptus* sp.					x				x		
	Hypocalymma angustifolium				x	x	x	x	x	x		
	Hypocalymma angustifolium subsp. Dandaragan plateau (S. Patrick 702A)				x							
	Hypocalymma cordifolium				x		x	x	x	x		
	Hypocalymma cordifolium subsp. *cordifolium*						x	x				
	Hypocalymma robustum				x		x	x	x			
	Kunzea ericifolia					x	x					
	Kunzea glabrescens				x		x	x	x			
	Kunzea micrantha				x	x						
	Kunzea micrantha subsp. *micrantha*				x							
	Kunzea micrantha subsp. *petiolata*				x							
	Kunzea recurva				x	x						
	Leptospermum erubescens				x		x	x	x			
	* *Leptospermum laevigatum*				x				x			
	Melaleuca holosericea				x							
	Melaleuca incana							x		x		
	Melaleuca incana subsp. *incana*				x	x	x	x				
	Melaleuca lateritia					x	x	x				
	Melaleuca parviceps				x		x	x	x			
	Melaleuca pauciflora					x	x					
	Melaleuca preissiana				x	x	x	x		x		
	Melaleuca pungens				x							
	Melaleuca radula				x	x						
	Melaleuca rhaphiophylla				x		x					
	Melaleuca scabra					x						
	Melaleuca seriata				x							
	Melaleuca subtrigona				x							
	Melaleuca trichophylla				x			x	x			
	Melaleuca viminea						x	x	x			
	Melaleuca viminea subsp. *viminea*				x	x						
	Melaleuca sp.					x						
	Paragonis grandiflora				x							
	Pericalymma ellipticum				x		x	x	x	x		
	Pericalymma ellipticum var. *ellipticum*				x	x						
	Pericalymma ellipticum var. *floridum*				x							
	Regelia ciliata				x	x						
	Taxandria linearifolia				x	x	x	x	x	x		
	Thryptomene australis subsp. *australis*				x							
	Verticordia acerosa var. *acerosa*				x							
	Verticordia acerosa var. *preissii*				x							
	Verticordia bifimbriata				x							
	Verticordia chrysantha				x							
	Verticordia densiflora							x				
	Verticordia densiflora var. *cespitosa*				x							
	Verticordia densiflora var. *densiflora*				x			x				
	Verticordia endlicheriana var. *endlicheriana*				x							
	Verticordia fimbrilepis subsp. *fimbrilepis*	T	E	x	x							
	Verticordia ?huegelii							x				

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
MYRTACEAE (continued)	*Verticordia huegelii* var. *decumbens*				x							
	Verticordia huegelii var. *huegelii*				x		x					
	Verticordia insignis subsp. *insignis*				x							
	Verticordia pennigera				x			x				
	Verticordia plumosa				x			x				
	Verticordia plumosa var. *ananeotes*	T	E		x							
	Verticordia plumosa var. *brachyphylla*				x			x				
	Verticordia plumosa var. *plumosa*				x		x	x	x			
	Verticordia sp.							x				
	Myrtaceae sp.						x					
OLACACEAE	*Olax benthamiana*				x	x	x	x		x		
OLEACEAE	* *Olea europaea*			x								
ONAGRACEAE	* *Oenothera lindheimeri*				x							
ORCHIDACEAE	*Caladenia denticulata*				x							
	Caladenia discoidea				x							
	Caladenia ferruginea				x							
	Caladenia flava				x					x		
	Caladenia flava subsp. *flava*				x	x						
	Caladenia hirta subsp. *hirta*				x							
	Caladenia latifolia				x							
	Caladenia longicauda subsp. *longicauda*				x							
	Caladenia macrostylis									x		
	Caladenia marginata				x							
	Caladenia reptans									x		
	Caladenia reptans subsp. *reptans*				x	x						
	Caladenia speciosa	P4			x							
	Caladenia splendens				x							
	Caladenia sp.				x	x	x	x		x		
	Corybas recurvus				x							
	Cryptostylis ovata									x		
	Cyanicula gemmata					x						
	Cyanicula sericea				x					x		
	Cyrtostylis huegelii				x							
	Cyrtostylis robusta					x				x		
	Cyrtostylis sp.					x		x				
	* *Disa bracteata*				x	x				x		
	Diuris brumalis				x							
	Diuris corymbosa				x							
	Diuris longifolia				x					x		
	Diuris micrantha	T	V	x								
	Diuris ostrina				x							
	Diuris porrifolia				x							
	Diuris purdiei	T	E	x	x							
	Diuris setacea				x							
	Diuris sp.											

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
ORCHIDACEAE (continued)	*Drakaea elastica*	T	E	x	x							
	Drakaea glyptodon				x							
	Drakaea livida				x							
	Drakaea micrantha	T	V	x								
	Elythranthera brunonis				x		x			x		
	Elythranthera emarginata				x							
	Eriochilus dilatatus					x				x		
	Eriochilus dilatatus subsp. *multiflorus*				x							
	Eriochilus helonomos				x							
	Eriochilus scaber									x		
	Eriochilus tenuis									x		
	Leporella fimbriata				x					x		
	Leptoceras menziesii					x						
	Lyperanthus serratus									x		
	Microtis alba				x							
	Microtis media				x	x				x		
	Microtis media subsp. *media*				x							
	Microtis sp.					x						
	Paracaleana gracilicordata	P1			x						x	x
	Paracaleana granitica	P1			x						x	x
	Paracaleana hortiorum				x							
	Paracaleana nigrita				x							
	Pheladenia deformis					x				x		
	Praecoxanthus aphyllus				x							
	Prasophyllum brownii				x					x		
	Prasophyllum elatum				x					x		
	Prasophyllum fimbria				x							
	Prasophyllum macrostachyum				x							
	Prasophyllum parvifolium				x							
	Prasophyllum plumiforme				x							
	Prasophyllum sp.					x						
	Pterostylis angulata				x							
	Pterostylis aspera				x							
	Pterostylis atrosanguinea				x							
	Pterostylis barbata				x	x				x		
	Pterostylis dilatata				x							
	Pterostylis glebosa				x							
	Pterostylis pyramidalis									x		
	Pterostylis recurva				x	x				x		
	Pterostylis sanguinea				x							
	Pterostylis vittata				x	x				x		
	Pterostylis sp. Bloated snail orchid (W. Jackson BJ 486)				x							
	Pterostylis sp.					x	x	x				
	Pyrorchis nigricans				x	x				x		
	Pyrorchis sp.						x	x				
	Spiculaea ciliata				x							
	Thelymitra antennifera				x					x		
	Thelymitra benthamiana				x							

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
ORCHIDACEAE	*Thelymitra cornicina*					x						
(continued)	*Thelymitra crinita*				x	x				x		
	Thelymitra dedmaniarum	T	E	x								
	Thelymitra flexuosa				x							
	Thelymitra frenchii				x							
	Thelymitra graminea				x							
	Thelymitra macrophylla				x	x	x			x		
	Thelymitra mucida				x							
	Thelymitra spiralis				x							
	Thelymitra stellata	T	E	x								
	Thelymitra uliginosa				x							
	Thelymitra vulgaris				x							
	Thelymitra sp.				x	x	x	x		x		
	Orchidaceae sp.					x	x	x				
OROBANCHACEAE	* *Bellardia trixago*				x	x						
	* *Bellardia viscosa*				x							
	* *Orobanche minor*				x		x					
	* *Parentucellia latifolia*				x	x						
OXALIDACEAE	* *Oxalis compressa*									x		
	* *Oxalis corniculata*				x					x		
	Oxalis exilis				x							
	* *Oxalis glabra*				x							
	* *Oxalis incarnata*				x							
	Oxalis perennans				x	x						
	* *Oxalis pes-caprae*					x		x				
	Oxalis sp.					x		x				
PAPAVERACEAE	* *Fumaria capreolata*				x							
PHILYDRACEAE	*Philydrella drummondii*					x	x					
	Philydrella pygmaea				x					x		
	Philydrella pygmaea subsp. *pygmaea*				x	x						
PHRYMACEAE	*Glossostigma diandrum*				x							
PHYLLANTHACEAE	*Phyllanthus calycinus*				x	x	x	x	x	x		
	Poranthera huegelii				x							
	Poranthera microphylla				x	x	x			x		
PHYTOLACCACEAE	* *Phytolacca octandra*							x				
PINACEAE	* *Pinus pinaster*											
	* *Pinus radiata*			x								
PITTOSPORACEAE	*Billardiera floribunda*				x		x	x		x		
	Billardiera fraseri				x	x				x		
	Billardiera fusiformis				x	x	x	x	x	x		

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
PITTOSPORACEAE (continued)	*Billardiera heterophylla*						x					
	Billardiera variifolia				x		x	x	x	x		
	Billardiera sp.					x	x	x	x			
	Cheiranthera preissiana				x							
	Marianthus coeruleopunctatus				x							
	Marianthus drummondianus				x	x	x	x	x	x		
	Marianthus tenuis				x			x	x			
	* *Pittosporum undulatum*				x							
PLANTAGINACEAE	* *Callitriche stagnalis*				x							
	* *Misopates orontium*				x							
	Plantago hispida				x							
	* *Plantago lanceolata*									x		
	?*Veronica* sp.					x						
POACEAE	* *Aira caryophyllea*				x	x	x	x		x		
	* *Aira cupaniana*				x		x					
	* *Aira praecox*				x							
	Amphibromus nervosus				x							
	Amphipogon amphipogonoides				x	x	x	x	x	x		
	Amphipogon debilis				x	x						
	Amphipogon laguroides				x	x				x		
	Amphipogon laguroides subsp. *havelii*				x							
	Amphipogon laguroides subsp. *laguroides*				x			x				
	Amphipogon strictus				x							
	Amphipogon turbinatus				x		x					
	Amphipogon sp.					x	x					
	Aristida contorta				x							
	* *Aristida ramosa*				x							
	Austrostipa campylachne				x	x						
	Austrostipa compressa				x							
	Austrostipa flavescens				x		x					
	Austrostipa hemipogon				x							
	Austrostipa mollis				x							
	Austrostipa semibarbata				x							
	Austrostipa tenuifolia				x							
	Austrostipa trichophylla				x							
	Austrostipa variabilis				x							
	Austrostipa sp.				x	x	x		x			
	* *Avellinia michelii*				x							
	* *Avena barbata*				x							
	* *Avena fatua*									x		
	* *Brachypodium distachyon*				x							
	* *Briza maxima*				x			x				
	* *Briza minor*				x	x				x		
	* *Bromus diandrus*				x							
	* *Bromus hordeaceus*				x							
	Bromus sp.					x						
	* *Cenchrus ciliaris*			x								

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
POACEAE (continued)	* *Chloris gayana*				x							
	* ?*Cynodon dactylon*					x						
	Dichelachne crinita				x		x					
	* *Ehrharta calycina*				x							
	* *Ehrharta longiflora*				x							
	* *Ehrharta* sp.				x							
	* *Eleusine indica*				x							
	Eragrostis brownii				x							
	Eragrostis elongata				x							
	* *Glyceria declinata*				x							
	Hemarthria uncinata				x							
	Lachnagrostis filiformis									x		
	Lachnagrostis plebeia				x							
	* *Lagurus ovatus*				x							
	* *Lolium rigidum*				x							
	Lolium sp.					x						
	* *Melinis repens*				x							
	Microlaena stipoides				x							
	Microlaena stipoides var. *stipoides*				x	x						
	Neurachne alopecuroidea				x	x	x	x	x	x		
	Neurachne sp.						x					
	* *Panicum miliaceum*				x							
	* *Paspalum dilatatum*				x							
	* *Pentameris airoides*				x	x						
	* *Pentameris airoides* subsp. *airoides*				x							
	* *Poa annua*				x							
	Poa drummondiana				x							
	Poa porphyroclados				x							
	Rytidosperma caespitosum				x	x	x	x	x	x		
	Rytidosperma occidentale				x			x				
	Rytidosperma pilosum				x							
	Rytidosperma setaceum				x					x		
	Rytidosperma sp.					x	x					
	* *Setaria italica*				x							
	* *Setaria verticillata*				x							
	* *Sorghum halepense*				x							
	Spartochloa scirpoidea							x				
	Tetrarrhena laevis				x	x	x	x	x	x		
	* *Urochloa mutica*			x								
	* *Vulpia bromoides*				x							
	* *Vulpia muralis*				x							
	* *Vulpia myuros*				x	x				x		
	* *Vulpia myuros* forma *myuros*				x							
	* *Vulpia* sp.					x						
	Poaceae sp.					x	x	x				
PODOCARPACEAE	*Podocarpus drouynianus*							x				

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
POLYGALACEAE	*Comesperma calymega*				x	x	x	x	x	x		
	Comesperma ciliatum				x	x	x					
	Comesperma confertum							x				
	Comesperma flavum				x							
	Comesperma polygaloides					x	x					
	Comesperma scoparium				x							
	Comesperma virgatum				x	x	x	x	x	x		
	Comesperma volubile					x						
	Comesperma sp.							x				
POLYGONACEAE	*Muehlenbeckia adpressa*				x							
	* *Polygonum aviculare*				x							
	* *Rumex acetosella*				x							
	* *Rumex crispus*				x							
POTAMOGETONACEAE	*Potamogeton ochreatus*				x							
PRIMULACEAE	* *Lysimachia arvensis*				x	x	x	x		x		
	Samolus junceus					x		x				
PROTEACEAE	*Adenanthos barbiger*				x		x	x	x	x		
	Adenanthos meisneri				x							
	Adenanthos obovatus				x		x	x	x			
	Banksia armata				x			x	x			
	Banksia armata var. *armata*				x			x				
	Banksia attenuata				x	x						
	Banksia bipinnatifida							x				
	Banksia bipinnatifida subsp. *bipinnatifida*				x			x				
	Banksia dallanneyi				x			x		x		
	Banksia dallanneyi subsp. *dallanneyi* var. *dallanneyi*				x	x	x	x	x			
	Banksia dallanneyi subsp. *dallanneyi* var. *mellicula*				x							
	Banksia dallanneyi subsp. *sylvestris*				x			x				
	Banksia grandis				x	x	x	x	x	x		
	Banksia kippistiana				x							
	Banksia littoralis				x	x	x	x	x	x		
	Banksia nivea				x					x		
	Banksia polycephala				x							
	Banksia recurvistylis	P2			x							
	Banksia seminuda						x	x				
	Banksia sessilis						x	x	x	x		
	Banksia sessilis var. *sessilis*				x		x					
	Banksia sphaerocarpa				x			x	x			
	Banksia sphaerocarpa var. *sphaerocarpa*				x							
	Banksia squarrosa subsp. *squarrosa*				x		x	x				
	Banksia telmatiaea				x							
	Banksia undata				x			x	x			
	Banksia undata var. *splendens*				x							

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
PROTEACEAE (continued)	*Banksia undata* var. *undata*				x							
	Banksia sp.					x			x			
	Conospermum canaliculatum				x							
	Conospermum canaliculatum subsp. *canaliculatum*				x							
	Conospermum capitatum						x	x		x		
	Conospermum capitatum subsp. *glabratum*				x		x	x				
	Conospermum huegelii				x							
	Conospermum stoechadis				x							
	Conospermum stoechadis subsp. *sclerophyllum*				x							
	Conospermum stoechadis subsp. *stoechadis*				x							
	Grevillea bipinnatifida				x		x	x	x			
	Grevillea bipinnatifida subsp. *bipinnatifida*				x	x		x				
	Grevillea centristigma				x							
	Grevillea crowleyae	P2			x							
	Grevillea diversifolia				x		x	x				
	Grevillea diversifolia subsp. *diversifolia*				x	x	x	x				
	Grevillea endlicheriana				x							
	Grevillea flexuosa	T	V	x	x							
	Grevillea leptobotrys				x							
	Grevillea manglesii subsp. *dissectifolia*	P3			x							
	Grevillea manglesii subsp. *manglesii*				x			x	x			
	Grevillea manglesii subsp. *ornithopoda*	P2			x							x
	Grevillea pilulifera				x							
	Grevillea pimeleoides	P4			x				x			
	Grevillea preissii							x				
	Grevillea pulchella				x		x	x	x			
	Grevillea pulchella subsp. *ascendens*				x			x				
	Grevillea quercifolia				x		x	x		x		
	Grevillea synapheae									x		
	Grevillea synapheae subsp. *synapheae*				x							
	Grevillea ?trifida						x					
	Grevillea wilsonii				x		x	x	x	x		
	Hakea amplexicaulis				x		x	x	x	x		
	Hakea candolleana				x							
	Hakea ceratophylla				x							
	Hakea cyclocarpa				x		x	x	x	x		
	Hakea erinacea				x			x				
	Hakea gilbertii				x							
	Hakea incrassata				x	x	x	x	x			
	Hakea lasianthoides				x							
	Hakea lissocarpha				x	x	x	x	x	x		
	Hakea marginata				x	x						
	Hakea neospathulata				x							
	Hakea petiolaris							x	x			
	Hakea petiolaris subsp. *petiolaris*				x			x				
	Hakea prostrata				x	x	x	x		x		
	Hakea ruscifolia				x	x	x	x	x	x		
	Hakea stenocarpa				x		x	x				

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
PROTEACEAE (continued)	*Hakea sulcata*				x							
	Hakea trifurcata				x		x	x				
	Hakea undulata				x		x	x	x			
	Hakea varia				x	x	x	x	x	x		
	Isopogon asper				x							
	Isopogon autumnalis	P3			x							
	Isopogon crithmifolius				x							
	Isopogon dubius				x			x	x			
	Isopogon sphaerocephalus				x			x	x			
	Isopogon sp. Darling Range (F. Hort 1662)				x			x	x			
	Lambertia multiflora var. *darlingensis*				x							
	Persoonia angustiflora				x	x			x			
	Persoonia elliptica				x		x	x	x	x		
	Persoonia longifolia				x	x	x	x	x	x		
	Persoonia quinquenervis				x							
	Persoonia saccata				x							
	Petrophile biloba				x			x				
	Petrophile brevifolia				x							
	Petrophile filifolia subsp. *laxa*	P3			x							
	Petrophile heterophylla						x					
	Petrophile linearis				x			x				
	Petrophile macrostachya				x							
	Petrophile seminuda				x							
	Petrophile serruriae				x			x	x			
	Petrophile squamata				x							
	Petrophile squamata subsp. northern (J. Monks 40)				x							
	Petrophile striata				x	x		x	x			
	Petrophile sp.								x			
	Stirlingia latifolia				x			x				
	Stirlingia simplex				x				x			
	Synaphea acutiloba				x							
	Synaphea cuneata				x							
	Synaphea damopsis				x			x				
	Synaphea decorticans				x							
	Synaphea gracillima				x	x		x				
	Synaphea odocoileops	P1			x							
	Synaphea pandurata	P3			x							
	Synaphea petiolaris				x		x	x				
	Synaphea petiolaris subsp. *petiolaris*				x			x				
	Synaphea pinnata				x							
	Synaphea spinulosa											
	Synaphea sp. Fairbridge Farm (D. Papenfus 696)	T	CE	x	x							
	Synaphea sp. Pinjarra Plain (A.S. George 17182)	T	E		x							
	Synaphea sp. Serpentine (G.R. Brand 103)	T	CE	x	x							
	Synaphea sp.								x			
	Xylomelum occidentale				x		x	x				

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
PTERIDACEAE	*Cheilanthes austrotenuifolia*				x			x				
	Cheilanthes distans				x							
	Cheilanthes sieberi subsp. *sieberi*				x			x				
	Cheilanthes sp.							x				
RANUNCULACEAE	*Clematis pubescens*				x	x	x	x	x	x		
	Ranunculus colonorum				x	x	x		x	x		
	* *Ranunculus muricatus*									x		
RESTIONACEAE	*Alexgeorgea nitens*						x					
	Chaetanthus aristatus				x							
	Cytogonidium leptocarpoides				x							
	Desmocladus asper				x							
	Desmocladus castaneus				x							
	Desmocladus fasciculatus				x	x	x	x	x	x		
	Desmocladus flexuosus				x	x	x	x	x	x		
	Desmocladus lateriflorus				x							
	Desmocladus sp.								x			
	Dielsia stenostachya				x							
	Empodisma gracillimum									x		
	Hypolaena exsulca				x	x	x	x		x		
	Lepidobolus preissianus				x	x						
	Lepidobolus preissianus subsp. *preissianus*				x							
	Leptocarpus canus					x						
	Leptocarpus coangustatus					x	x			x		
	Leptocarpus decipiens				x	x						
	Leptocarpus kraussii				x							
	Leptocarpus scariosus					x	x					
	Leptocarpus sp.					x						
	Lepyrodia glauca				x	x						
	Lepyrodia heleocharoides	P3			x							
	Lepyrodia macra				x							
	Lepyrodia muirii				x							
	Lepyrodia riparia				x							
	Loxocarya cinerea				x	x	x	x	x	x		
	Loxocarya striata							x	x			
	Sporadanthus rivularis						x					
	Tremulina tremula				x							
	Restionaceae sp.					x	x					
RHAMNACEAE	*Cryptandra arbutiflora*				x							
	Cryptandra arbutiflora var. *arbutiflora*				x	x		x				
	Cryptandra nutans				x							
	Cryptandra sp.					x						
	Stenanthemum coronatum				x							
	Stenanthemum emarginatum				x							
	Stenanthemum nanum				x							
	Trymalium ledifolium				x		x	x	x	x		
	Trymalium ledifolium var. *ledifolium*				x	x						

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
RHAMNACEAE (continued)	*Trymalium ledifolium* var. *rosmarinifolium*				x							
	Trymalium odoratissimum						x	x		x		
	Trymalium odoratissimum subsp. *odoratissimum*				x	x	x	x	x	x		
ROSACEAE	*Acaena echinata*				x							
	* *Prunus cerasifera*				x							
	* *Rubus anglocandicans*				x							
	* *Rubus fruticosus* aggregate			x								
	* *Rubus laudatus*				x							
	* *Rubus loganobaccus*				x							
	* *Rubus ulmifolius*				x							
	* *Rubus ulmifolius* var. *ulmifolius*				x							
RUBIACEAE	* *Galium divaricatum*				x							
	* *Galium murale*				x							
	Opercularia apiciflora				x	x	x			x		
	Opercularia echinocephala				x	x	x	x	x	x		
	Opercularia hispidula				x	x	x	x		x		
	Opercularia vaginata				x	x		x		x		
	Opercularia sp.					x						
RUPPIACEAE	*Ruppia polycarpa*				x							
RUTACEAE	*Asterolasia pallida*				x			x	x			
	Boronia crenulata				x		x	x	x			
	Boronia crenulata subsp. *crenulata* var. *crenulata*				x		x					
	Boronia crenulata subsp. *viminea*				x	x	x	x				
	Boronia fastigiata				x	x	x	x	x	x		
	Boronia molloyae				x		x	x	x	x		
	Boronia ramosa				x							
	Boronia ramosa subsp. *ramosa*				x							
	Boronia scabra subsp. *scabra*				x							
	Boronia spathulata						x					
	Boronia tenuis	P4			x							x
	Boronia sp.					x	x					
	Diplolaena microcephala							x				
	Philotheca nodiflora subsp. *latericola*				x							
	Philotheca spicata				x	x	x	x	x	x		
	Rutaceae sp.								x			
SALICACEAE	* *Salix* spp. except *S.babylonica, S.* x *calodendron* & *S.* x *reichardtii*			x								
SALVINIACEAE	* *Salvinia molesta*			x								
SANTALACEAE	*Exocarpos sparteus*							x				
	Leptomeria cunninghamii				x	x	x	x	x	x		

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
SAPINDACEAE	*Diplopeltis huegelii* subsp. *huegelii*				x							
	Diplopeltis huegelii subsp. *lehmannii*				x							
	Dodonaea ceratocarpa				x			x	x			
	Dodonaea pinifolia				x							
	Dodonaea viscosa subsp. *angustissima*							x				
SCROPHULARIACEAE	* *Phyllopodium cordatum*				x							
	* *Verbascum virgatum*				x			x				
SOLANACEAE	*Anthocercis gracilis*	T	V	x	x							
	* *Datura ferox*				x							
	* *Lycium ferocissimum*			x								
	* *Solanum elaeagnifolium*			x								
STYLIDIACEAE	*Levenhookia dubia*					x						
	Levenhookia preissii	P1										
	Levenhookia pusilla				x	x	x	x		x		
	Levenhookia stipitata				x	x		x				
	Stylidium adpressum				x							
	Stylidium amoenum				x	x	x	x	x	x		
	Stylidium amoenum var. *amoenum*				x							
	Stylidium amoenum var. *caulescens*				x							
	Stylidium androsaceum				x		x			x		
	Stylidium brunonianum				x	x	x	x				
	Stylidium bulbiferum				x		x	x		x		
	Stylidium calcaratum				x	x	x			x		
	Stylidium carnosum				x							
	Stylidium ciliatum				x	x		x	x			
	Stylidium crassifolium				x	x	x			x		
	Stylidium despectum				x							
	Stylidium dichotomum				x		x		x			
	Stylidium diuroides				x							
	Stylidium diuroides subsp. *diuroides*				x			x				
	Stylidium divaricatum				x							
	Stylidium diversifolium				x							
	Stylidium ecorne				x							
	Stylidium emarginatum				x	x						
	Stylidium eriopodum				x							
	Stylidium guttatum				x	x						
	Stylidium hispidum				x					x		
	Stylidium ireneae	P4			x	x	x					
	Stylidium junceum				x		x	x		x		
	Stylidium lateriticola				x			x		x		
	Stylidium lineatum				x		x					
	Stylidium longitubum	P4				x	x					
	Stylidium paulineae				x							
	Stylidium perpusillum				x							
	Stylidium petiolare				x	x						
	Stylidium piliferum				x		x	x	x	x		

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
STYLIDIACEAE (continued)	*Stylidium pulchellum*				x	x						
	Stylidium pycnostachyum				x	x						
	Stylidium recurvum				x							
	Stylidium repens				x		x	x	x			
	Stylidium scariosum				x							
	Stylidium schoenoides				x					x		
	Stylidium spathulatum					x				x		
	Stylidium tenue subsp. *majusculum*				x							
	Stylidium tenue subsp. *tenue*				x							
	Stylidium thesioides				x	x				x		
	Stylidium utricularioides				x	x						
	Stylidium xanthellum				x							
	Stylidium sp. Boulder Rock (A.H. Burbidge 2536)				x							
	Stylidium sp.				x	x	x		x			
TAMARICACEAE	* *Tamarix aphylla*			x								
THYMELAEACEAE	*Pimelea argentea*				x							
	Pimelea brevistyla subsp. *brevistyla*				x							
	Pimelea ciliata						x	x	x	x		
	Pimelea ciliata subsp. *ciliata*				x	x	x	x				
	Pimelea imbricata				x							
	Pimelea imbricata var. *piligera*				x	x						
	Pimelea lanata						x					
	Pimelea lehmanniana							x		x		
	Pimelea lehmanniana subsp. *nervosa*				x							
	Pimelea preissii				x							
	Pimelea rara	P4			x						x	
	Pimelea spectabilis				x		x					
	Pimelea suaveolens					x	x	x		x		
	Pimelea suaveolens subsp. *suaveolens*				x		x	x				
	Pimelea sylvestris				x							
	Pimelea sp.					x	x		x			
TYPHACEAE	*Typha* sp.							x				
VERBENACEAE	* *Lantana camara*			x								
	Verbenaceae sp.					x						
VIOLACEAE	*Hybanthus calycinus*				x		x			x		
	Hybanthus debilissimus				x	x	x			x		
	Hybanthus floribundus				x		x	x		x		
	Hybanthus floribundus subsp. *floribundus*				x	x		x				
XANTHORRHOEACEAE	*Chamaescilla corymbosa*				x		x	x		x		
	Chamaescilla corymbosa var. *corymbosa*				x	x	x					
	Chamaescilla sp.							x				
	Xanthorrhoea acanthostachya				x							

APPENDIX B: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR IN THE MYARA NORTH SURVEY AREA

Note: * denotes introduced species; T denotes threatened species; P1-P4 denotes priority species; SCC = State Conservation Code; FCC = Federal Conservation Code; CE = Critically Endangered, E = Endangered, V = Vulnerable.

Family	Species	SCC	FCC	Data source								
				EPBC	Naturemap	MCPL 2006	MCPL 2011	MCPL 2012	MCPL 2019	Permanent Plots Myara North	DBCA TPFL Sites	DBCA WAH records
XANTHORRHOEACEAE	*Xanthorrhoea gracilis*				x	x	x	x	x	x		
(continued(	*Xanthorrhoea preissii*				x	x	x	x	x	x		
ZAMIACEAE	*Macrozamia riedlei*				x	x	x	x	x	x		
ZYGOPHYLLACEAE	* *Tribulus terrestris*				x							

APPENDIX C: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; ESP – Esperance Plains; GES – Geraldton Sandplains; JAF – Jarrah Forest; MAL – Mallee; SWA – Swan Coastal Plain; WAR – Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	Family	SCC	FCC	Description and Habitat	Likelihood of Occurrence	Vegetation complex outside Occurrence	Vegetation complex Occurrence	SVT Code
Anthocercis gracilis	Solanaceae	T	Vulnerable	Habit: Erect, spindly shrub, to 0.6 (-1) m high. Flower colour: yellow-green Flowering period (indicated in green): J F M A M J J A **S** **O** N D Soils: Sandy or loamy soils. Granite outcrops. IBRA Distribution: AVW, JAF Florabase records: 29	Moderate			
Caladenia huegelii	Orchidaceae	T	Endangered	Habit: Tuberous, perennial, herb, 0.25-0.6 m high. Flower colour: green & cream & red Flowering period (indicated in green): J F M A M J J A **S** **O** N D Soils: Grey or brown sand, clay loam. IBRA Distribution: JAF, SCP Florabase records: 41	Low			
Diuris drummondii	Orchidaceae	T	Vulnerable	Habit: Tuberous, perennial, herb, 0.5-1.05 m high. Flower colour: yellow Flowering period (indicated in green): **J** F M A M J J A S O **N** **D** Soils: Low-lying depressions, swamps IBRA Distribution: AVW, JAF, SWA, WAR Florabase records: 51	Moderate			

APPENDIX C: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; ESP – Esperance Plains; GES – Geraldton Sandplains; JAF – Jarrah Forest; MAL – Mallee; SWA – Swan Coastal Plain; WAR – Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	Family	SCC	FCC	Description and Habitat	Likelihood of Occurrence	Vegetation complex outside Occurrence	Vegetation complex Occurrence	SVT Code
Diuris micrantha	Orchidaceae	T	Vulnerable	Habit: Tuberous, perennial, herb, 0.3-0.6 m high. Flower colour: yellow & brown Flowering period (indicated in green): J F M A M J J A **S** **O** N D Soils: Brown loamy clay. Winter-wet swamps, in shallow water. IBRA Distribution: JAF, SWA Florabase records: 7	Moderate			
Diuris purdiei	Orchidaceae	T	Endangered	Habit: Tuberous, perennial, herb, 0.15-0.35 m high. Flower colour: yellow Flowering period (indicated in green): J F M A M J J A **S** **O** N D Soils: Grey-black sand, moist. Winter-wet swamps. IBRA Distribution: JAF, SWA Florabase records: 24	Low			
Drakaea elastica	Orchidaceae	T	Endangered	Habit: Tuberous, perennial, herb, 0.12-0.3 m high. Flower colour: red & green & yellow Flowering period (indicated in green): J F M A M J J A S **O** **N** D Soils: White or grey sand. Low-lying situations adjoining winter-wet swamps. IBRA Distribution: SWA Florabase records: 19	Low			

APPENDIX C: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; ESP – Esperance Plains; GES – Geraldton Sandplains; JAF – Jarrah Forest; MAL – Mallee; SWA – Swan Coastal Plain; WAR – Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	Family	SCC	FCC	Description and Habitat	Likelihood of Occurrence	Vegetation complex outside Occurrence	Vegetation complex Occurrence	SVT Code
Drakaea micrantha	Orchidaceae	T	Vulnerable	Habit: Tuberous, perennial, herb, 0.15-0.3 m high. Flower colour: red & yellow Flowering period (indicated in green): J F M A M J J A **S** **O** N D Soils: White-grey sand. IBRA Distribution: JAF, SWA, WAR Florabase records: 49	Low			
Eleocharis keigheryi	Cyperaceae	T	Vulnerable	Habit: Rhizomatous, clumped perennial, grass-like or herb (sedge), to 0.4 m high. Flower colour: green Flowering period (indicated in green): J F M A M J J **A** **S** **O** **N** D Soils: Clay, sandy loam. Emergent in freshwater: creeks, claypans. IBRA Distribution: AVW, GES, JAF, SWA Florabase records: 56	Moderate			
Eucalyptus x *balanites*	Myrtaceae	T	Endangered	Habit: Mallee to 5 m high, bark rough, flaky. Flower colour: white Flowering period (indicated in green): **J** **F** M A M J J A S **O** **N** **D** Soils: Sandy soils with lateritic gravel. IBRA Distribution: GES, SWA Florabase records: 11	Low			

APPENDIX C: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; ESP – Esperance Plains; GES – Geraldton Sandplains; JAF – Jarrah Forest; MAL – Mallee; SWA – Swan Coastal Plain; WAR – Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	Family	SCC	FCC	Description and Habitat	Likelihood of Occurrence	Vegetation complex outside Occurrence	Vegetation complex Occurrence	SVT Code
Grevillea flexuosa	Proteaceae	T	Vulnerable	Habit: Irregular, few-branched, non-lignotuberous shrub, to 2 m high. Flower colour: creamy-yellow Flowering period (indicated in green): J F M A M J **J A S O** N D Soils: Red-brown sand with laterite & gravel, sand over granite. Ridgetop plateau & associated breakaways. IBRA Distribution: JAF Florabase records: 43	Moderate			
Lasiopetalum pterocarpum	Malvaceae	T	Endangered	Habit: Open, multi-stemmed shrub (with distinctly winged fruit), to 1.2 m high. Flower colour: pink Flowering period (indicated in green): J F M A M J J **A S O N D** Soils: Dark red-brown loam or clayey sand over granite. On sloping banks near creeklines. IBRA Distribution: JAF Florabase records: 11	Moderate	Darling Scarp, DS2		
Synaphea sp. Fairbridge Farm (D. Papenfus 696)	Proteaceae	T	Critically Endangered	Habit: Dense, clumped shrub, to 0.3 m high, to 0.4 m wide. Flower colour: yellow Flowering period (indicated in green): J F M A M J J A S **O** N D Soils: Sandy with lateritic pebbles. Near winter-wet flats. IBRA Distribution: JAF, SWA Florabase records: 31	Low			

APPENDIX C: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; ESP – Esperance Plains; GES – Geraldton Sandplains; JAF – Jarrah Forest; MAL – Mallee; SWA – Swan Coastal Plain; WAR – Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	Family	SCC	FCC	Description and Habitat	Likelihood of Occurrence	Vegetation complex outside Occurrence	Vegetation complex Occurrence	SVT Code
Synaphea sp. Pinjarra Plain (A.S. George 17182)	Proteaceae	T	Endangered	Habit: Erect, clumped shrub (sub-shrub), to 0.8 m high. Flower colour: yellow Flowering period (indicated in green): J F M A M J J A **S O N** D Soils: Grey sandy loam or clay, grey-brown clayey sand, brown clayey loam, laterite. Flats, seasonally wet areas, railroad reserves often with wet depressions or drains. IBRA Distribution: SWA Florabase records: 63	Low			
Synaphea sp. Serpentine (G.R. Brand 103)	Proteaceae	T	Critically Endangered	Habit: Erect shrub 0.3-0.6 m high and to 0.5 m wide. Flower colour: yellow Flowering period (indicated in green): J F M A M J J A **S O** N D Soils: Sand, loamy sand, clay-loam, clay soil. Flats, gentle slope to wetland, seasonally wet areas. IBRA Distribution: SWA Florabase records: 36	Low			

APPENDIX C: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; ESP – Esperance Plains; GES – Geraldton Sandplains; JAF – Jarrah Forest; MAL – Mallee; SWA – Swan Coastal Plain; WAR – Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	Family	SCC	FCC	Description and Habitat	Likelihood of Occurrence	Vegetation complex outside Occurrence	Vegetation complex Occurrence	SVT Code
Tetraria australiensis	Cyperaceae	T	Vulnerable	Habit: Rhizomatous, tufted perennial, grass-like or herb (sedge), to 1 m high. Flower colour: brown Flowering period (indicated in green): J F M A M J J A S O **N** **D** Soils: Sand, sandy loam. Flats, well-drained areas. IBRA Distribution: JAF, SWA Florabase records: 37	Low			
Thelymitra dedmaniarum	Orchidaceae	T	Endangered	Habit: Tuberous, perennial, herb, to 0.8 m high. Flower colour: yellow Flowering period (indicated in green): **J** F M A M J J A S O **N** **D** Soils: Granite IBRA Distribution: JAF Florabase records: 4	Low			
Thelymitra stellata	Orchidaceae	T	Endangered	Habit: Tuberous, perennial, herb, 0.15-0.25 m high. Flower colour: yellow & brown Flowering period (indicated in green): J F M A M J J A S **O** **N** D Soils: Sand, gravel, lateritic loam. IBRA Distribution: GES, JAF, SWA Florabase records: 20	Low			

APPENDIX C: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; ESP – Esperance Plains; GES – Geraldton Sandplains; JAF – Jarrah Forest; MAL – Mallee; SWA – Swan Coastal Plain; WAR – Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	Family	SCC	FCC	Description and Habitat	Likelihood of Occurrence	Vegetation complex outside Occurrence	Vegetation complex Occurrence	SVT Code
Verticordia fimbrilepis subsp. *fimbrilepis*	Myrtaceae	T	Endangered	Habit: Shrub, 0.3-0.7 m high. Flower colour: pink-white Flowering period (indicated in green): **J** F M A M J **J** A S **O** **N** **D** Soils: Gravelly or clayey soils. Flats, road verges. IBRA Distribution: AVW, JAF Florabase records: 39	Moderate			
Verticordia plumosa var. *ananeotes*	Myrtaceae	T	Endangered	Habit: Erect, sparsely branched shrub, 0.3-0.5 m high. Flower colour: pink-purple/white Flowering period (indicated in green): J F M A M J J A S O **N** **D** Soils: Sandy loam. Seasonally inundated plains. IBRA Distribution: JAF, SWA Florabase records: 23	Moderate			
Andersonia sp. Saxatilis (F. & J. Hort 3324)	Ericaceae	P1	-	Habit: Single-stemmed shrub to 0.6 m high. Flower colour: white-pink Flowering period (indicated in green): **J** F M A M J J A **S** **O** N D Soils: Dry, brown loam, clay over granite. Slope, outcrops, granite and laterite. IBRA Distribution: JAF Florabase records: 6	High	Dwellingup, D2 Cooke, Ce	Dwellingup, D2 Cooke, Ce	G

APPENDIX C: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; ESP – Esperance Plains; GES – Geraldton Sandplains; JAF – Jarrah Forest; MAL – Mallee; SWA – Swan Coastal Plain; WAR – Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	Family	SCC	FCC	Description and Habitat	Likelihood of Occurrence	Vegetation complex outside Occurrence	Vegetation complex Occurrence	SVT Code
Anthotium sp. Darling Range (F. Hort & B. Hort 2431)	Goodeniaceae	P1	-	Habit: Prostrate, spreading perennial, herb, to 0.05 m high. Flower colour: pink/mauve/purple/blue Flowering period (indicated in green): J F M A M J J A S O **N** **D** Soils: Yellow, grey or brown clayey sand, loam. Slopes, low plains, drainage lines of swamp flats. IBRA Distribution: JAF Florabase records: 16	Low			
Calytrix simplex subsp. *simplex*	Myrtaceae	P1	-	Habit: Shrub, ca 0.2 m high. Flower colour: purple Flowering period (indicated in green): J F M A M J J A S **O** **N** D Soils: Grey clay loam soil, red-brown gravelly loam. Flats and slopes on laterite, swamp. IBRA Distribution: JAF, SWA Florabase records: 5	Moderate			
Darwinia hortiorum	Myrtaceae	P1	-	Habit: Erect to spreading, densely branched shrub to 0.7 m high and 0.8 m wide. Flower colour: reddish-brown & green & yellow-red Flowering period (indicated in green): J F M A M J J A **S** **O** **N** **D** Soils: Shallow granitic soils, loam or loam/clay associated with laterite. Granite outcrops and drainage lines to granite outcrops. IBRA Distribution: JAF Florabase records: 8	Low	Cooke, Ce		

APPENDIX C: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; ESP – Esperance Plains; GES – Geraldton Sandplains; JAF – Jarrah Forest; MAL – Mallee; SWA – Swan Coastal Plain; WAR – Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	Family	SCC	FCC	Description and Habitat	Likelihood of Occurrence	Vegetation complex outside Occurrence	Vegetation complex Occurrence	SVT Code
Hemigenia rigida	Lamiaceae	P1	-	Habit: Upright or spreading shrub, 0.1-0.6 (-1) m high. Flower colour: blue-purple/violet Flowering period (indicated in green): **J** F M A M J J **A S O N D** Soils: Sandy soils, lateritic gravelly soils. Hillslopes, granite outcrops IBRA Distribution: AVW Florabase records: 4	Low			
Hibbertia polyancistra	Dilleniaceae	P1	-	Habit: Erect shrub 0.3-0.45 (-0.6) m high. Flower colour: yellow Flowering period (indicated in green): J F M A M J J A S O **N D** Soils: Shallow soil over granite. IBRA Distribution: JAF Florabase records: 8	Low			
Levenhookia preissii	Stylidiaceae	P1	-	Habit: Annual (ephemeral), herb, 0.03-0.17 m high. Flower colour: pink-red Flowering period (indicated in green): **J** F M A M J J A **S O N D** Soils: Grey or black, peaty sand. Swamps. IBRA Distribution: SWA Florabase records: 14	Low			

APPENDIX C: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; ESP – Esperance Plains; GES – Geraldton Sandplains; JAF – Jarrah Forest; MAL – Mallee; SWA – Swan Coastal Plain; WAR – Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	Family	SCC	FCC	Description and Habitat	Likelihood of Occurrence	Vegetation complex outside Occurrence	Vegetation complex Occurrence	SVT Code
Paracaleana gracilicordata	Orchidaceae	P1	-	Habit: Perennial, herb, to 0.07 m high. Flower colour: green-yellow-purple Flowering period (indicated in green): J F M A M J J A S **O N** D Soils: Growing on moss mats, granite. Outcrops. IBRA Distribution: JAF Florabase records: 8	High		Dwellingup, D2	G S
Paracaleana granitica	Orchidaceae	P1	-	Habit: Perennial, herb, to 0.07 m high. Flower colour: green-purple Flowering period (indicated in green): J F M A M J J A S **O N D** Soils: Growing on moss mats, granite. Outcrops. IBRA Distribution: JAF Florabase records: 7	High		Dwellingup, D2 Pindalup, Pn Murray 1, My1	G T D P
Senecio gilbertii	Asteraceae	P1	-	Habit: Erect, slender perennial, herb, to 1.5 m high. Flower colour: yellow Flowering period (indicated in green): J F M A M J J A **S O N** D Soils: Peaty sand. Swamps, slopes IBRA Distribution: AVW, JAF Florabase records: 10	Low			

APPENDIX C: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; ESP – Esperance Plains; GES – Geraldton Sandplains; JAF – Jarrah Forest; MAL – Mallee; SWA – Swan Coastal Plain; WAR – Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	Family	SCC	FCC	Description and Habitat	Likelihood of Occurrence	Vegetation complex outside Occurrence	Vegetation complex Occurrence	SVT Code
Synaphea odocoileops	Proteaceae	P1	-	Habit: Tufted, compact shrub, 0.2-0.5 m high. Flower colour: yellow Flowering period (indicated in green): J F M A M J J A S O N D Soils: Brown-orange loam & sandy clay, granite. Swamps, winter-wet areas. IBRA Distribution: SWA Florabase records: 22	Low			
Banksia recurvistylis	Proteaceae	P2	-	Habit: Non-lignotuberous shrub to c. 2 m high and 3 m wide. Flower colour: pale yellow Flowering period (indicated in green): J F M A M J J A S O **N D** Soils: Shallow, lateritic soils associated with granite outcrops. IBRA Distribution: JAF Florabase records: 7	High			
Bossiaea modesta	Fabaceae	P2	-	Habit: Slender, trailing & twining shrub. Flower colour: yellow & red Flowering period (indicated in green): J F M A M J J A S **O N D** Soils: Soils derived from granite. Damp areas close to stream. IBRA Distribution: JAF, SWA Florabase records: 22	Low	Yarragil 2, Yg2		

APPENDIX C: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; ESP – Esperance Plains; GES – Geraldton Sandplains; JAF – Jarrah Forest; MAL – Mallee; SWA – Swan Coastal Plain; WAR – Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	Family	SCC	FCC	Description and Habitat	Likelihood of Occurrence	Vegetation complex outside Occurrence	Vegetation complex Occurrence	SVT Code
Grevillea crowleyae	Proteaceae	P2	-	Habit: Dense & spreading shrub, 0.5-1.5 m high. Flower colour: - Flowering period (indicated in green): J F M A M J J **A S O N** D Soils: Loam. IBRA Distribution: JAF Florabase records: 9	High			
Grevillea manglesii subsp. *ornithopoda*	Proteaceae	P2	-	Habit: Spreading, virgate shrub, 1-3 (-5) m high, up to 3 m wide. Flower colour: - Flowering period (indicated in green): J F M A M J J A **S O N** D Soils: Loam, loam over clay, sand, clay. Edge of river bank and creek, dunes IBRA Distribution: JAF, SWA Florabase records: 17	High		Dwellingup, D1	G
Johnsonia pubescens subsp. *cygnorum*	Hemerocallidaceae	P2	-	Habit: Tufted, perennial, herb, 0.15-0.25 m high. Flower colour: white-green Flowering period (indicated in green): J F M A M J J A **S** O N D Soils: Grey-white-yellow sand. Flats, seasonally-wet sites. IBRA Distribution: SWA Florabase records: 12	Low			

APPENDIX C: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; ESP – Esperance Plains; GES – Geraldton Sandplains; JAF – Jarrah Forest; MAL – Mallee; SWA – Swan Coastal Plain; WAR – Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	Family	SCC	FCC	Description and Habitat	Likelihood of Occurrence	Vegetation complex outside Occurrence	Vegetation complex Occurrence	SVT Code
Millotia tenuifolia var. *laevis*	Asteraceae	P2	-	Habit: Ascending to erect annual, herb, 0.02-0.1 m high. Flower colour: yellow Flowering period (indicated in green): J F M A M J J A **S** **O** N D Soils: Granite or laterite soils. IBRA Distribution: AVW, JAF, SWA Florabase records: 13	Moderate	Dwellingup, D2		
Tetratheca phoenix	Elaeocarpaceae	P2	-	Habit: Few-branched shrub (subshrub), to 0.25 m high. Flower colour: dark pink-magenta Flowering period (indicated in green): J F M A M J J A **S** **O** N D Soils: Brown gravelly loam over granite. Mid to Upper slopes, near granite outcrops. IBRA Distribution: JAF Florabase records: 10	Moderate			
Acacia drummondii subsp. *affinis*	Fabaceae	P3	-	Habit: Erect shrub, 0.3-1 m high. Flower colour: yellow Flowering period (indicated in green): J F M A M J **J** **A** S O N D Soils: Lateritic gravelly soils. IBRA Distribution: AVW, JAF, SWA Florabase records: 37	Moderate			

APPENDIX C: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; ESP – Esperance Plains; GES – Geraldton Sandplains; JAF – Jarrah Forest; MAL – Mallee; SWA – Swan Coastal Plain; WAR – Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	Family	SCC	FCC	Description and Habitat	Likelihood of Occurrence	Vegetation complex outside Occurrence	Vegetation complex Occurrence	SVT Code
Acacia horridula	Fabaceae	P3	-	Habit: Harsh, slender, single-stemmed shrub, 0.3-0.6 (-1) m high. Flower colour: yellow Flowering period (indicated in green): J F M A **M J J A** S O N D Soils: Gravelly soils over granite, sand. Rocky hillslopes. IBRA Distribution: JAF, SWA Florabase records: 33	Moderate	Darling Scarp, DS2 Dwellingup, D2		
Acacia oncinophylla subsp. *oncinophylla*	Fabaceae	P3	-	Habit: Shrub, 0.9-2.5 m high, 'minni-ritchi' bark, phyllodes mostly 8-13 cm long, 1-2 mm wide. Flower colour: yellow Flowering period (indicated in green): J F M A M J J **A S O** N D Soils: Granitic soils IBRA Distribution: AVW, JAF, SWA Florabase records: 42	High			
Andersonia sp. Audax (F. Hort, B. Hort & J. Hort 3179)	Ericaceae	P3	-	Habit: Shrub, to 1.1 m high and 1.1 m wide. Flower colour: white-cream/mauve-pink Flowering period (indicated in green): J F M A M J J A S **O N** D Soils: Loam, clay, sand, gravel. Granite, slopes and drainage lines. IBRA Distribution: JAF Florabase records: 22	High	Dwellingup, D2 Yarragil 2, Yg2 Cooke, Ce	Cooke, Ce Dwellingup, D2 Swamp, S	G E P PL

APPENDIX C: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; ESP – Esperance Plains; GES – Geraldton Sandplains; JAF – Jarrah Forest; MAL – Mallee; SWA – Swan Coastal Plain; WAR – Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	Family	SCC	FCC	Description and Habitat	Likelihood of Occurrence	Vegetation complex outside Occurrence	Vegetation complex Occurrence	SVT Code
Byblis gigantea	Byblidaceae	P3	-	Habit: Small, branched perennial, herb (or sub shrub), to 0.45 m high. Flower colour: pink-purple/white Flowering period (indicated in green): **J** F M A M J **J** A **S** **O** **N** **D** Soils: Sandy-peat swamps. Seasonally wet areas. IBRA Distribution: JAF, SWA Florabase records: 40	Low	Yarragil 2, Yg2		
Cyathochaeta teretifolia	Cyperaceae	P3	-	Habit: Rhizomatous, clumped, robust perennial, grass-like or herb (sedge), to 2.0 m high, to 1.0 m wide. Flower colour: brown Flowering period (indicated in green): **J** F M A M J **J** A **S** **O** **N** D Soils: Grey sand, sandy clay. Swamps, creek edges. IBRA Distribution: JAF, SWA, WAR Florabase records: 39	Low			
Grevillea manglesii subsp. *dissectifolia*	Proteaceae	P3	-	Habit: Spreading, virgate shrub, 1.5-3 (-5) m high, up to 33 m wide. Flower colour: white & red & brown Flowering period (indicated in green): J F M A M **J** J A **S** **O** **N** D Soils: Gravelly loam, moist. Roadsides. IBRA Distribution: JAF Florabase records: 27	Moderate	Dwellingup, D1 Murray 1, My1 Pindalup, Pn		

APPENDIX C: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; ESP – Esperance Plains; GES – Geraldton Sandplains; JAF – Jarrah Forest; MAL – Mallee; SWA – Swan Coastal Plain; WAR – Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	Family	SCC	FCC	Description and Habitat	Likelihood of Occurrence	Vegetation complex outside Occurrence	Vegetation complex Occurrence	SVT Code
Halgania corymbosa	Boraginaceae	P3	-	Habit: Erect shrub, 0.35-1 m high. Flower colour: blue-purple Flowering period (indicated in green): J F M A M J J **A S O N** D Soils: Gravelly soils, soils over granite. IBRA Distribution: JAF, SWA Florabase records: 18	Moderate			
Isopogon autumnalis	Proteaceae	P3	-	Habit: Shrub 0.3-1 m high, commonly 0.5-1 m wide. Flower colour: pale yellow Flowering period (indicated in green): J **F M A M** J J A S O N D Soils: Sandy soils. IBRA Distribution: GES, JAF, SWA Florabase records: 59	Low			
Lasiopetalum glutinosum subsp. *glutinosum*	Malvaceae	P3	-	Habit: Shrub to 0.8 m high. Flower colour: pink-purple Flowering period (indicated in green): J F M A M J J A **S O** N D Soils: Lateritic gravel and clay, clay loam, sandy clay over granite. Slopes, granite outcrops. IBRA Distribution: AVW, JAF, SWA Florabase records: 48	Moderate			

APPENDIX C: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; ESP – Esperance Plains; GES – Geraldton Sandplains; JAF – Jarrah Forest; MAL – Mallee; SWA – Swan Coastal Plain; WAR – Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	Family	SCC	FCC	Description and Habitat	Likelihood of Occurrence	Vegetation complex outside Occurrence	Vegetation complex Occurrence	SVT Code
Lepyrodia heleocharoides	Restionaceae	P3	-	Habit: Rhizomatous, slender, tufted perennial, herb (sedge-like), 0.15-0.25 m high. Flower colour: - Flowering period (indicated in green): J F M A M J J A S O N D Soils: Moist peaty sand. Dry or seasonally inundated heath or woodland, swamps. IBRA Distribution: JAF, SWA Florabase records: 20	Low			
Meionectes tenuifolia	Haloragaceae	P3	-	Habit: Annual semi-aquatic herb, to 0.35 m high. Flower colour: orange-red-brown, green Flowering period (indicated in green): J F M A M J J A S O N D Soils: Grey sand or grey-brown clay, shallow soils. Seasonally inundated flat, edge of swamp. IBRA Distribution: JAF, SWA Florabase records: 24	Low	Yarragil 1, Yg1		

APPENDIX C: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; ESP – Esperance Plains; GES – Geraldton Sandplains; JAF – Jarrah Forest; MAL – Mallee; SWA – Swan Coastal Plain; WAR – Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	Family	SCC	FCC	Description and Habitat	Likelihood of Occurrence	Vegetation complex outside Occurrence	Vegetation complex Occurrence	SVT Code
Petrophile filifolia subsp. *laxa*	Proteaceae	P3	-	Habit: Erect, spreading shrub, to 0.75 m high. Flower colour: cream Flowering period (indicated in green): **J** F M A M J **J** A S O **N** **D** Soils: White gritty sand, brown, red, yellow, white or grey sand, brown-yellow sandy clay. Winter-wet sites, flats, slopes, swamps, drainage lines. IBRA Distribution: JAF Florabase records: 18	Moderate	Yarragil 2, Yg2 Swamp, S		
Pithocarpa corymbulosa	Asteraceae	P3	-	Habit: Erect to scrambling perennial, herb, 00.5-1 m high. Flower colour: white Flowering period (indicated in green): **J** **F** **M** **A** M J J A S O N D Soils: Gravelly or sandy loam. Amongst granite outcrops. IBRA Distribution: GES, JAF, SWA Florabase records: 22	Moderate	Murray 1, My1		
Stackhousia sp. Red-blotched corolla (A. Markey 911)	Celastraceae	P3	-	Habit: Erect herb or shrub, approximately 0.2 m high. Flower colour: cream-yellow Flowering period (indicated in green): J F M A M J J A **S** **O** **N** D Soils: Brown loamy sand, clayey sand over laterite, white sandy clay over granite, grey clay. Slopes. IBRA Distribution: AVW, GES, JAF Florabase records: 9	Moderate			

APPENDIX C: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; ESP – Esperance Plains; GES – Geraldton Sandplains; JAF – Jarrah Forest; MAL – Mallee; SWA – Swan Coastal Plain; WAR – Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	Family	SCC	FCC	Description and Habitat	Likelihood of Occurrence	Vegetation complex outside Occurrence	Vegetation complex Occurrence	SVT Code
Synaphea pandurata	Proteaceae	P3	-	Habit: Clumped shrub (subshrub), 0.2-0.55 m high. Flower colour: yellow Flowering period (indicated in green): J F M **A** M **J** J A **S** **O** N **D** Soils: Yellow-grey, yellow-brown, yellow-red sands and sandy loams, dark brown loam, laterite gravel, granite. In undulating areas. IBRA Distribution: JAF Florabase records: 23	Moderate			
Thysanotus anceps	Asparagaceae	P3	-	Habit: Rhizomatous, leafless perennial, herb, to 0.4 m high. Flower colour: purple Flowering period (indicated in green): J F M A M J J A S **O** **N** **D** Soils: White or grey sand, lateritic gravel, laterite. IBRA Distribution: GES, JAF, SWA Florabase records: 17	Moderate	Dwellingup, D1		
Acacia cuneifolia	Fabaceae	P4	-	Habit: Erect or straggly shrub, 1-3 m high. Flower colour: yellow Flowering period (indicated in green): J F M A M J **J** **A** **S** **O** N D Soils: Sand, clay or loam over granite. Granite outcrops & hills, rocky watercourses. IBRA Distribution: AVW, JAF Florabase records: 41	Low	Cooke, Ce		

APPENDIX C: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; ESP – Esperance Plains; GES – Geraldton Sandplains; JAF – Jarrah Forest; MAL – Mallee; SWA – Swan Coastal Plain; WAR – Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	Family	SCC	FCC	Description and Habitat	Likelihood of Occurrence	Vegetation complex outside Occurrence	Vegetation complex Occurrence	SVT Code
Boronia tenuis	Rutaceae	P4	-	Habit: Procumbent or erect & slender shrub, 0.1-0.5 m high. Flower colour: blue/pink-white Flowering period (indicated in green): J F M A M J J **A S O N** D Soils: Laterite, stony soils, granite. IBRA Distribution: JAF, SWA Florabase records: 45	High	Yarragil 1, Yg1 Murray 1, My1	Dwellingup, D2	PL
Caladenia speciosa	Orchidaceae	P4	-	Habit: Tuberous, perennial, herb, 0.35-0.6 m high. Flower colour: white-pink Flowering period (indicated in green): J F M A M J J A **S O** N D Soils: White, grey or black sand. IBRA Distribution: JAF, SWA Florabase records: 59	Low	Cooke, Ce		
Chorizema ulotropis	Fabaceae	P4	-	Habit: Sprawling, open, semi-prostrate shrub, to 0.45 m high. Flower colour: orange-yellow Flowering period (indicated in green): J F M A M J **J A S** O N D Soils: Moist to dry soils, white sand with gravel, laterite, granite. Outcrops, winter damp to dry areas, flats. IBRA Distribution: ESP, JAF, MAL Florabase records: 24	Moderate			

APPENDIX C: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; ESP – Esperance Plains; GES – Geraldton Sandplains; JAF – Jarrah Forest; MAL – Mallee; SWA – Swan Coastal Plain; WAR – Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	Family	SCC	FCC	Description and Habitat	Likelihood of Occurrence	Vegetation complex outside Occurrence	Vegetation complex Occurrence	SVT Code
Drosera occidentalis	Droseraceae	P4	-	Habit: Fibrous-rooted, rosetted perennial, herb, to 0.025 m high. Flower colour: pink/white Flowering period (indicated in green): **J** F M A M J **J** A S **O** **N** **D** Soils: White/black sand over yellow clay, yellow sand, moist brown/grey clay/sand, peaty sand, sandy clay. Damp flats, flood plain. IBRA Distribution: JAF, SWA Florabase records: 18	Low	Pindalup, Pn Dwellingup, D2		
Grevillea pimeleoides	Proteaceae	P4	-	Habit: Non-lignotuberous shrub, 0.4-2.4 m high. Flower colour: yellow-orange Flowering period (indicated in green): J F M A **M** **J** **J** **A** **S** **O** **N** D Soils: Gravelly soils over granite. Rocky hillsides. IBRA Distribution: JAF Florabase records: 36	High	Murray 1, My1 Dwellingup, D1 Dwellingup, D2		
Hemigenia platyphylla	Lamiaceae	P4	-	Habit: Spreading shrub, 0.2-1.5 m high. Flower colour: blue-purple Flowering period (indicated in green): J F M A M J J A **S** **O** **N** D Soils: Sandy & loamy soils. Granite rocks, slopes. IBRA Distribution: AVW, ESP, JAF, MAL Florabase records: 21	High		Dwellingup, D1	PW

APPENDIX C: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; ESP – Esperance Plains; GES – Geraldton Sandplains; JAF – Jarrah Forest; MAL – Mallee; SWA – Swan Coastal Plain; WAR – Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	Family	SCC	FCC	Description and Habitat	Likelihood of Occurrence	Vegetation complex outside Occurrence	Vegetation complex Occurrence	SVT Code
Lasiopetalum cardiophyllum	Malvaceae	P4	-	Habit: Erect, multi-stemmed shrub, 0.2-0.5 m high. Flower colour: pink Flowering period (indicated in green): **J** F M A M J J **A** **S** **O** **N** **D** Soils: Lateritic gravelly soils, sandy clay. Flats, hillslopes. IBRA Distribution: AVW, JAF Florabase records: 34	Moderate			
Parsonsia diaphanophleba	Apocynaceae	P4	-	Habit: Woody climber, to 10 m high. Flower colour: white/cream & pink Flowering period (indicated in green): **J** **F** M **A** **M** **J** J A **S** O N D Soils: Alluvial soils. Along rivers. IBRA Distribution: JAF, SWA Florabase records: 28	Moderate	Murray 1, My1		
Pimelea rara	Thymelaeaceae	P4	-	Habit: Shrub, 0.2-0.35 m high. Flower colour: white Flowering period (indicated in green): **J** F M A M J J A S O N **D** Soils: Lateritic soils. IBRA Distribution: JAF Florabase records: 52	High	Dwellingup, D1 Yarragil 1, Yg1 Yarragil 2, Yg2 Dwellingup, D2	Yarragil 1, Yg1 Dwellingup, D2 Yarragil 2, Yg2	D ST S

APPENDIX C: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; ESP – Esperance Plains; GES – Geraldton Sandplains; JAF – Jarrah Forest; MAL – Mallee; SWA – Swan Coastal Plain; WAR – Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	Family	SCC	FCC	Description and Habitat	Likelihood of Occurrence	Vegetation complex outside Occurrence	Vegetation complex Occurrence	SVT Code
Senecio leucoglossus	Asteraceae	P4	-	Habit: Erect annual, herb, to 1.3 m high. Flower colour: white Flowering period (indicated in green): J F M A M J J **A S O N D** Soils: Gravelly lateritic or granitic soils. Granite outcrops, slopes. IBRA Distribution: JAF, SWA, WAR Florabase records: 44	Moderate			
Stylidium ireneae	Stylidiaceae	P4	-	Habit: Lax perennial, herb, (0.06-) 0.1-0.28 m high. Flower colour: pink Flowering period (indicated in green): J F M A M J J A S **O N D** Soils: Sandy loam. Valleys near creek lines. IBRA Distribution: JAF, SWA, WAR Florabase records: 25	Moderate			
Stylidium longitubum	Stylidiaceae	P4	-	Habit: Erect annual (ephemeral), herb, 0.05-0.12 m high. Flower colour: pink Flowering period (indicated in green): J F M A M J J A S **O N D** Soils: Sandy clay, clay. Seasonal wetlands. IBRA Distribution: GES, JAF, SWA Florabase records: 46	Low			

APPENDIX C: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: Refer to Appendix A for State (SCC; Department of Biodiversity, Conservation and Attractions 2017a) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; ESP – Esperance Plains; GES – Geraldton Sandplains; JAF – Jarrah Forest; MAL – Mallee; SWA – Swan Coastal Plain; WAR – Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	Family	SCC	FCC	Description and Habitat	Likelihood of Occurrence	Vegetation complex outside Occurrence	Vegetation complex Occurrence	SVT Code
Verreauxia verreauxii	Goodeniaceae	P4	-	Habit: Perennial, herb, to 0.5 m high. Flower colour: yellow Flowering period (indicated in green): J F M A M J J A S O N D Soils: White/grey or yellow sand. Flats. IBRA Distribution: AVW, JAF Florabase records: 44	Low			

APPENDIX D: ASSESSMENT OF INTRODUCED (WEED) FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: WONS = Weeds of National Significance (Department of Agriculture, Water and the Environment 2020e); WAOL = Western Australian Organism List (Department of Primary Industries and Regional Development 2020). IBRA Distribution: AVW – Avon Wheatbelt; CAR – Carnarvon; CEK – Central Kimberley; COO – Coolgardie; DAL – Dampierland; ESP – Esperance Plains; GAS – Gascoyne; GES – Geraldton Sandplains; HAM – Hampton; JAF – Jarrah Forest; MAL – Mallee; NUL – Nullarbor; PIL – Pilbara; SWA – Swan Coastal Plain; VIB – Victoria Bonaparte; WAR - Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	WONS	WAOL legal status	WAOL Control Category	WAOL Control Category	Declared areas	Description and Habitat	Likelihood of Occurrence
* *Asparagus asparagoides*	Yes	Declared Pest - s22(2)	-	Exempt	No Control Category, Whole of State	Habit: Rhizomatous and tuberous, perennial, herb and climber, 1-5 m high. Flower colour: white Flowering period (indicated in green): J F M A M J J **A** **S** O N D Soils: Sand, loam, clay, granite. IBRA Distribution: AVW, COO, ESP, GES, JAF, MAL, SWA, WAR Florabase records: 78	Moderate
* *Chrysanthemoides monilifera*	No	Declared Pest, Prohibited - s12	C1 Exclusion	Prohibited	Whole of State	Habit: Shrub, 0.8-3 m high. Flower colour: yellow Flowering period (indicated in green): J F M A M **J** **J** **A** **S** **O** N D Soils: Swampy loam, lateritic sandy clay. Coastal areas, roadsides, waste areas. IBRA Distribution: JAF Florabase records: 50	Moderate
* *Chrysanthemoides monilifera* subsp. *monilifera*	Yes	Declared Pest, Prohibited - s12	C2 Eradication	Prohibited	Whole of State	Habit: Erect shrub, 0.8-3m high. Flower colour: yellow Flowering period (indicated in green): J F M A M **J** **J** **A** **S** **O** N D Soils: Red-brown loam, limestone rubble. Sandplains, coastal areas, roadsides & waste areas. IBRA Distribution: AVW, GES, JAF, SWA Florabase records: 47	Moderate

APPENDIX D: ASSESSMENT OF INTRODUCED (WEED) FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: WONS = Weeds of National Significance (Department of Agriculture, Water and the Environment 2020e); WAOL = Western Australian Organism List (Department of Primary Industries and Regional Development 2020). IBRA Distribution: AVW – Avon Wheatbelt; CAR – Carnarvon; CEK – Central Kimberley; COO – Coolgardie; DAL – Dampierland; ESP – Esperance Plains; GAS – Gascoyne; GES – Geraldton Sandplains; HAM – Hampton; JAF – Jarrah Forest; MAL – Mallee; NUL – Nullarbor; PIL – Pilbara; SWA – Swan Coastal Plain; VIB – Victoria Bonaparte; WAR - Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	WONS	WAOL legal status	WAOL Control Category	WAOL Control Category	Declared areas	Description and Habitat	Likelihood of Occurrence
** Genista monspessulana*	Yes	Permitted - s11	-	-	-	Habit: Erect shrub, 1-5 m high, leaves trifoliate, petiolate, standard more or less glabrous. Flower colour: yellow Flowering period (indicated in green): **J** F M A M J J **A** S O **N** D Soils: Loam, lateritic sand, black peaty sand. Edging rivers and roadsides. IBRA Distribution: AVW. JAF, SWA, WAR Florabase records: 38	Moderate
** Gomphocarpus fruticosus*	No	Declared Pest - s22(2)	C3 Management	-	Shire of Serpentine-Jarrahdale, Shire of Wandering	Habit: Erect perennial, herb or shrub, 0.5-1.5 m high. Flower colour: white/cream Flowering period (indicated in green): J **F M A M J J** A S O N D Soils: Disturbed sites. IBRA Distribution: AVW, ESP, JAF, MAL, NUL, SWA Florabase records: 44	Moderate
** Lantana camara*	Yes	Declared Pest, Prohibited - s12	C1 Exclusion	Prohibited	Whole of State	Habit: Scrambling, prickly shrub or climber, to 3(-8) m high. Flower colour: cream-yellow/pink-purple/orange-red Flowering period (indicated in green): **J F M** A M **J J A S** O N D Soils: Sandy soils. Moist areas. IBRA Distribution: CAR, COO, DAL, GES, JAF, PIL, SWA, Florabase records: 35	Low

APPENDIX D: ASSESSMENT OF INTRODUCED (WEED) FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: WONS = Weeds of National Significance (Department of Agriculture, Water and the Environment 2020e); WAOL = Western Australian Organism List (Department of Primary Industries and Regional Development 2020). IBRA Distribution: AVW – Avon Wheatbelt; CAR – Carnarvon; CEK – Central Kimberley; COO – Coolgardie; DAL – Dampierland; ESP – Esperance Plains; GAS – Gascoyne; GES – Geraldton Sandplains; HAM – Hampton; JAF – Jarrah Forest; MAL – Mallee; NUL – Nullarbor; PIL – Pilbara; SWA – Swan Coastal Plain; VIB – Victoria Bonaparte; WAR - Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	WONS	WAOL legal status	WAOL Control Category	WAOL Control Category	Declared areas	Description and Habitat	Likelihood of Occurrence
**Lycium ferocissimum*	Yes	Permitted - s11	-	-	-	Habit: Intricately branched, spiny shrub, 0.5-2.5(-4) m high. Flower colour: white-purple-blue Flowering period (indicated in green): J F M **A** **M** J J **A** **S** **O** **N** **D** Soils: Waste grounds. IBRA Distribution: AVW, CAR, COO, ESP, GAS, GES, HAM, MAL, NUL, SWA Florabase records: 50	Low
**Moraea flaccida*	No	Declared Pest - s22(2)	-	Exempt	No Control Category, Whole of State	Habit: Cormous, perennial, herb, to 0.75 m high. Flower colour: yellow & orange/yellow Flowering period (indicated in green): J F M A M J J A **S** **O** **N** D Soils: White sand, grey sandy loam over limestone, laterite clay, gravel. Seasonally wet sites, along creeklines, hilltops, pasture and disturbed land. IBRA Distribution: AVW, ESP, JAF, MAL, SWA, WAR Florabase records: 84	Moderate
**Rubus anglocandicans*	No	Declared Pest - s22(2)	C3 Management	Exempt	Whole of State	Habit: Scrambling, rampant, sprawling shrub, to 4 m high. Flower colour: pink/white Flowering period (indicated in green): **J** **F** M A M J J A S O **N** **D** Soils: Grey sand, red-brown gravelly loam, red clay loam, granite, limestone. Hillsides, along river banks and watercourses, in roadside drains. IBRA Distribution: JAF, SWA, WAR Florabase records: 98	Moderate

APPENDIX D: ASSESSMENT OF INTRODUCED (WEED) FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: WONS = Weeds of National Significance (Department of Agriculture, Water and the Environment 2020e); WAOL = Western Australian Organism List (Department of Primary Industries and Regional Development 2020). IBRA Distribution: AVW – Avon Wheatbelt; CAR – Carnarvon; CEK – Central Kimberley; COO – Coolgardie; DAL – Dampierland; ESP – Esperance Plains; GAS – Gascoyne; GES – Geraldton Sandplains; HAM – Hampton; JAF – Jarrah Forest; MAL – Mallee; NUL – Nullarbor; PIL – Pilbara; SWA – Swan Coastal Plain; VIB – Victoria Bonaparte; WAR - Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	WONS	WAOL legal status	WAOL Control Category	WAOL Control Category	Declared areas	Description and Habitat	Likelihood of Occurrence
**Rubus fruticosus* aggregate	Yes	-	-	-	-	Habit: Perennial, semi-deciduous shrub. Flower colour: white-pink Flowering period (indicated in green): J F M A M J J A S O N D Soils: - IBRA Distribution: - Florabase records: -	Moderate
**Rubus laudatus*	No	Declared Pest - s22(2)	C3 Management	Exempt	Whole of State	Habit: Decumbent shrub, to 3 m high. Flower colour: white Flowering period (indicated in green): J F M A M J J A S O N D Soils: Grey to black-grey sand, red-brown gravelly loam, granite. Low flats, along watercourses and streams, near swamps, roadsides. IBRA Distribution: ESP, JAF, SWA, WAR Florabase records: 62	Moderate
**Rubus ulmifolius*	No	Declared Pest - s22(2)	C3 Management	Exempt	Whole of State	Habit: Straggling perennial, herb or shrub, to 4 m high. Flower colour: pink/white/blue/purple Flowering period (indicated in green): J F M A M J J A S O N D Soils: Along creeks & drains. IBRA Distribution: JAF, SWA, WAR Florabase records: 45	Moderate

APPENDIX D: ASSESSMENT OF INTRODUCED (WEED) FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: WONS = Weeds of National Significance (Department of Agriculture, Water and the Environment 2020e); WAOL = Western Australian Organism List (Department of Primary Industries and Regional Development 2020). IBRA Distribution: AVW – Avon Wheatbelt; CAR – Carnarvon; CEK – Central Kimberley; COO – Coolgardie; DAL – Dampierland; ESP – Esperance Plains; GAS – Gascoyne; GES – Geraldton Sandplains; HAM – Hampton; JAF – Jarrah Forest; MAL – Mallee; NUL – Nullarbor; PIL – Pilbara; SWA – Swan Coastal Plain; VIB – Victoria Bonaparte; WAR - Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	WONS	WAOL legal status	WAOL Control Category	WAOL Control Category	Declared areas	Description and Habitat	Likelihood of Occurrence
* *Rubus ulmifolius* var. *ulmifolius*	No	Declared Pest - s22(2)	C3 Management	Exempt	Whole of State	Habit: Prickly perennial, herb or shrub, to 4 m high. Flower colour: pink, pale blue/mauve Flowering period (indicated in green): **J** F M A M J J A S O **N** D Soils: Slopes adjacent to drainage lines, around dams, near towns. IBRA Distribution: JAF, SWA, WAR Florabase records: 20	Moderate
**Salix* spp. except *S. babylonica, S.* x *calodendron & S.* x *reichardtii*	Yes	-	-	-	-	Habit: Deciduous shrub or tree Flower colour: cream/yellow Flowering period (indicated in green): J F M A M J J A S **O** **N** D Soils: - IBRA Distribution: - Florabase records: -	Low
* *Salvinia molesta*	Yes	Declared Pest, Prohibited - s12	C2 Eradication	Prohibited	Whole of State	Habit: Rhizomatous, herb or (fern), 0.05-0.2 m high, floating aquatic; leaves in whorls of 3: 2 floating leaves and 1 submerged root-like water-leaf. Flower colour: - Flowering period (indicated in green): J F M A M J J A S O N D Soils: Still or slow-flowing fresh water ponds and streams. IBRA Distribution: GES, JAF, PIL, SWA, VIB, WAR Florabase records: 17	Moderate

APPENDIX D: ASSESSMENT OF INTRODUCED (WEED) FLORA POTENTIALLY PRESENT IN THE MYARA NORTH SURVEY AREA

Note: WONS = Weeds of National Significance (Department of Agriculture, Water and the Environment 2020e); WAOL = Western Australian Organism List (Department of Primary Industries and Regional Development 2020). IBRA Distribution: AVW – Avon Wheatbelt; CAR – Carnarvon; CEK – Central Kimberley; COO – Coolgardie; DAL – Dampierland; ESP – Esperance Plains; GAS – Gascoyne; GES – Geraldton Sandplains; HAM – Hampton; JAF – Jarrah Forest; MAL – Mallee; NUL – Nullarbor; PIL – Pilbara; SWA – Swan Coastal Plain; VIB – Victoria Bonaparte; WAR - Warren. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking.

Species	WONS	WAOL legal status	WAOL Control Category	WAOL Control Category	Declared areas	Description and Habitat	Likelihood of Occurrence
* *Solanum elaeagnifolium*	Yes	Declared Pest - s22(2)	-	Exempt	No Control Category, Whole of State	Habit: Erect perennial, herb, to 1 m high. Flower colour: blue/purple/pink/white Flowering period (indicated in green): **J F M** A M J J A S O **N D** Soils: Gravelly, red-brown clay-loam. Roadside. IBRA Distribution: AVW, MAL, SWA Florabase records: 27	Low
* *Tamarix aphylla*	Yes	Declared Pest - s22(2)	-	Exempt	No Control Category, Whole of State	Habit: Tree, to 12 m high. Flower colour: pink-white Flowering period (indicated in green): J **F** M A **M** J J A S O N D Soils: Along river banks. IBRA Distribution: AVW, CAR, CEK, GES, MAL, SWA Florabase records: 16	Low
* *Zantedeschia aethiopica*	No	Declared Pest - s22(2)	-	Exempt	No Control Category, Whole of State	Habit: Rhizomatous (tuber-like), perennial, herb, to 1 m high. Flower colour: white Flowering period (indicated in green): J F M A M J **J A S O N** D Soils: Loam, sand. Swamps, rarely uplands. IBRA Distribution: AVW, GES, JAF, SWA, Florabase records: 49	Moderate

APPENDIX E: SUMMARY OF SITE-VEGETATION TYPES DEFINED PREVIOUSLY IN AND NEAR THE MYARA NORTH SURVEY AREA

The site-vegetation types were initially defined and mapped by Havel (1975a, 297b) and have since been refined and expanded on extensive studies by Mattiske for various clients in the Northern Jarrah forest.

SVT Code	Description
A -	Open Woodland of *Melaleuca preissiana* with dense understorey of Myrtaceae species, *Hakea varia* and sedge species on swamp areas.
A/C -	Mosaic of A and C site-vegetation types.
AC -	Open Woodland of *Melaleuca preissiana - Banksia littoralis* with dense understorey of Myrtaceae species on swamps and creeklines.
AW -	Open woodland of *Eucalyptus patens - Corymbia calophylla – Eucalyptus marginata – Banksia littoralis* with low mixed understorey on sandy to loam soils on valley floors.
AW/AX -	Mosaic of AW and AX site-vegetation types.
AW/CW -	Mosaic of AW and CW site-vegetation types.
AX -	Open Woodland *of Eucalyptus rudis – Melaleuca preissiana* with dense understorey of mixed *Melaleuca* species on clay soils in swamps.
C -	Woodland of *Melaleuca* species - *Banksia littoralis* with dense *Taxandria linearifolia* and *Astartea scoparia* in understorey on creek-lines.
CW -	Woodland to Open Forest of *Eucalyptus patens - Corymbia calophylla - Banksia littoralis* with dense *Taxandria linearifolia* and *Astartea scoparia* in understorey on creek-lines and water-courses.
D -	Open Forest of *Eucalyptus marginata - Corymbia calophylla* on lower slopes with mixed low understorey species, including *Babingtonia camphorosmae* and *Acacia extensa* on clay loams to gravelly clay-loams.
E -	Open Forest to Woodland of *Eucalyptus marginata - Corymbia calophylla* with scattered understorey, including *Kingia australis, Mesomelaena tetragona* and *Babingtonia camphorosmae* on sandy gravels on lower slopes.
G -	Mosaic of Open Woodland of *Eucalyptus marginata – Corymbia calophylla*, mixed Proteaceae – Myrtaceae heath and Lithic Complex associated with granite outcrops.
J -	Open Woodland of *Eucalyptus marginata - Corymbia calophylla - Eucalyptus patens* over low mixed understorey, including *Lyginia barbata* and *Patersonia* species on sandy soils on lower slopes.
P -	Open Forest of *Allocasuarina fraseriana - Eucalyptus marginata - Corymbia calophylla* with scattered understorey, including *Grevillea wilsonii* and *Adenanthos barbiger* and low shrubs, herbs and sedges on sandy gravels.
PS -	Open Forest of *Allocasuarina fraseriana - Eucalyptus marginata - Corymbia calophylla - Banksia grandis* with scattered understorey, including *Adenanthos barbiger* and *Grevillea wilsonii* on sandy gravel soils.
PW -	Open Forest of *Allocasuarina fraseriana - Eucalyptus marginata - Corymbia calophylla* with scattered understorey, including *Grevillea wilsonii, Adenanthos barbiger, Babingtonia camphorosmae* and *Hypocalymma angustifolium* on moister sandy gravels.

APPENDIX E: SUMMARY OF SITE VEGETATION TYPES DEFINED PREVIOUSLY IN AND NEAR THE MYARA NORTH SURVEY AREA

SVT Code	Description
Q -	Open Forest of *Eucalyptus marginata - Corymbia calophylla – Eucalyptus patens* on lower slopes with mixed understorey species, including *Trymalium odoratissimum* subsp. *odoratissimum, Acacia extensa* and *Phyllanthus calycinus* on seasonally moister loamy soils.
R -	Open Woodland of *Eucalyptus marginata - Corymbia calophylla* on fringes of granite outcrops or shallow soils.
RG -	Open Woodland of *Eucalyptus marginata - Corymbia calophylla* with patches of Heath of Proteaceae – Myrtaceae species on fringes of granite outcrops or shallow soils.
S -	Open Forest of *Eucalyptus marginata - Banksia grandis – Allocasuarina fraseriana* with scattered understorey, including *Adenanthos barbiger, Leucopogon capitellatus* and *Styphelia tenuiflora* on gravels and sandy-gravels.
SP -	Open Forest of *Allocasuarina fraseriana - Eucalyptus marginata - Banksia grandis* with scattered understorey, including *Adenanthos barbiger* and *Leucopogon capitellatus* on sandy-gravels to gravelly soils.
ST -	Open Forest of *Eucalyptus marginata - Corymbia calophylla* with scattered understorey, including *Leucopogon capitellatus, Leucopogon verticillatus, Lasiopetalum floribundum* and *Styphelia tenuiflora* on sandy-gravelly soils.
SW -	Open Forest of *Eucalyptus marginata - Corymbia calophylla – Banksia grandis* with scattered understorey, including *Adenanthos barbiger, Hypocalymma angustifolium* and *Styphelia tenuiflora* on seasonally moister sandy-gravelly soils.
T -	Open Forest of *Eucalyptus marginata - Corymbia calophylla* with scattered understorey, including *Leucopogon verticillatus, Pteridium esculentum, Clematis pubescens* and *Bossiaea aquifolium* subsp. *aquifolium* on sandy-loam gravelly soils.
TS -	Open Forest of *Eucalyptus marginata - Corymbia calophylla – Banksia grandis* with scattered understorey, including *Leucopogon verticillatus, Pteridium esculentum, Clematis pubescens* and *Bossiaea aquifolium* subsp. *aquifolium* on sandy-loam gravelly to gravelly soils.
W -	Open Forest of *Eucalyptus marginata - Eucalyptus patens – Corymbia calophylla* on lower slopes with mixed low understorey species, including *Acacia extensa* and *Hypocalymma angustifolium* on seasonally moister sandy-loam gravelly soils.
WA -	Open woodland of *Eucalyptus patens - Corymbia calophylla – Eucalyptus marginata – Banksia littoralis* including *Hypocalymma angustifolium* and range of *Myrtaceae* species on sandy loam lower slopes.

APPENDIX F: VASCULAR PLANT SPECIES RECORDED IN MYARA, JARRAHDALE AND NEARBY FOREST AREAS AND PLOTS

FAMILY		SPECIES	Myara Mapping	FMP Plots	Huntly/ Myara Plots	Jarrahdale Plots	Myara Plots
ADIANTACEAE		*Adiantum aethiopicum*	1				
		Cheilanthes austrotenuifolia	1				
		Cheilanthes sieberi	1				
AMARANTHACEAE		*Ptilotus drummondii*	1		1		
		Ptilotus drummondii var. *drummondii*		1			
		Ptilotus manglesii	1	1		1	1
ANARTHRIACEAE		*Lyginia barbata*	1				
		Lyginia imberbis	1				
APIACEAE		*Centella asiatica*	1		1		
		Daucus glochidiatus			1	1	
		Hydrocotyle callicarpa	1		1	1	
		Pentapeltis peltigera	1	1	1	1	1
		Platysace compressa	1	1	1	1	1
		Platysace filiformis			1		
		Platysace tenuissima	1		1		
		Trachymene pilosa	1	1	1	1	1
		Xanthosia atkinsoniana	1	1	1	1	1
		Xanthosia candida	1	1	1	1	1
		Xanthosia ciliata	1			1	
		Xanthosia huegelii	1	1	1	1	1
		Xanthosia singuliflora	1		1		
		Xanthosia tasmanica	1				
		Xanthosia sp.	1				
APOCYNACEAE	*	*Gomphocarpus fruticosus*	1				
ASPARAGACEAE		*Chamaescilla corymbosa*	1	1	1	1	1
		Dichopogon capillipes	1			1	
		Laxmannia sessiliflora	1				
		Laxmannia sessiliflora subsp. australis	1				
		Laxmannia squarrosa	1				
		Laxmannia sp.	1				
		Lomandra brittanii	1			1	1
		Lomandra caespitosa	1		1	1	1
		Lomandra drummondii	1	1	1	1	1
		Lomandra effusa	1				
		Lomandra hermaphrodita	1	1	1	1	1
		Lomandra integra	1			1	1
		Lomandra micrantha	1	1		1	1
		Lomandra micrantha subsp. *micrantha*	1				
		Lomandra nigricans	1	1		1	1
		Lomandra odora	1			1	1
		Lomandra preissii	1	1		1	1
		Lomandra purpurea	1		1	1	1
		Lomandra sericea	1			1	
		Lomandra sonderi	1	1	1	1	1
		Lomandra spartea	1	1	1	1	1
		Lomandra suaveolens	1				
		Lomandra sp.	1	1	1	1	
		Sowerbaea laxiflora	1			1	
	P3	*Thysanotus anceps*				1	
		Thysanotus dichotomus	1	1	1	1	1
		Thysanotus fastigiatus	1	1	1	1	
		Thysanotus gracilis				1	
		Thysanotus manglesianus	1	1		1	
		Thysanotus multiflorus	1	1	1	1	1
		Thysanotus patersonii	1				1
		Thysanotus scaber	1				
		Thysanotus sparteus					1

APPENDIX F: VASCULAR PLANT SPECIES RECORDED IN MYARA, JARRAHDALE AND NEARBY FOREST AREAS AND PLOTS

FAMILY	SPECIES	Myara Mapping	FMP Plots	Huntly/ Myara Plots	Jarrahdale Plots	Myara Plots
ASPARAGACEAE	*Thysanotus tenellus*				1	
(continued)	*Thysanotus thyrsoideus*	1	1	1	1	1
	Thysanotus sp.	1		1	1	
	Asparagaceae sp.	1				
ASPHODELACEAE	*Bulbine semibarbata*				1	
ASTERACEAE	*Asterolasia pallida*	1				
	Craspedia variabilis	1	1			
	* *Erigeron* sp.	1		1		
	* *Erigeron sumatrensis*				1	1
	Euchiton sphaericus				1	1
	Hyalosperma cotula	1				
	* *Hypochaeris glabra*	1		1	1	1
	Lagenophora huegelii	1	1	1	1	1
	Millotia tenuifolia	1			1	1
	Olearia paucidentata	1				
	Podolepis gracilis			1		
	Panaetia lessonii	1		1		
	Podolepis sp.	1		1		
	Podotheca angustifolia	1				
	Podotheca gnaphalioides	1				
	Podotheca sp.	1				
	Pseudognaphalium luteoalbum	1			1	1
	Pterochaeta paniculata	1			1	
	Quinetia urvillei	1		1		
	Senecio diaschides	1		1	1	1
	Senecio hispidulus	1		1	1	1
	Senecio leucoglossus (P4)		1	1	1	1
	Senecio quadridentatus	1		1	1	1
	Senecio sp.	1		1		
	Siloxerus humifusus	1		1		
	Siloxerus multiflorus	1				
	* *Sonchus oleraceus*				1	1
	Trichocline spathulata	1	1	1	1	1
	* *Ursinia anthemoides*	1				
	* Asteraceae sp.	1	1			
BORYACEAE	*Borya sphaerocephala*	1				
CAMPANULACEAE	*Isotoma hypocrateriformis*	1			1	1
	Lobelia gibbosa			1	1	
	Wahlenbergia preissii					1
CASUARINACEAE	*Allocasuarina fraseriana*	1	1	1	1	1
	Allocasuarina humilis	1				
	Allocasuarina microstachya	1				
CELASTRACEAE	*Stackhousia monogyna*	1	1	1		1
	Tripterococcus brunonis	1	1	1		1
CENTROLEPIDACEAE	*Aphelia cyperoides*			1		1
	Centrolepis aristata	1		1	1	1
	Centrolepis drummondiana			1		
COLCHICACEAE	*Burchardia congesta*	1	1		1	1
	Burchardia multiflora	1				
	Burchardia sp.	1				
	Wurmbea dioica	1			1	
	Wurmbea sp.	1				
CUPRESSACEAE	*Callitris pyramidalis*	1				

APPENDIX F: VASCULAR PLANT SPECIES RECORDED IN MYARA, JARRAHDALE AND NEARBY FOREST AREAS AND PLOTS

FAMILY	SPECIES	Myara Mapping	FMP Plots	Huntly/ Myara Plots	Jarrahdale Plots	Myara Plots
CYPERACEAE	*Baumea juncea*			1		
	Baumea vaginalis	1				
	Caustis dioica	1				1
	Chorizandra enodis	1				
	Cyathochaeta avenacea	1	1	1	1	1
	* *Cyperus rotundus*			1		
	Gahnia aristata	1				
	Gahnia decomposita	1		1		1
	Isolepis cernua	1				
	Isolepis marginata	1				1
	Lepidosperma asperatum	1				
	Lepidosperma gracile	1		1		
	Lepidosperma leptostachyum	1		1	1	
	Lepidosperma longitudinale	1				1
	Lepidosperma pubisquameum	1				1
	Lepidosperma squamatum	1		1	1	1
	Lepidosperma tenue	1		1	1	1
	Lepidosperma tetraquetrum	1		1		
	Lepidosperma sp.	1	1			1
	Lepidosperma sp. (flat)	1				
	Lepidospema sp. (terete)	1				
	Lepidosperma sp.1					1
	Mesomelaena graciliceps	1			1	1
	Mesomelaena stygia					1
	Mesomelaena tetragona	1		1	1	1
	Schoenus clandestinus	1				
	Schoenus discifer	1				
	Schoenus sp.	1				
	Tetraria capillaris			1	1	1
	Tetraria octandra	1		1	1	1
	Tetraria sp. Jarrah Forest (R. Davis 7391)	1	1			1
	Cyperaceae sp.	1	1			
DASYPOGONACEAE	*Dasypogon bromeliifolius*	1				
	Kingia australis	1				
DENNSTAEDTIACEAE	*Pteridium esculentum*	1	1	1	1	1
DILLENIACEAE	*Hibbertia acerosa*	1	1	1		1
	Hibbertia amplexicaulis	1	1	1	1	1
	Hibbertia commutata	1	1	1	1	1
	Hibbertia commutata (seedling)					1
	Hibbertia diamesogenos			1		
	Hibbertia huegelii	1	1	1	1	1
	Hibbertia hypericoides	1	1	1		1
	Hibbertia lasiopus	1		1		
	Hibbertia lineata					1
	Hibbertia ovata	1		1		
	Hibbertia perfoliata	1	1	1		1
	Hibbertia pilosa	1				
	Hibbertia quadricolor	1		1		1
	Hibbertia racemosa			1		
	Hibbertia silvestris	1				
	Hibbertia stellaris	1				
	Hibbertia striata					1
	Hibbertia sp.	1	1		1	1
DROSERACEAE	*Drosera bulbosa*				1	
	Drosera erythrorhiza	1		1	1	1
	Drosera glanduligera	1				
	Drosera macrantha	1		1	1	
	Drosera microphylla				1	
	Drosera pallida			1	1	

APPENDIX F: VASCULAR PLANT SPECIES RECORDED IN MYARA, JARRAHDALE AND NEARBY FOREST AREAS AND PLOTS

FAMILY	SPECIES	Myara Mapping	FMP Plots	Huntly/ Myara Plots	Jarrahdale Plots	Myara Plots
DROSERACEAE	*Drosera platystigma*			1	1	
(continued)	*Drosera pulchella*			1		1
	Drosera stolonifera	1		1	1	1
	Drosera sp.	1	1	1		1
	Drosera sp. (climbing)	1				1
	Drosera sp. 1	1				1
	Drosera sp. 2	1				1
ELAEOCARPACEAE	*Platytheca galioides*	1				
	Tetratheca hirsuta	1	1	1	1	1
	Tetratheca sp.	1				
ERICACEAE	*Andersonia aristata*	1				
	Andersonia latiflora			1		
	Andersonia lehmanniana	1				1
	Andersonia lehmanniana subsp. *lehmanniana*	1				
	Leucopogon australis	1	1			
	Leucopogon capitellatus	1	1	1	1	1
	Leucopogon glabellus	1				
	Leucopogon hirsutus			1		
	Leucopogon parviflorus					1
	Leucopogon sprengelioides					1
	Leucopogon tenuis	1				
	Leucopogon verticillatus	1	1	1	1	1
	Leucopogon sp.	1				
	Lysinema ciliatum	1				
	Lysinema elegans	1				
	Lysinema pentapetalum	1				
	Styphelia discolor	1	1	1	1	1
	Styphelia epacridis	1				
	Styphelia erectifolia	1				
	Styphelia erubescens				1	
	Styphelia nitens	1	1	1	1	1
	Styphelia pallida	1		1	1	1
	Styphelia propinqua	1	1	1	1	1
	Styphelia stricta	1				
	Styphelia tenuiflora	1	1	1	1	1
	Styphelia sp.	1				
	Ericaceae sp.	1				
EUPHORBIACEAE	*Amperea simulans*	1				
	Monotaxis grandiflora			1	1	
	Monotaxis grandiflora var. *grandiflora*					1
	Monotaxis occidentalis	1		1	1	
	Stachystemon vermicularis			1		
	Stachystemon virgatus	1				
FABACEAE	*Acacia alata*	1		1	1	1
	Acacia alata var. *alata*	1				
	Acacia applanata	1				1
	Acacia barbinervis	1	1	1	1	1
	Acacia barbinervis subsp. *barbinervis*	1				
	Acacia browniana	1		1		
	Acacia browniana var. *endlicheri*	1				
	Acacia browniana var. *intermedia*	1				
	Acacia browniana var. *obscura*	1				
	Acacia celastrifolia	1			1	
	Acacia divergens	1		1		1
	Acacia drummondii		1	1	1	1
	Acacia drummondii subsp. *candolleana*	1				1
	Acacia ephedroides	1				
	Acacia extensa	1	1	1		1
	Acacia gemina	1				

APPENDIX F: VASCULAR PLANT SPECIES RECORDED IN MYARA, JARRAHDALE AND NEARBY FOREST AREAS AND PLOTS

FAMILY	SPECIES	Myara Mapping	FMP Plots	Huntly/ Myara Plots	Jarrahdale Plots	Myara Plots
FABACEAE	*Acacia horridula* (P3)	1				
(continued)	*Acacia incrassata*			1		
	Acacia incurva	1				
	Acacia lateriticola	1	1	1	1	1
	* *Acacia longifolia*	1				
	* *Acacia longifolia* subsp. *longifolia*	1				
	Acacia multispicata	1				
	Acacia nervosa	1	1			
	Acacia obovata	1				
	Acacia oncinophylla	1				
	Acacia preissiana	1		1		
	Acacia pulchella	1	1	1	1	1
	Acacia pulchella var. glaberrima	1				
	Acacia pulchella var. pulchella	1				
	Acacia saligna	1		1		1
	Acacia stenoptera	1				1
	Acacia trigonophylla	1				
	Acacia urophylla	1	1	1	1	1
	Acacia varia			1	1	
	Acacia willdenowiana	1		1	1	
	Acacia sp.	1	1	1		
	Aotus cordifolia					1
	Aotus gracillima	1				
	Bossiaea aquifolium	1	1	1	1	1
	Bossiaea eriocarpa	1		1		
	Bossiaea ornata	1	1	1	1	1
	Bossiaea pulchella	1				
	Bossiaea spinescens					1
	Callistachys lanceolata	1				
	Chorizema cordatum	1	1	1		1
	Chorizema dicksonii	1				
	Chorizema ilicifolium			1		
	Chorizema rhombeum			1		
	Daviesia cordata	1				
	Daviesia decurrens	1	1	1	1	1
	Daviesia horrida	1		1		1
	Daviesia incrassata	1				
	Daviesia physodes			1		
	Daviesia preissii	1	1			
	Daviesia rhombifolia	1	1			
	Daviesia sp.	1				
	Dillwynia laxiflora	1				
	Gastrolobium bilobum	1				
	Gastrolobium calycinum	1				
	Gastrolobium ebracteolatum			1		
	Gastrolobium retusum	1				
	Gastrolobium spinosum	1				1
	Gastrolobium villosum	1	1			1
	Gastrolobium sp.	1				
	Gompholobium capitatum	1		1		
	Gompholobium cyaninum	1	1	1		
	Gompholobium knightianum	1	1	1	1	1
	Gompholobium marginatum		1	1	1	1
	Gompholobium polymorphum	1	1	1	1	1
	Gompholobium preissii	1	1	1	1	1
	Gompholobium scabrum	1				
	Gompholobium tomentosum	1				1
	Gompholobium sp.	1		1		
	Gompholobium sp.1					1
	Hardenbergia comptoniana	1				
	Hovea chorizemifolia	1	1	1	1	1
	Hovea pungens	1				

APPENDIX F: VASCULAR PLANT SPECIES RECORDED IN MYARA, JARRAHDALE AND NEARBY FOREST AREAS AND PLOTS

FAMILY		SPECIES	Myara Mapping	FMP Plots	Huntly/ Myara Plots	Jarrahdale Plots	Myara Plots
FABACEAE		*Hovea trisperma*	1		1	1	1
(continued)		*Hovea trisperma var. grandiflora*	1				
		Hovea sp.	1				
		Isotropis cuneifolia					1
		Isotropis cuneifolia subsp. *cuneifolia*	1				
		Jacksonia alata					1
		Jacksonia furcellata	1				
		Kennedia coccinea	1	1	1	1	1
		Kennedia prostrata	1	1	1		1
		Labichea punctata	1	1	1	1	1
		Mirbelia dilatata	1		1	1	1
		Paraserianthes lophantha	1		1		
		Sphaerolobium linophyllum				1	
		Sphaerolobium macranthum					1
		Sphaerolobium medium	1		1	1	1
		Sphaerolobium sp.					1
	*	*Trifolium dubium*			1	1	
		Viminaria juncea	1		1		
		Fabaceae sp.	1				
GENTIANACEAE	*	*Centaurium erythraea*			1	1	
GERANIACEAE		*Pelargonium littorale*	1				
GOODENIACEAE		*Dampiera alata*	1			1	
		Dampiera hederacea				1	
		Dampiera linearis	1	1		1	1
		Dampiera pedunculata				1	
		Dampiera sp.	1				
		Goodenia micrantha			1		
		Goodenia pulchella	1				
		Goodenia trinervis	1				
		Lechenaultia biloba	1	1	1	1	1
		Scaevola calliptera	1	1	1	1	1
		Scaevola pilosa				1	1
		Goodeniaceae sp.	1				
HAEMODORACEAE		*Anigozanthos manglesii*	1				1
		Anigozanthos sp.	1				
		Conostylis ?caricina subsp. *caricina*	1				
		Conostylis aculeata	1			1	
		Conostylis pusilla	1				1
		Conostylis serrulata	1		1	1	1
		Conostylis setigera	1	1	1		1
		Conostylis setigera subsp. *setigera*	1				
		Conostylis setosa	1	1	1	1	1
		Conostylis sp.	1				
		Haemodorum laxum	1		1	1	1
		Haemodorum spicatum	1			1	
		Haemodorum sp.	1		1		1
		Haemodorum sp. 1					1
		Haemodorum sp. 2					1
		Haemodoraceae sp.		1			
HALORAGACEAE		*Glischrocaryon aureum*	1		1	1	1
		Gonocarpus benthamii			1		
		Gonocarpus cordiger	1	1			
		Gonocarpus diffusus				1	
		Gonocarpus sp.		1			
HEMEROCALLIDACEAE		*Agrostocrinum hirsutum*	1				
		Agrostocrinum scabrum		1		1	1

APPENDIX F: VASCULAR PLANT SPECIES RECORDED IN MYARA, JARRAHDALE AND NEARBY FOREST AREAS AND PLOTS

FAMILY		SPECIES	Myara Mapping	FMP Plots	Huntly/ Myara Plots	Jarrahdale Plots	Myara Plots
HEMEROCALLIDACEAE		*Caesia micrantha*	1				
(continued)		*Corynotheca micrantha*	1				
		Dianella revoluta	1	1		1	1
		Johnsonia lupulina	1				
		Stypandra glauca	1				
		Tribonanthes australis	1				
		Tricoryne elatior	1		1	1	1
		Tricoryne humilis				1	1
		Tricoryne sp.	1				
HYPOXIDACEAE		*Pauridia* sp.	1				
IRIDACEAE		*Orthrosanthus laxus*	1				
		Patersonia babianoides			1	1	1
		Patersonia juncea	1				1
		Patersonia occidentalis	1	1	1		1
		Patersonia pygmaea	1		1	1	1
		Patersonia rudis	1		1	1	1
		Patersonia sp.	1				
	*	*Watsonia meriana*	1				
		Iridaceae sp.	1				
JUNCACEAE	*	*Juncus bufonius*				1	
		Juncus planifolius			1		
		Juncus subsecundus			1		
		Juncus sp.	1				
LAMIACEAE		*Hemiandra pungens*	1			1	1
		Hemiandra sp.	1				
		Hemigenia incana	1				
		Hemigenia pritzelii	1	1	1	1	
		Hemigenia viscida	1				
		Hemigenia sp.	1				
	*	*Lavandula stoechas*	1				
LAURACEAE		*Cassytha glabella*	1		1	1	
		Cassytha racemosa			1		
		Cassytha sp.	1				1
LENTIBULARIACEAE		*Utricularia multifida*	1	1		1	
LINDSAEACEAE		*Lindsaea linearis*	1				1
LOGANIACEAE		*Orianthera serpyllifolia*	1		1		
		Phyllangium paradoxum			1	1	
LORANTHACEAE		*Nuytsia floribunda*	1				
MALVACEAE		*Lasiopetalum floribundum*	1	1	1	1	1
		Lasiopetalum glabratum	1	1	1	1	1
		Lasiopetalum glutinosum				1	
		Lasiopetalum sp.	1				
		Thomasia foliosa	1				
		Thomasia paniculata	1		1		1
		Thomasia pauciflora			1		
MENYANTHACEAE		*Liparophyllum capitatum*				1	
MYRTACEAE		*Astartea scoparia*	1		1		1
		Babingtonia camphorosmae	1				1
		Calothamnus lateralis	1				
		Calothamnus quadrifidus	1			1	
		Calothamnus rupestris	1				
		Calothamnus sanguineus	1				

APPENDIX F: VASCULAR PLANT SPECIES RECORDED IN MYARA, JARRAHDALE AND NEARBY FOREST AREAS AND PLOTS

FAMILY	SPECIES	Myara Mapping	FMP Plots	Huntly/ Myara Plots	Jarrahdale Plots	Myara Plots
MYRTACEAE	*Calothamnus* sp.					1
(continued)	*Calytrix depressa*	1				
	Calytrix flavescens	1				
	Calytrix variabilis	1				
	Calytrix sp.	1				
	Corymbia calophylla	1	1	1	1	1
	Corymbia calophylla (seedling)					1
^	*Corymbia maculata*	1				
	Darwinia citriodora	1				
^	*Eucalyptus cypellocarpa*	1				
	Eucalyptus drummondii	1				
	Eucalyptus marginata	1	1	1	1	1
	Eucalyptus marginata (seedling)					1
	Eucalyptus megacarpa	1		1		
	Eucalyptus patens	1		1		1
	Eucalyptus patens (seedling)					1
	Eucalyptus rudis	1		1		
	Eucalyptus wandoo	1				
	Eucalyptus sp.	1	1	1		
	Hypocalymma angustifolium	1	1	1	1	1
	Hypocalymma cordifolium	1		1		
	Hypocalymma robustum	1				
	Kunzea glabrescens					1
	Kunzea micrantha	1				
	Kunzea micrantha subsp. *micrantha*	1				
	Kunzea pulchella	1				
	Kunzea recurva	1				1
	Kunzea sp.	1				
	Leptospermum erubescens	1	1			1
*	*Leptospermum laevigatum*	1				
*	*Melaleuca armillaris* subsp. *armillaris*	1				
	Melaleuca incana			1		
	Melaleuca incana subsp. *incana*	1				
	Melaleuca lateritia	1				
	Melaleuca parviceps	1				1
	Melaleuca pauciflora	1				
	Melaleuca preissiana	1		1		1
	Melaleuca rhaphiophylla	1				
	Melaleuca trichophylla	1				
	Melaleuca viminea	1				1
	Melaleuca viminea (seedling)					1
	Melaleuca sp.	1				
	Pericalymma ellipticum	1	1	1		1
	Taxandria linearifolia	1		1		1
	Verticordia densiflora	1				
	Verticordia densiflora var. *densiflora*	1				
	Verticordia pennigera	1				
	Verticordia plumosa	1				0
	Verticordia plumosa var. *plumosa*	1				
	Verticordia sp.	1				
	Myrtaceae sp.	1				
OLACACEAE	*Olax benthamiana*			1		
ORCHIDACEAE	*Caladenia flava*	1		1	1	1
	Caladenia macrostylis			1	1	
	Caladenia reptans	1		1	1	
	Caladenia reptans subsp. *reptans*	1				
	Caladenia sp.	1		1		1
	Caladenia sp. 1					1
	Cryptostylis ovata			1	1	
	Cryptostylis sp.	1				
	Cyanicula sericea	1		1	1	

APPENDIX F: VASCULAR PLANT SPECIES RECORDED IN MYARA, JARRAHDALE AND NEARBY FOREST AREAS AND PLOTS

FAMILY		SPECIES	Myara Mapping	FMP Plots	Huntly/ Myara Plots	Jarrahdale Plots	Myara Plots
ORCHIDACEAE		*Cyrtostylis robusta*			1	1	
(continued)	*	*Disa bracteata*			1	1	
		Diuris longifolia	1		1	1	
		Diuris sp.	1				
		Elythranthera brunonis	1		1		1
		Eriochilus dilatatus			1	1	
		Eriochilus scaber			1		
		Eriochilus tenuis			1		
		Leporella fimbriata			1	1	
		Lyperanthus serratus			1		
		Microtis media			1		
		Pheladenia deformis	1		1		
		Prasophyllum brownii			1		
		Prasophyllum elatum				1	
		Prasophyllum sp.	1				1
		Prasophyllum sp.1					1
		Pterostylis barbata	1			1	
		Pterostylis pyramidalis			1	1	
		Pterostylis recurva	1		1	1	
		Pterostylis vittata			1	1	
		Pterostylis sp.	1				1
		Pterostylis sp. 1					1
		Pyrorchis nigricans	1		1	1	
		Thelymitra antennifera	1		1		
		Thelymitra crinita	1		1	1	1
		Thelymitra macrophylla			1	1	
		Thelymitra sp.	1	1	1		1
		Orchidaceae sp.	1	1			1
		Orchidaceae sp. 1	1				1
		Orchidaceae sp. 2	1				1
OROBANCHACEAE	*	*Parentucellia latifolia*	1				
OXALIDACEAE	*	*Oxalis compressa*			1		
	*	*Oxalis corniculata*			1	1	
	*	*Oxalis pes-caprae*	1				
	*	*Oxalis sp.*	1				
PHILYDRACEAE		*Philydrella drummondii*					1
		Philydrella pygmaea			1		
PHYLLANTHACEAE		*Phyllanthus calycinus*	1	1	1	1	1
		Poranthera microphylla	1		1	1	1
PINACEAE	*	*Pinus pinaster*	1				
PITTOSPORACEAE		*Billardiera floribunda*			1	1	
		Billardiera fraseri			1	1	
		Billardiera fusiformis	1		1	1	1
		Billardiera heterophylla	1				
		Billardiera variifolia			1	1	
		Billardiera sp.	1				
		Billardiera sp.1					1
		Marianthus drummondianus	1	1	1		
		Marianthus sp.	1				
PLANTAGINACEAE	*	*Plantago lanceolata*				1	
POACEAE	*	*Aira caryophyllea*			1	1	1
		Amphipogon amphipogonoides	1		1		1
		Amphipogon laguroides	1		1		
		Amphipogon laguroides subsp. *laguroides*	1				
		Austrostipa elegantissima		1			

APPENDIX F: VASCULAR PLANT SPECIES RECORDED IN MYARA, JARRAHDALE AND NEARBY FOREST AREAS AND PLOTS

FAMILY		SPECIES	Myara Mapping	FMP Plots	Huntly/ Myara Plots	Jarrahdale Plots	Myara Plots
POACEAE		*Austrostipa mollis*					1
(continued)		*Austrostipa* sp.	1				1
	*	*Avena fatua*			1		
	*	*Briza minor*	1			1	1
		Lachnagrostis filiformis				1	
		Neurachne alopecuroidea	1	1	1	1	1
		Paspalidium sp.?					1
		Rytidosperma acerosum					1
		Rytidosperma caespitosum	1		1		1
		Rytidosperma setaceum				1	
		Rytidosperma sp.					1
		Tetrarrhena laevis	1	1	1	1	1
	*	*Vulpia myuros*			1	1	
		Poaceae sp.	1	1			
POLYGALACEAE		*Comesperma calymega*			1		
		Comesperma virgatum	1	1	1	1	1
		Comesperma sp.	1				1
PRIMULACEAE	*	*Lysimachia arvensis*	1		1	1	1
PROTEACEAE		*Adenanthos barbiger*	1	1	1	1	1
		Adenanthos obovatus	1				
		Banksia armata	1				
		Banksia bipinnatifida	1				1
		Banksia bipinnatifida subsp. *bipinnatifida*	1				
		Banksia dallanneyi subsp. *dallanneyi* var. *dallanneyi*	1	1	1	1	1
		Banksia fraseri		1			
		Banksia grandis	1	1	1	1	1
		Banksia grandis (seedling)					1
		Banksia littoralis	1		1		1
		Banksia seminuda	1				
		Banksia sessilis	1		1		1
		Banksia sphaerocarpa	1	1			
		Banksia squarrosa subsp. *squarrosa*	1				
		Banksia undata var. *undata*	1				
		Conospermum canaliculatum subsp. *canaliculatum*	1				
		Conospermum capitatum	1			1	
		Conospermum capitatum subsp. *glabratum*	1				
		Conospermum huegelii	1				
	P3	*Conospermum scaposum*					1
		Conospermum stoechadis	1				
		Conospermum stoechadis subsp. *sclerophyllum*	1				
		Grevillea bipinnatifida	1				1
		Grevillea diversifolia subsp. *diversifolia*	1				
		Grevillea manglesii subsp. *manglesii*	1				
		Grevillea monticola	1				
		Grevillea pulchella					1
		Grevillea pulchella subsp. ascendens	1				
		Grevillea quercifolia	1			1	
		Grevillea synapheae				1	
		Grevillea wilsonii	1	1	1	1	1
		Grevillea sp.	1				1
		Hakea amplexicaulis	1		1		
		Hakea ceratophylla	1				
		Hakea cyclocarpa	1			1	1
		Hakea gilbertii	1				
		Hakea incrassata	1				
		Hakea lissocarpha	1	1	1	1	1
		Hakea marginata	1				
		Hakea petiolaris subsp. *petiolaris*	1				
		Hakea prostrata	1		1		1

APPENDIX F: VASCULAR PLANT SPECIES RECORDED IN MYARA, JARRAHDALE AND NEARBY FOREST AREAS AND PLOTS

FAMILY	SPECIES	Myara Mapping	FMP Plots	Huntly/ Myara Plots	Jarrahdale Plots	Myara Plots
PROTEACEAE	*Hakea ruscifolia*	1		1	1	1
(continued)	*Hakea stenocarpa*	1				
	Hakea sulcata	1				
	Hakea trifurcata	1				
	Hakea undulata	1				
	Hakea varia	1		1		1
	Hakea sp.	1				
	Isopogon dubius	1				
	Persoonia angustiflora	1				
	Persoonia elliptica	1		1	1	
	Persoonia longifolia	1	1	1	1	1
	Persoonia longifolia (seedling)					1
	Persoonia saccata	1				
	Persoonia sp.		1			
	Petrophile macrostachya	1				1
	Petrophile serruriae	1				
	Petrophile squamata	1				
	Petrophile squamata subsp. *squamata*	1				
	Petrophile striata	1				
	Petrophile sp.	1				
	Stirlingia latifolia	1				1
	Stirlingia simplex	1				
	Synaphea cuneata	1				
	Synaphea gracillima	1				
	Synaphea petiolaris	1				
	Synaphea petiolaris subsp. *petiolaris*	1				
	Synaphea sp.	1				1
	Xylomelum occidentale	1				1
	Proteaceae sp.	1				
RANUNCULACEAE	*Clematis pubescens*	1	1	1	1	1
	Ranunculus colonorum	1	1	1		
	* *Ranunculus muricatus*			1		
RESTIONACEAE	*Chaetanthus leptocarpoides*	1				
	Chaetanthus tenellus	1				
	Chordifex ?laxus	1				
	Desmocladus fasciculatus	1		1		1
	Desmocladus flexuosus	1	1	1	1	1
	Empodisma gracillimum			1		
	Hypolaena exsulca	1		1	1	1
	Lepidobolus preissianus	1				
	Lepidobolus preissianus subsp. *preissianus*	1				1
	Leptocarpus canus	1				
	Leptocarpus coangustatus	1		1		
	Leptocarpus scariosus	1				
	Lepyrodia macra	1				
	Lepyrodia riparia	1				
	Loxocarya cinerea	1		1	1	1
	Restio sp.	1				
	Restionaceae sp.	1				1
RHAMNACEAE	*Cryptandra arbutiflora* var. *arbutiflora*	1				1
	Cryptandra arbutiflora var. *tubulosa*	1				
	Cryptandra mutila	1				
	Cryptandra myriantha	1				
	Cryptandra sp.	1				
	Stenanthemum nanum	1				
	Trymalium ledifolium	1	1	1	1	1
	Trymalium odoratissimum	1		1		1
	Trymalium odoratissimum subsp. *odoratissimum*				1	
ROSACEAE	*Acaena echinata*	1				

APPENDIX F: VASCULAR PLANT SPECIES RECORDED IN MYARA, JARRAHDALE AND NEARBY FOREST AREAS AND PLOTS

FAMILY		SPECIES	Myara Mapping	FMP Plots	Huntly/ Myara Plots	Jarrahdale Plots	Myara Plots
RUBIACEAE		*Galium* sp.	1				
		Opercularia apiciflora	1			1	1
		Opercularia echinocephala	1	1	1	1	1
		Opercularia hispidula	1			1	1
		Opercularia vaginata	1	1		1	
		Opercularia sp.	1		1		
RUTACEAE		*Boronia crenulata*	1				1
		Boronia crenulata subsp. *pubescens*	1				
		Boronia crenulata subsp. *viminea*					1
		Boronia fastigiata	1	1	1	1	1
		Boronia molloyae	1		1		
		Boronia scabra subsp. *scabra*	1				
		Boronia sp.	1				
		Cyanothamnus ramosus subsp. anethifolius	1				
		Philotheca spicata	1	1	1		1
SANTALACEAE		*Leptomeria cunninghamii*	1	1	1	1	1
		Santalum acuminatum	1				
SAPINDACEAE		*Dodonaea ceratocarpa*	1				
SOLANACEAE	*	*Solanum nigrum*	1				
STYLIDIACEAE		*Levenhookia pusilla*	1	1	1	1	1
		Levenhookia stipitata		1			
		Stylidium affine	1				
		Stylidium amoenum	1	1	1	1	1
		Stylidium androsaceum	1	1	1	1	
		Stylidium bulbiferum		1			1
		Stylidium calcaratum	1	1	1	1	1
		Stylidium ciliatum		1			
		Stylidium crassifolium				1	
		Stylidium diuroides	1				
		Stylidium emarginatum	1				
		Stylidium hispidum	1	1	1	1	1
		Stylidium junceum	1	1		1	
		Stylidium lateriticola	1			1	1
		Stylidium lineatum	1	1			
		Stylidium piliferum	1	1	1	1	1
		Stylidium repens	1				
		Stylidium schoenoides	1			1	1
		Stylidium spathulatum				1	
		Stylidium thesioides	1			1	
		Stylidium sp.	1		1		
THYMELACEAE		*Pimelea ciliata*	1	1	1	1	1
		Pimelea imbricata	1				
		Pimelea lehmanniana				1	
		Pimelea lehmanniana subsp. *nervosa*	1				
		Pimelea suaveolens	1	1	1	1	1
		Pimelea sp.	1				1
VIOLACEAE		*Hybanthus calycinus*			1	1	
		Hybanthus debilissimus	1		1		
		Hybanthus floribundus	1		1		1
		Hybanthus floribundus subsp. *floribundus*					1
XANTHORRHOEACEAE		*Xanthorrhoea gracilis*	1	1	1	1	1
		Xanthorrhoea preissii	1	1	1	1	1
ZAMIACEAE		*Macrozamia riedlei*	1	1	1	1	1
		Macrozamia riedlei (seedlings)					

APPENDIX G: SUMMARY OF INTRODUCED SPECIES IN THE MYARA NORTH SURVEY AREA AND ADJACENT MYARA/HUNTLY REGION

WONS - Weeds of National Significance - DAWE - Department of Agriculture, Water and the Environment (2021e);

WAOL - Western Australian Organism List DPIRD - WA Department of Primary Industries and Regional Development (2021);

Ecological impact (EI) and invasiveness (IR) ratings - DPAW - WA Department of Parks and Wildlife (2014)

	SPECIES	WONS Weeds (DAWE 2021)	Weeds Status (DPIRD 2021)	EI (DPAW 2014)	IR (DPAW 2014)	Myara former Mapping	Myara 2020 Mapping	Myara Plots	FMP Plots	Huntly Myara Plots	Jarrahdale Plots
*	*Liliaceae sp.*	N	-	-	-	x					
*	*Disa bracteata*	N	-	U	R	x				x	x
*	*Gomphocarpus fruticosus*	N	Declared Pest - s22(2)	U	R		x				
*	Asteraceae sp.	N	Permitted - s11	-	-	x	x		x		
*	*Erigeron* sp.	N	Permitted - s11	-	-	x	x			x	
*	*Medicago* sp.	N	Permitted - s11	-	-	x					
*	*Oxalis compressa*	N	Permitted - s11	-	-					x	
*	*Oxalis corniculata*	N	Permitted - s11	-	-					x	x
*	*Oxalis* sp.	N	Permitted - s11	-	-		x				
*	*Parentucellia latifolia*	N	Permitted - s11	-	-	x	x				
*	*Senecio* sp.	N	Permitted - s11	-	-	x					
*	*Trifolium* sp.	N	Permitted - s11	-	-	x					
*	*Vulpia* sp.	N	Permitted - s11	-	-	x					
*	*Acacia dealbata* subsp. *dealbata*	N	Permitted - s11	H	M	x					
*	*Leptospermum laevigatum*	N	Permitted - s11	H	M	x	x				
*	*Watsonia meriana*	N	Permitted - s11	H	M		x				
*	*Avena fatua*	N	Permitted - s11	H	R					x	
*	*Cynodon dactylon*	N	Permitted - s11	H	R	x					
*	*Oxalis pes-caprae*	N	Permitted - s11	H	S	x	x				
*	*Plantago lanceolata*	N	Permitted - s11	H	U						x
*	*Romulea rosea*	N	Permitted - s11	H	U	x					
*	*Lavandula stoechas*	N	Permitted - s11	L	M		x				
*	*Robinia pseudoacacia*	N	Permitted - s11	L	M	x					
*	*Senecio vulgaris*	N	Permitted - s11	L	M	x					
*	*Verbascum virgatum*	N	Permitted - s11	L	M	x					

APPENDIX G: SUMMARY OF INTRODUCED SPECIES IN THE MYARA NORTH SURVEY AREA AND ADJACENT MYARA/HUNTLY REGION

WONS - Weeds of National Significance - DAWE - Department of Agriculture, Water and the Environment (2021e);

WAOL - Western Australian Organism List DPIRD - WA Department of Primary Industries and Regional Development (2021);

Ecological impact (EI) and invasiveness (IR) ratings - DPAW - WA Department of Parks and Wildlife (2014)

	SPECIES	WONS Weeds (DAWE 2021)	Weeds Status (DPIRD 2021)	EI (DPAW 2014)	IR (DPAW 2014)	Myara former Mapping	Myara 2020 Mapping	Myara Plots	FMP Plots	Huntly Myara Plots	Jarrahdale Plots
*	*Juncus bufonius*	N	Permitted - s11	L	R						x
*	*Arctotheca calendula*	N	Permitted - s11	M	M	x					
*	*Melaleuca armillaris* subsp. *armillaris*	N	Permitted - s11	M	M		x				
*	*Hypochaeris glabra*	N	Permitted - s11	M	R	x	x	x		x	x
*	*Hypochaeris radicata*	N	Permitted - s11	M	R	x					
*	*Hypochaeris* sp.	N	Permitted - s11	M	R	x					
*	*Pinus pinaster*	N	Permitted - s11	M	R		x				
*	*Sonchus oleraceus*	N	Permitted - s11	M	R	x		x			x
*	*Vellereophyton dealbatum*	N	Permitted - s11	M	R	x					
*	*Acacia longifolia*	N	Permitted - s11	U	M		x				
*	*Acacia longifolia* subsp. *longifolia*	N	Permitted - s11	U	M		x				
*	*Hypericum perforatum*	N	Permitted - s11	U	M	x					
*	*Phytolacca octandra*	N	Permitted - s11	U	M	x					
*	*Solanum nigrum*	N	Permitted - s11	U	M		x				
*	*Aira caryophyllea*	N	Permitted - s11	U	R	x		x		x	x
*	*Aira cupaniana*	N	Permitted - s11	U	R	x					
*	*Brassica tournefortii*	N	Permitted - s11	U	R	x					
*	*Briza minor*	N	Permitted - s11	U	R	x	x	x			x
*	*Briza maxima*	N	Permitted - s11	U	R	x					
*	*Centaurium erythraea*	N	Permitted - s11	U	R	x				x	x
*	*Dittrichia graveolens*	N	Permitted - s11	U	R						
*	*Erigeron sumatrensis*	N	Permitted - s11	U	R			x			x
*	*Lotus uliginosus*	N	Permitted - s11	U	R						
*	*Lysimachia arvensis*	N	Permitted - s11	U	R	x	x	x		x	x
*	*Orobanche minor*	N	Permitted - s11	U	R	x					

APPENDIX G: SUMMARY OF INTRODUCED SPECIES IN THE MYARA NORTH SURVEY AREA AND ADJACENT MYARA/HUNTLY REGION

WONS - Weeds of National Significance - DAWE - Department of Agriculture, Water and the Environment (2021e);

WAOL - Western Australian Organism List DPIRD - WA Department of Primary Industries and Regional Development (2021);

Ecological impact (EI) and invasiveness (IR) ratings - DPAW - WA Department of Parks and Wildlife (2014)

SPECIES	WONS Weeds (DAWE 2021)	Weeds Status (DPIRD 2021)	EI (DPAW 2014)	IR (DPAW 2014)	Myara former Mapping	Myara 2020 Mapping	Myara Plots	FMP Plots	Huntly Myara Plots	Jarrahdale Plots
* *Ranunculus muricatus*	N	Permitted - s11	U	R					x	
* *Ursinia anthemoides*	N	Permitted - s11	U	R	x	x				
* *Vulpia myuros*	N	Permitted - s11	U	R	x				x	x
* *Cyperus rotundus*	N	Permitted - s11	U	S					x	
* *Pentameris airoides*	N	Permitted - s11	U	U	x					
* *Trifolium arvense*	N	Permitted - s11	U	U	x					
* *Trifolium dubium*	N	Permitted - s11	U	U					x	x
* *Bellardia trixago*	N	Permitted - s11			x					

APPENDIX H: SUMMARY OF SPECIES IN THE VEGETATION PLOTS WITHIN MYARA NORTH AND THE NEARBY MYARA NORTH REGION

Note: * denotes intrdouced species and P3 nd P4 denote Priority Flora species.

	Species	A	AC	D	D/DA	DA	E	C	CW	W	PW	SW	P	PS	PT	S	SP	ST	T	TS
*	*Aira caryophyllea*	x			x											x		x	x	x
*	Asteraceae sp.	x																x		
*	*Avena fatua*																		x	
*	*Briza minor*					x														x
*	*Centaurium erythraea*																		x	x
*	*Cyperus rotundus*																			x
*	*Disa bracteata*	x													x	x		x		x
*	*Drosera stolonifera*				x	x										x	x	x		
*	*Erigeron sumatrensis*															x		x	x	x
*	*Hypochaeris glabra*	x	x	x	x				x			x		x		x	x	x	x	x
*	*Juncus bufonius*																			x
*	*Lysimachia arvensis*		x			x														x
*	*Oxalis compressa*																			x
*	*Oxalis corniculata*	x																	x	x
*	*Plantago lanceolata*															x				
*	*Ranunculus muricatus*																		x	x
*	*Sonchus oleraceus*			x										x		x				x
*	*Trifolium dubium*																			x
*	*Vulpia myuros*															x	x		x	x
P3	*Conospermum scaposum*				x															
P3	*Thysanotus anceps*																x			
P4	*Stylidium scabridum*						x		x					x		x	x			
	Acacia alata													x		x				x
	Acacia applanata			x																
	Acacia barbinervis													x		x	x			x
	Acacia browniana													x		x			x	
	Acacia celastrifolia																			x

APPENDIX H: SUMMARY OF SPECIES IN THE VEGETATION PLOTS WITHIN MYARA NORTH AND THE NEARBY MYARA NORTH REGION

Note: * denotes intrdouced species and P3 nd P4 denote Priority Flora species.

Species	A	AC	D	D/DA	DA	E	C	CW	W	PW	SW	P	PS	PT	S	SP	ST	T	TS
Acacia divergens		x					x	x	x										
Acacia drummondii		x											x		x	x	x	x	x
Acacia extensa		x	x		x								x	x	x		x		x
Acacia incrassata	x																		
Acacia lateriticola	x	x											x		x	x	x	x	x
Acacia nervosa													x						
Acacia preissiana															x			x	
Acacia pulchella		x	x		x			x		x			x		x	x	x	x	x
Acacia saligna	x																		
Acacia sp.		x											x		x				
Acacia stenoptera																x			x
Acacia urophylla		x	x			x				x			x		x	x	x	x	x
Acacia varia			x								x				x	x			
Acacia willdenowiana											x		x		x				
Acacia drummondii subsp. *candolleana*													x				x		
Adenanthos barbiger			x								x	x	x	x	x	x	x	x	x
Agrostocrinum scabrum			x								x		x		x	x	x	x	x
Allocasuarina fraseriana			x								x	x	x	x	x	x	x		x
Amphipogon amphipogonoides		x	x	x									x		x	x	x	x	x
Amphipogon laguroides	x	x							x										
Andersonia latiflora															x				
Andersonia lehmanniana					x														
Anigozanthos manglesii	x			x															
Aotus cordifolia								x											
Aphelia cyperoides	x																		
Astartea scoparia	x	x		x	x		x	x	x						x				
Austrostipa eleganthissima										x							x		
Austrostipa mollis					x														

APPENDIX H: SUMMARY OF SPECIES IN THE VEGETATION PLOTS WITHIN MYARA NORTH AND THE NEARBY MYARA NORTH REGION

Note: * denotes intrdouced species and P3 nd P4 denote Priority Flora species.

Species	A	AC	D	D/DA	DA	E	C	CW	W	PW	SW	P	PS	PT	S	SP	ST	T	TS
Austrostipa sp.																			x
Babingtonia camphorosmae				x	x	x							x						
Banksia bipinnatifida															x				
Banksia dallanneyi subsp. *dallanneyi* var. *dallanneyi*			x	x	x	x		x		x	x	x	x	x	x	x	x	x	x
Banksia fraseri													x						
Banksia grandis		x	x								x	x	x	x	x	x	x	x	x
Banksia sessilis			x									x			x	x			
Banksia sphaerocarpa													x						
Banksia littoralis	x	x						x											
Baumea juncea	x	x																	
Billardiera floribunda							x		x							x		x	x
Billardiera sp.1																x			
Billardiera variifolia	x												x		x	x	x	x	x
Billardiera fraseri			x												x				
Billardiera fusiformis	x	x												x	x	x			x
Boronia crenulata								x											
Boronia crenulata subsp. *viminea*								x											
Boronia fastigiata		x	x							x	x	x	x	x	x	x	x	x	x
Boronia molloyae		x					x		x						x				
Bossiaea aquifolium			x				x		x	x		x	x		x	x	x	x	x
Bossiaea ornata		x	x		x						x	x	x		x	x	x	x	x
Bossiaea spinescens													x						
Bossiaea eriocarpa																		x	
Brachyscome pusilla				x															
Bulbine semibarbata		x																	
Burchardia congesta	x	x	x										x	x	x	x	x	x	x
Caladenia flava		x	x	x							x		x	x	x	x	x	x	x

APPENDIX H: SUMMARY OF SPECIES IN THE VEGETATION PLOTS WITHIN MYARA NORTH AND THE NEARBY MYARA NORTH REGION

Note: * denotes intrdouced species and P3 nd P4 denote Priority Flora species.

Species	A	AC	D	D/DA	DA	E	C	CW	W	PW	SW	P	PS	PT	S	SP	ST	T	TS
Caladenia macrostylis															x	x	x		
Caladenia reptans			x												x	x	x		x
Caladenia sp.			x									x			x	x			x
Caladenia sp. 1			x																
Calothamnus quadrifidus																			x
Calothamnus sp.				x															
Cassytha glabella		x													x		x	x	x
Cassytha racemosa									x								x	x	x
Cassytha sp.								x											
Caustis dioica						x													
Centella asiatica		x																	
Centrolepis drummondiana	x																		
Centrolepis aristata	x	x		x							x								x
Chamaescilla corymbosa	x		x	x	x	x				x		x	x		x	x	x	x	x
Chorizema cordatum						x						x	x		x	x	x		x
Chorizema ilicifolium		x																	
Chorizema rhombeum															x			x	x
Clematis pubescens		x	x										x	x	x	x	x	x	x
Comesperma calymega															x				
Comesperma virgatum			x							x	x		x		x	x	x	x	x
Comesperma sp.												x							
Conospermum capitatum			x																
Conostylis aculeata															x	x			x
Conostylis setigera			x			x		x		x		x	x		x	x	x	x	x
Conostylis setosa			x							x	x	x	x	x	x	x	x		x
Conostylis pusilla				x	x										x		x		
Conostylis serrulata			x					x			x	x	x		x	x	x	x	x
Corymbia calophylla			x	x	x	x		x		x	x		x	x	x	x	x	x	x

APPENDIX H: SUMMARY OF SPECIES IN THE VEGETATION PLOTS WITHIN MYARA NORTH AND THE NEARBY MYARA NORTH REGION

Note: * denotes intrdouced species and P3 nd P4 denote Priority Flora species.

Species	A	AC	D	D/DA	DA	E	C	CW	W	PW	SW	P	PS	PT	S	SP	ST	T	TS
Craspedia variabilis				x												x		x	
Cryptandra arbutiflora var. *arbutiflora*					x														
Cryptostylis ovata	x						x								x	x			x
Cyanicula sericea															x		x		
Cyathochaeta avenacea	x		x				x	x		x	x	x	x	x	x	x	x	x	x
Cyperaceae sp.													x						
Cyrtostylis robusta															x	x	x	x	x
Dampiera alata	x	x			x	x									x				x
Dampiera hederacea							x	x											
Dampiera linearis	x	x	x			x		x	x	x	x	x	x		x	x	x		x
Dampiera pedunculata	x	x																	
Dasypogon bromeliifolius																			x
Daucus glochidiatus															x	x		x	x
Daviesia decurrens													x			x			
Daviesia horrida	x					x													
Daviesia physodes																	x		
Daviesia preissii													x						
Daviesia rhombifolia													x						
Desmocladus flexuosus			x			x					x	x	x		x	x	x		x
Desmocladus fasciculatus				x	x	x		x					x		x		x		
Dianella revoluta		x											x		x		x	x	x
Dichopogon capillipes	x															x			x
Diuris longifolia	x	x					x						x	x	x	x	x	x	x
Drosera bulbosa											x				x	x			x
Drosera erythrorhiza	x	x	x									x	x		x	x	x	x	x
Drosera macrantha															x	x	x	x	x
Drosera microphylla			x																
Drosera pallida		x	x										x		x	x	x	x	x

APPENDIX H: SUMMARY OF SPECIES IN THE VEGETATION PLOTS WITHIN MYARA NORTH AND THE NEARBY MYARA NORTH REGION

Note: * denotes intrdouced species and P3 nd P4 denote Priority Flora species.

Species	A	AC	D	D/DA	DA	E	C	CW	W	PW	SW	P	PS	PT	S	SP	ST	T	TS
Drosera platystigma	x	x							x		x				x				
Drosera pulchella	x	x													x		x		
Drosera sp.													x		x		x	x	x
Drosera sp. (climbing)												x				x			x
Drosera sp. 1	x		x	x	x	x						x	x		x	x			x
Drosera sp. 2	x			x	x	x		x					x		x	x	x		
Drosera stolonifera											x		x	x	x		x	x	x
Elythranthera brunonis						x										x		x	
Empodisma gracillimum	x														x				
Eriochilus dilatatus		x							x				x	x	x	x	x	x	x
Eriochilus scaber																		x	
Eriochilus tenuis															x				x
Eucalyptus marginata		x	x	x		x		x		x	x	x	x	x	x	x	x	x	x
Eucalyptus megacarpa							x		x						x				
Eucalyptus patens		x					x	x	x						x	x		x	
Eucalyptus rudis	x	x																	
Eucalyptus sp.													x		x				
Euchiton sphaericus																		x	
Gahnia decomposita	x	x						x	x						x				
Gastrolobium ebracteolatum		x					x		x										
Gastrolobium spinosum													x						
Gastrolobium villosum													x						
Glischrocaryon aureum													x		x	x			
Gompholobium capitatum															x	x			
Gompholobium cyaninum													x						
Gompholobium knightianum			x							x	x	x	x		x	x			x
Gompholobium marginatum	x	x	x	x	x	x		x		x	x	x	x		x	x	x		x
Gompholobium polymorphum			x	x		x				x	x		x	x	x	x	x	x	x

APPENDIX H: SUMMARY OF SPECIES IN THE VEGETATION PLOTS WITHIN MYARA NORTH AND THE NEARBY MYARA NORTH REGION

Note: * denotes intrdouced species and P3 nd P4 denote Priority Flora species.

Species	A	AC	D	D/DA	DA	E	C	CW	W	PW	SW	P	PS	PT	S	SP	ST	T	TS
Gompholobium preissii			x	x						x	x	x	x		x	x	x		x
Gompholobium sp.															x				
Gompholobium sp.1																			x
Gompholobium tomentosum																x			
Gonocarpus benthamii															x				
Gonocarpus cordiger																			x
Gonocarpus diffusus	x	x					x		x										
Gonocarpus sp.										x									
Goodenia sp.1						x													
Goodenia trinervis	x				x														
Grevillea bipinnatifida						x													
Grevillea pulchella					x								x						
Grevillea quercifolia											x								
Grevillea synapheae			x															x	
Grevillea variifolia				x															
Grevillea wilsonii			x		x	x						x	x		x	x			x
Haemodoraceae sp.													x					x	
Haemodorum laxum			x										x		x		x	x	x
Haemodorum sp.	x					x		x				x	x		x	x			
Haemodorum sp. 1	x				x	x							x		x	x			
Haemodorum sp. 2					x														
Haemodorum spicatum											x								
Hakea amplexicaulis													x						x
Hakea cyclocarpa						x										x			
Hakea lissocarpha			x		x	x						x	x		x	x		x	x
Hakea prostrata	x				x														
Hakea ruscifolia				x							x		x		x	x			
Hakea varia	x	x																	

APPENDIX H: SUMMARY OF SPECIES IN THE VEGETATION PLOTS WITHIN MYARA NORTH AND THE NEARBY MYARA NORTH REGION

Note: * denotes intrdouced species and P3 nd P4 denote Priority Flora species.

Species	A	AC	D	D/DA	DA	E	C	CW	W	PW	SW	P	PS	PT	S	SP	ST	T	TS
Hemiandra pungens					x							x			x				
Hemigenia pritzelii		x	x										x		x	x	x	x	x
Hibbertia acerosa	x		x							x			x		x	x	x		x
Hibbertia amplexicaulis		x	x	x		x	x		x	x	x	x	x	x	x	x	x	x	x
Hibbertia commutata		x	x	x		x				x	x	x	x	x	x	x	x	x	x
Hibbertia diamesogenos	x																		
Hibbertia huegelii	x		x										x		x				
Hibbertia huegelli															x				
Hibbertia hypericoides			x	x		x							x		x	x	x	x	
Hibbertia lasiopus															x				
Hibbertia lineata						x													
Hibbertia ovata													x		x	x	x	x	x
Hibbertia perfoliata			x	x									x		x	x	x	x	
Hibbertia quadricolor												x		x	x	x	x		
Hibbertia racemosa															x				
Hibbertia sp.													x		x	x		x	x
Hibbertia striata															x				
Hovea chorizemifolia		x	x							x	x	x	x	x	x	x	x	x	x
Hovea trisperma			x			x					x		x		x	x	x	x	x
Hyalosperma cotula	x														x		x		
Hybanthus calycinus													x	x	x	x	x		x
Hybanthus debilissimus			x												x	x	x	x	x
Hybanthus floribundus						x									x	x			x
Hybanthus floribundus subsp. *floribundus*															x	x			x
Hydrocotyle callicarpa	x	x											x		x		x		x
Hypocalymma angustifolium	x	x	x	x	x	x				x	x				x	x	x	x	x
Hypocalymma cordifolium	x	x					x		x						x				
Hypolaena exsulca			x			x	x	x			x				x				

APPENDIX H: SUMMARY OF SPECIES IN THE VEGETATION PLOTS WITHIN MYARA NORTH AND THE NEARBY MYARA NORTH REGION

Note: * denotes intrdouced species and P3 nd P4 denote Priority Flora species.

Species	A	AC	D	D/DA	DA	E	C	CW	W	PW	SW	P	PS	PT	S	SP	ST	T	TS
Isolepis marginata																	x		
Isotoma hypocrateriformis		x													x			x	
Isotropis cuneifolia	x				x														
Jacksonia alata					x														
Juncus planifolius	x	x																	
Juncus subsecundus	x																		
Kennedia coccinea		x	x								x	x	x		x	x	x	x	x
Kennedia prostrata			x	x	x										x	x	x	x	x
Kingia australis						x													
Kunzea glabrescens						x													
Kunzea recurva						x													
Labichea punctata			x							x	x	x	x	x	x	x	x		x
Lachnagrostis filiformis																			x
Lagenophora huegelii	x	x	x	x									x	x	x	x	x	x	x
Lasiopetalum floribundum		x	x				x	x	x			x	x	x	x	x	x	x	x
Lasiopetalum glabratum			x										x			x			
Lasiopetalum glutinosum			x													x			
Laxmannia squarrosa				x	x														
Lechenaultia biloba			x		x	x		x		x		x	x		x	x	x	x	x
Lepidobolus preissianus subsp. *preissianus*					x														
Lepidosperma gracile													x		x	x			
Lepidosperma leptostachyum													x	x	x	x			x
Lepidosperma longitudinale								x											
Lepidosperma pubisquameum	x		x										x			x			
Lepidosperma sp.	x									x			x		x		x		
Lepidosperma sp.1			x										x			x			x
Lepidosperma squamatum	x	x	x	x	x	x							x		x	x	x		x
Lepidosperma tenue		x	x			x						x	x		x	x			

APPENDIX H: SUMMARY OF SPECIES IN THE VEGETATION PLOTS WITHIN MYARA NORTH AND THE NEARBY MYARA NORTH REGION

Note: * denotes intrdouced species and P3 nd P4 denote Priority Flora species.

Species	A	AC	D	D/DA	DA	E	C	CW	W	PW	SW	P	PS	PT	S	SP	ST	T	TS
Lepidosperma tetraquetrum		x					x		x						x				
Leporella fimbriata			x								x		x		x		x	x	x
Leptocarpus coangustatus	x	x											x						
Leptomeria cunninghamii	x		x										x		x	x	x	x	x
Leptospermum erubescens				x						x					x				
Leucopogon australis													x						
Leucopogon capitellatus		x	x			x							x		x	x	x	x	x
Leucopogon hirsutus		x																	
Leucopogon parviflorus								x											
Leucopogon sprengelioides					x														
Leucopogon verticillatus			x										x		x	x	x	x	x
Levenhookia pusilla	x	x				x				x	x	x	x		x		x		x
Levenhookia stipitata																			x
Lindsaea linearis			x			x													
Liparophyllum capitatum	x																		
Lobelia gibbosa																x			
Lobelia sp.								x											
Lomandra brittanii						x						x	x	x	x	x	x	x	x
Lomandra caespitosa		x	x	x		x					x		x		x	x	x	x	x
Lomandra drummondii											x		x		x	x	x	x	x
Lomandra hermaphrodita	x	x	x	x		x				x	x	x	x	x	x	x	x	x	x
Lomandra integra	x	x	x				x		x		x		x		x	x	x	x	x
Lomandra micrantha		x	x			x						x	x		x	x	x	x	x
Lomandra micrantha subsp. *micrantha*																			x
Lomandra nigricans			x										x	x	x	x	x	x	x
Lomandra odora											x		x		x	x	x	x	x
Lomandra preissii		x	x			x				x		x	x	x	x	x	x	x	x
Lomandra purpurea													x		x	x	x		x

APPENDIX H: SUMMARY OF SPECIES IN THE VEGETATION PLOTS WITHIN MYARA NORTH AND THE NEARBY MYARA NORTH REGION

Note: * denotes intrdouced species and P3 nd P4 denote Priority Flora species.

Species	A	AC	D	D/DA	DA	E	C	CW	W	PW	SW	P	PS	PT	S	SP	ST	T	TS
Lomandra sericea													x	x	x			x	x
Lomandra sonderi		x	x	x						x	x	x	x		x	x	x	x	x
Lomandra sp.	x		x			x	x					x	x		x	x	x	x	x
Lomandra sp.1																x			
Lomandra spartea	x		x		x	x				x		x	x		x	x	x	x	x
Loxocarya cinerea			x					x				x	x		x	x	x	x	x
Lyperanthus serratus																x			
Macrozamia riedlei		x	x	x			x	x	x	x		x	x		x	x	x	x	x
Marianthus drummondianus																			x
Melaleuca incana	x	x																	
Melaleuca parviceps					x														
Melaleuca preissiana	x	x																	
Melaleuca viminea	x																		
Mesomelaena graciliceps											x				x				
Mesomelaena stygia	x																		
Mesomelaena tetragona	x		x																
Microtis media	x	x					x		x								x		x
Millotia tenuifolia				x	x								x		x		x	x	x
Mirbelia dilatata						x		x			x				x	x		x	x
Monotaxis grandiflora			x										x		x	x	x		x
Monotaxis grandiflora var. *grandiflora*												x	x		x	x			
Monotaxis occidentalis													x		x	x	x		x
Neurachne alopecuroidea	x		x	x	x	x	x	x			x		x		x	x	x	x	x
Olax benthamiana																	x		x
Opercularia apiciflora											x		x	x	x	x	x	x	x
Opercularia echinocephala	x		x	x		x		x			x	x	x	x	x	x	x	x	x
Opercularia hispidula																	x	x	x
Opercularia sp.								x								x			

APPENDIX H: SUMMARY OF SPECIES IN THE VEGETATION PLOTS WITHIN MYARA NORTH AND THE NEARBY MYARA NORTH REGION

Note: * denotes intrdouced species and P3 nd P4 denote Priority Flora species.

Species	A	AC	D	D/DA	DA	E	C	CW	W	PW	SW	P	PS	PT	S	SP	ST	T	TS
Opercularia vaginata													x						
Operculina aequisepala													x						
Orchidaceae sp.										x									x
Orchidaceae sp. 1																			x
Orchidaceae sp. 2					x														
Orianthera serpyllifolia													x		x			x	x
Paraserianthes lophantha							x												
Paspalidium sp.?																x			
Patersonia babianoides			x	x		x			x		x	x	x		x	x		x	x
Patersonia juncea	x												x						
Patersonia occidentalis	x	x	x	x	x	x				x		x	x		x	x	x	x	x
Patersonia pygmaea	x				x	x					x		x		x	x		x	x
Patersonia rudis						x						x	x		x	x	x		
Pentapeltis peltigera		x	x	x		x		x		x	x	x	x	x	x	x	x	x	x
Pericalymma ellipticum	x				x	x						x	x						
Persoonia elliptica															x	x	x		x
Persoonia longifolia		x	x								x	x	x	x	x	x	x	x	x
Persoonia sp.													x						
Petrophile macrostachya													x						
Pheladenia deformis			x																
Philotheca spicata				x		x				x					x				
Philydrella drummondii	x																		
Philydrella pygmaea	x																		
Phyllangium paradoxum		x																x	
Phyllanthus calycinus			x		x					x	x	x	x	x	x	x	x	x	x
Pimelea ciliata					x	x							x		x		x	x	x
Pimelea lehmanniana																x			
Pimelea sp.					x														

APPENDIX H: SUMMARY OF SPECIES IN THE VEGETATION PLOTS WITHIN MYARA NORTH AND THE NEARBY MYARA NORTH REGION

Note: * denotes intrdouced species and P3 nd P4 denote Priority Flora species.

Species	A	AC	D	D/DA	DA	E	C	CW	W	PW	SW	P	PS	PT	S	SP	ST	T	TS
Pimelea suaveolens			x	x	x	x							x		x	x	x	x	x
Platysace commutata			x			x						x	x		x	x	x		x
Platysace compressa			x										x		x	x	x	x	x
Platysace filiformis													x		x				
Platysace tenuissima													x	x	x	x	x	x	x
Poaceae sp.																	x		x
Podolepis capillaris	x																		
Podotheca angustifolia				x									x						
Podotheca gnaphalioides					x														
Poranthera microphylla													x		x	x			
Prasophyllum brownii																	x	x	x
Prasophyllum elatum																x			x
Prasophyllum sp.																x			
Prasophyllum sp.1															x	x			
Pseudognaphalium luteoalbum													x					x	
Pteridium esculentum		x					x	x	x				x		x	x	x	x	x
Pterochaeta paniculata												x	x		x				
Pterostylis barbata															x			x	
Pterostylis pyramidalis		x	x								x		x		x	x	x	x	x
Pterostylis recurva									x		x		x	x	x		x		x
Pterostylis sp.			x									x							
Pterostylis sp. 1																x			x
Pterostylis vittata			x										x		x	x	x	x	x
Ptilotus drummondii													x		x				
Ptilotus drummondii var. *drummondii*													x						
Ptilotus manglesii					x						x	x	x			x			x
Pyrorchis nigricans			x										x		x	x			x
Ranunculus colonorum													x		x			x	x

APPENDIX H: SUMMARY OF SPECIES IN THE VEGETATION PLOTS WITHIN MYARA NORTH AND THE NEARBY MYARA NORTH REGION

Note: * denotes intrdouced species and P3 nd P4 denote Priority Flora species.

Species	A	AC	D	D/DA	DA	E	C	CW	W	PW	SW	P	PS	PT	S	SP	ST	T	TS
Restionaceae sp.					x														
Rytidosperma acerosum																	x		
Rytidosperma caespitosum	x	x				x						x	x		x	x	x		x
Rytidosperma setaceum															x				
Rytidosperma sp.						x													
Scaevola calliptera		x	x		x	x				x	x	x	x	x	x	x	x	x	x
Scaevola pilosa	x																	x	x
Scaevola sp.			x																x
Senecio diaschides		x		x											x		x		x
Senecio hispidulus													x		x		x	x	x
Senecio quadridentatus																			x
Senecio sp.	x			x													x		
Senecio sp.1				x															
Sowerbaea laxiflora	x		x										x		x	x			x
Sphaerolobium linophyllum											x		x		x				
Sphaerolobium macranthum						x													
Sphaerolobium medium			x			x							x		x				x
Sphaerolobium sp.						x									x	x			
Stachystemon vermicularis															x	x			
Stackhousia monogyna															x				x
Stirlingia latifolia												x							
Stylidium amoenum			x							x		x	x		x	x	x	x	x
Stylidium androsaceum													x		x		x		x
Stylidium brunonianum						x													
Stylidium bulbiferum										x			x		x				
Stylidium calcaratum	x		x										x		x	x	x	x	x
Stylidium ciliatum						x				x			x		x				

APPENDIX H: SUMMARY OF SPECIES IN THE VEGETATION PLOTS WITHIN MYARA NORTH AND THE NEARBY MYARA NORTH REGION

Note: * denotes intrdouced species and P3 nd P4 denote Priority Flora species.

Species	A	AC	D	D/DA	DA	E	C	CW	W	PW	SW	P	PS	PT	S	SP	ST	T	TS
Stylidium crassifolium	x	x																	
Stylidium hirsutum															x	x			
Stylidium junceum													x		x				
Stylidium lateriticola													x		x	x	x		x
Stylidium lineatum										x									
Stylidium piliferum			x	x	x					x		x	x		x	x	x	x	x
Stylidium recurvum	x																		
Stylidium repens					x										x				
Stylidium rhynchocarpum																			x
Stylidium scariosum													x		x				
Stylidium schoenoides		x									x		x	x	x	x	x	x	x
Stylidium sp.	x											x				x			
Stylidium sp. 1																x			
Stylidium spathulatum	x	x																	
Stylidium thesioides	x	x																	
Stylidium hispidum					x						x		x		x	x	x		x
Styphelia discolor	x		x			x									x		x	x	x
Styphelia erubescens																		x	
Styphelia hispida													x						
Styphelia nitens	x		x							x	x		x		x	x	x	x	x
Styphelia pallida		x											x		x	x		x	x
Styphelia propinqua			x			x		x		x	x		x		x	x	x	x	x
Styphelia tenuiflora				x		x					x		x		x	x	x	x	x
Synaphea sp.						x													
Taxandria linearifolia	x	x					x	x	x						x				
Tetraria capillaris		x	x			x			x		x	x	x	x	x	x	x	x	x
Tetraria octandra	x		x	x	x	x		x			x	x	x		x	x	x		x
Tetraria sp. Jarrah Forest (R. Davis 7391)			x	x	x	x				x		x	x		x	x	x	x	x

APPENDIX H: SUMMARY OF SPECIES IN THE VEGETATION PLOTS WITHIN MYARA NORTH AND THE NEARBY MYARA NORTH REGION

Note: * denotes intrdouced species and P3 nd P4 denote Priority Flora species.

Species	A	AC	D	D/DA	DA	E	C	CW	W	PW	SW	P	PS	PT	S	SP	ST	T	TS
Tetrarrhena laevis	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Tetratheca hirsuta		x	x							x			x	x	x	x	x	x	x
Thelymitra antennifera	x	x							x										
Thelymitra crinita			x				x	x			x		x	x	x	x	x	x	x
Thelymitra macrophylla		x	x										x	x	x	x	x	x	x
Thelymitra sp.								x		x			x		x	x			
Thomasia paniculata	x	x					x	x	x							x			
Thomasia pauciflora																			x
Thysanotus ? scaber													x						
Thysanotus dichotomus												x	x		x	x	x	x	x
Thysanotus fastigiatus					x					x			x		x	x	x		x
Thysanotus gracilis		x																	
Thysanotus manglesianus	x												x		x		x		x
Thysanotus multiflorus			x	x	x	x		x		x	x	x	x	x	x	x	x	x	x
Thysanotus patersonii																x			x
Thysanotus sp.												x			x			x	x
Thysanotus sp.1				x	x								x		x	x			
Thysanotus sparteus																x			
Thysanotus tenellus		x											x		x			x	x
Thysanotus thyrsoideus	x	x	x								x	x	x	x	x	x	x	x	x
Trachymene pilosa		x	x	x	x						x	x	x	x	x		x	x	x
Trichocline spathulata	x		x		x					x		x	x	x	x	x	x	x	x
Tricoryne elatior	x	x	x					x			x		x		x	x	x		x
Tricoryne humilis	x		x								x		x		x	x			
Tripterococcus brunonis	x				x								x		x	x			
Trymalium ledifolium		x	x		x					x		x	x	x	x	x	x	x	x
Trymalium odoratissimum						x									x				
Trymalium odoratissimum subsp. *odoratissimum*															x				x

APPENDIX H: SUMMARY OF SPECIES IN THE VEGETATION PLOTS WITHIN MYARA NORTH AND THE NEARBY MYARA NORTH REGION

Note: * denotes intrdouced species and P3 nd P4 denote Priority Flora species.

Species	A	AC	D	D/DA	DA	E	C	CW	W	PW	SW	P	PS	PT	S	SP	ST	T	TS
Trymalium spatulatum			x																
Utricularia multifida	x																		
Viminaria juncea	x																		
Wahlenbergia preissii																	x	x	
Wurmbea dioica																			x
Xanthorrhoea gracilis	x		x	x				x		x	x	x	x		x	x	x	x	x
Xanthorrhoea preissii	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x
Xanthosia atkinsoniana			x					x			x	x	x		x	x	x	x	x
Xanthosia candida		x	x		x	x					x	x	x		x	x	x	x	x
Xanthosia ciliata			x																
Xanthosia huegelii	x		x	x	x	x					x		x		x	x	x		x
Xanthosia singuliflora													x						
Xylomelum occidentale			x	x															

APPENDIX I: SUMMARY OF VASCULAR PLANT SPECIES BY RECORDING SITES IN MYARA NORTH SURVEY AREA

Note: * denotes introduced species, P3 denotes Priority 3 species.

		Site-vegetation Types based on recording sites																				
	Species	A	AC	AD	AW	D	DA	DG	E	G	R	CW	W	SW	PW	P	PJ	PS	PT	SP	S	ST	T	TS
*	*Acacia longifolia*			2		1	1					1				1		1			1			
*	*Acacia longifolia* subsp. *longifolia*		1	1																				
*	*Briza minor*									1	1													
*	*Hypochaeris glabra*		2	2		1	3			7	3			3	2	2		2	1		6	1	1	1
*	*Lavandula stoechas*																				1			
*	*Leptospermum laevigatum*																				2			
*	*Lysimachia arvensis*									3	3	1		1									1	
*	*Oxalis pes-caprae*										1													
*	*Pinus pinaster*						1	1				1				1							1	2
*	*Erigeron* sp.																				1			1
*	*Solanum nigrum*																				2	2		
*	*Ursinia anthemoides*			1						5														
*	*Watsonia meriana*											2						1						
^	*Eucalyptus* sp.						1						1		2	1	1							
	Acacia alata	3	27	17	1	20	7	5	5	2	11	28	9	4	7	21		24	8	3	33	9	2	4
	Acacia alata var. *alata*		2			1										3		4	2	2	6	1		1
	Acacia applanata		1	1		5	1		4		2				1	7		3			3			
	Acacia barbinervis					9	2	1	1					1	12	35		60	1	3	26			
	Acacia barbinervis subsp. *barbinervis*		1													2		4			2			
	Acacia browniana			1		2			1					1	3	5		6	1	1	3			
	Acacia browniana ?var. *endlicheri*					2								1		1		3			1			
	Acacia browniana var. *intermedia*					1										2		2						
	Acacia browniana var. *obscura*										1			1							1			
	Acacia celastrifolia					2	2	1		5	1		1	1		9	4	5	1	2	5	1		
	Acacia divergens		19	3	1				1			8		1		1								
P3	*Acacia drummondii* subsp. *affinis*					1												1			1			
	Acacia drummondii subsp. *candolleana*		1			4	1				7		1	2		9	2	23	2	1	53	23	6	5
	Acacia drummondii subsp. *drummondii*					1					1				2	10		9	3	3	4	8	1	4
	Acacia ephedroides										1													
	Acacia gemina							1			1													
	Acacia incurva	3	10	12		3		1						1		1		4		2	2	3		
	Acacia lateriticola					4					1					2	1				9	2	1	3
	Acacia mutlispicata									1														

APPENDIX I: SUMMARY OF VASCULAR PLANT SPECIES BY RECORDING SITES IN MYARA NORTH SURVEY AREA

Note: * denotes introduced species, P3 denotes Priority 3 species.

	Site-vegetation Types based on recording sites																					
Species	A	AC	AD	AW	D	DA	DG	E	G	R	CW	W	SW	PW	P	PJ	PS	PT	SP	S	ST	T	TS
Acacia nervosa			1		3	3	2	3	1					4	13		15	1		2			
Acacia obovata					2																		
Acacia oncinophylla							1		3														
Acacia pulchella	4	10	16	1	120	16	4	2	28	62	7	25	54	40	120	2	316	54	60	412	147	50	70
Acacia pulchella var. *glaberrima*									1								2			1	1	1	1
Acacia saligna	9	6	4						1								1	1		2			
Acacia sp.		2	1		1							1			2		3					1	
Acacia stenoptera	4	2	2		4		1	1						2	3					1	1		
Acacia trigonophylla								1							2		1			3			
Acacia urophylla			3		55	1	3	1	3	25		8	35	17	64		151	34	51	384	144	69	102
Acacia willdenowiana		2	5		8	4		3				1		3	17		8		1	4			
Acaena echinata					1						1												
Adenanthos barbiger	1		5		76	5	1	11	1	6		2	35	102	420	6	990	78	101	519	132	23	64
Adenanthos meisneri					1					1													
Adenanthos obovatus		3	9		3									1	2		6		1		1	1	
Adiantum aethiopicum											2												
Agrostocrinum hirsutum	1	1			2												4	1		3	3	2	3
Allocasuarina fraseriana	1	12	18		93	16	6	18	6	15	11	11	16	167	698	10	1264	136	107	153	29	5	16
Allocasuarina humilis		1	1		10	3	2	3	9	5					17		3						
Allocasuarina microstachya	1								1														
Amphipogon amphipogonoides			3		9				7	4		4	5	3	8		23	2	3	32	13	4	10
Amphipogon laguroides subsp. *laguroides*			1																				
Amphipogon laguroides			1																				
Andersonia aristata									1						1								
Andersonia lehmanniana	2	6	14		4	3	1	2	3	5			2		1					1			
Andersonia lehmanniana subsp. *lehmanniana*	2		16		7	3	3		3	3					5		1						
Anigozanthos manglesii					2																		
Anigozanthos sp.					8								1		6		7			2			
Aotus gracillima		1																					
Asparagaceae sp.							1											1		1	1		
Astartea leptophylla											1												
Astartea scoparia	10	71	34	1	3	11	3	2	5	1	23												
Asteraceae sp.	1		1		4		1		3	2	1	2	4	2	11		8		5	11			1
Asterolasia pallida									11	6	1	1	3				1			11	3	1	1

APPENDIX I: SUMMARY OF VASCULAR PLANT SPECIES BY RECORDING SITES IN MYARA NORTH SURVEY AREA

Note: * denotes introduced species, P3 denotes Priority 3 species.

	Site-vegetation Types based on recording sites																						
Species	A	AC	AD	AW	D	DA	DG	E	G	R	CW	W	SW	PW	P	PJ	PS	PT	SP	S	ST	T	TS
Austrostipa sp.									1	1													
Babingtonia camphorosmae	6	11	29		57	15	12	9	13	15	1	2	9	26	21	2	9		1	3		1	
Banksia armata								1		1													
Banksia bipinnatifida					5			2						4	1		1			3			
Banksia bipinnatifida subsp. bipinnatifida					5	1	1	1					1	1	4		1	1		1			
Banksia dallanneyi subsp. dallanneyi var. dallanneyi	15	57	105	1	284	71	26	28	15	54	5	23	96	154	453	8	600	33	74	447	71	22	20
Banksia grandis	2	10	28		118	23	6	7	1	10	11	11	56	90	198	5	1318	119	158	719	236	59	163
Banksia littoralis	8	43	45		4	29		4			22	3			4	1	5			2		1	
Banksia seminuda		1																		2			
Banksia sessilis			4		14			1	6	7		3	6	19	87	1	69	3	9	93	6	4	4
Banksia sphaerocarpha						1	1			1					2								
Banksia squarrosa					2			1	2	1					2								
Banksia squarrosa subsp. squarrosa							1			1													
Banksia undata var. undata									3	1					1		1						
Banskia undata									1														
Baumea vaginalis		2									1												
Billardiera fusiformis			1			1			1	1		1	1				3			8		1	1
Billardiera heterophylla		1			1												1			2			
Billardiera sp.		1													1		3			2	1		
Boronia crenulata			1					1			1			2	4		11	2		7			3
Boronia crenulata subsp. pubescens					1																		
Boronia fastigiata	3	14	16	1	61	12	2	2	1	15	5	8	36	50	163		483	76	75	408	102	30	92
Boronia molloyae		1															1						
Boronia scabra subsp. scabra					1			1						5	7		1		1	3			
Boronia sp.			2										1		3				1	1			
Borya sphaerocephala					1				20	2					1								
Bossiaea aquifolium					9			1	2	7	5	4	8	1	5	1	55	5	11	110	47	3	19
Bossiaea eriocarpa																	1						
Bossiaea ornata		7	12		198	15	9	16	4	29	1	9	48	103	460	4	740	47	93	517	81	23	51
Bossiaea pulchella			1		4			2			1		1	8	39		73	2	10	22	3		1
Burchardia congesta					3		1		5	5		1	3	1	4		5	3		8	1	3	5
Burchardia multiflora			1						2	1		1			1					1	5		
Burchardia sp.					2									1									
Caesia micrantha																					1		
Caladenia flava					4	1			6	4	1		1				3	2	1	6	9	4	10

APPENDIX I: SUMMARY OF VASCULAR PLANT SPECIES BY RECORDING SITES IN MYARA NORTH SURVEY AREA

Note: * denotes introduced species, P3 denotes Priority 3 species.

	Site-vegetation Types based on recording sites																					
Species	A	AC	AD	AW	D	DA	DG	E	G	R	CW	W	SW	PW	P	PJ	PS	PT	SP	S	ST	T	TS
Caladenia reptans		1			2				4	1				1	1		8			6	1		1
Caladenia reptans subsp. reptans															1								
Caladenia sp.	1		1		6	2	1		1	2	1		3	6	9		20		4	7	8	3	5
Callistachys lanceolata					1						1				1								
Callitris pyramidalis					1										1								
Calothamnus lateralis		3																					
Calothamnus quadrifidus															2								
Calothamnus rupestris					2				4	2									1				
Calothamnus sanguineus			3		4	3		7	3	1				1	20		3			2			
Calothamnus *sp.*														1	1		1						
Calytrix ?depressa									3	3													
Calytrix flavescens						1			3	1	1												
Calytrix sp.	2	2	6		11	5	4	2	9	8		2	1		5		1		1	5	1		
Calytrix variabilis					1				1								1		1				
Cassytha glabella			1																				
Cassytha sp.	1	6	7	1	10	2	1		2	3	6	5		1	4		4			5	3	3	5
Centella asiatica			1							1													
Centrolepis aristata									3	3													
Chaetanthus leptocarpoides		1									1												
Chaetanthus tenellus		1																					
Chamaescilla corymbosa	6	9	24		94	17	4	11	12	12	2	7	34	67	237	2	284	10	25	186	38	6	10
Cheilanthes austrotenuifolia									3	1													
Cheilanthes sieberi									2														
Chelianthes sp.						1			14	3	1									1	1		1
Chorizandra enodis		1	1																				
Chorizema cordatum	1				2						1	3	2	3	1		10		2	7	1	3	1
Chorizema dicksonii					2										1								
Clematis pubescens	3	2	1		6	1			1	18	5	12	7	2	3		45	117	9	27	243	130	161
Comesperma ?virgatum		3	5		4				1	1			1		1		1	1		7			
Comesperma sp.			1				1										1		1				
Comesperma virgatum			2		10	3	2		2	2			1	4	25	3	21	2	1	8	1		
Conospermum canaliculatum subsp*. canaliculatum*					1					1													
Conospermum capitatum		1			4	1				1					13	1	6						
Conospermum sp.										1			1		2		6			7			
Conospermum stoechadis					5	3								1	9	1	8		1	2			

APPENDIX I: SUMMARY OF VASCULAR PLANT SPECIES BY RECORDING SITES IN MYARA NORTH SURVEY AREA

Note: * denotes introduced species, P3 denotes Priority 3 species.

	Site-vegetation Types based on recording sites																					
Species	A	AC	AD	AW	D	DA	DG	E	G	R	CW	W	SW	PW	P	PJ	PS	PT	SP	S	ST	T	TS
Conospermum stoechadis subsp. *sclerophyllum*			1																				
Conospermum capitatum subsp. *glabratum*		1	5		1	2								1			1						
Conostylis ?caricina subsp. *caricina*					1																		
Conostylis aculeata			7		1															2			
Conostylis pusilla	2	7	19		49	12	7	7	12	9		1	4	22	93	3	44		7	37	1		336
Conostylis serrulata		8	32		51	5	3	3	1	8	1	2	16	26	119	3	224	10	18	87	8	3	9
Conostylis setigera		7	12		82	15	1	7	3	15	1	6	28	65	269	2	391	20	50	219	19	8	6
Conostylis setigera subsp. *setigera*		1											1					2		1	1		1
Conostylis setosa		6	3		64	9	4	10		10	1	4	28	49	160	1	250	28	31	149	15	6	18
Conostylis sp.			2		1		1			1		2		2	7		5			3	1		1
Corymbia calophylla	14	77	125	1	363	78	31	35	74	120	47	42	132	157	545	6	846	117	136	1050	277	131	193
Corymbia maculata														1	1								
Craspedia variablis	1	2	7		49	5			2	7	2	2	20	10	19		30	6	2	62	7	4	6
Cryptandra arbutiflora subsp. *tubulosa*						1																	
Cryptandra mutila					1		1																
Cryptandra myriantha									2														
Cryptandra sp.										1													
Cryptostylis sp.																	1	1					2
Cyanicula sericea																	1						
Cyathochaeta avenacea	1	16	18		73	18	7	12	2	15	10	5	18	58	274	7	345	12	48	142	28	15	15
Cyperaceae sp.	1	2	4		6	1	1	3		1			1	3	4		1	1		6	4	6	8
Dampiera alata		6	9		9	1	2	2	1	1	4	1	1	3	12		26	5	5	22	4	1	
Dampiera linearis		3	11		39	7	3	5		2	3		6	14	83		104	3	11	40	5	7	3
Dampiera sp.														1			1						
Darwinia citriodora		1							2		3	2	1	1									
Darwinia sp.														1									
Dasypogon bromeliifolius	3	16	35		10	1							2	1	2		1			2			
Daviesia cordata										2			1		1		1			3	2		
Daviesia decurrens		2	4		23	2	3	3		1			1	9	61		47	1	9	35	2		1
Daviesia horrida		5	8		2	1	2		7	3	1			1	1		1		1	2	1	1	
Daviesia incrassata		1									1				1		1		1	5			
Daviesia preissii					17	4	3	1		4		1	5	7	38	2	60	2	5	47	1		1
Daviesia rhombifolia					2								2	2	4		9			1			
Daviesia sp.			1																				
Dayspogon bromeliifolius		5	11		2											2	1			2			

APPENDIX I: SUMMARY OF VASCULAR PLANT SPECIES BY RECORDING SITES IN MYARA NORTH SURVEY AREA

Note: * denotes introduced species, P3 denotes Priority 3 species.

	Site-vegetation Types based on recording sites																						
Species	A	AC	AD	AW	D	DA	DG	E	G	R	CW	W	SW	PW	P	PJ	PS	PT	SP	S	ST	T	TS
Desmocladus fasciculatus	7	29	100		127	33	11	12	5	12	1	6	21	23	60	4	65	5	11	70	7	6	7
Desmocladus flexuosus	1	5	13		39	7		3	1	1	1	3	14	26	124	5	237	17	32	136	15	4	18
Dianella revoluta					8	1			1	2		1		6	20		46	9	6	19	5		
Dillwynia laxiflora															1								
Diuris longifolia									1														
Diuris sp.									1					1	1								
Dodonaea ceratocarpa									11	1													
Drosera erythrorhiza	1	1	3		9			2	4	4		1	3	2	15		16		2	10	2		1
Drosera macrantha					1				6	1			1				2			5	1	1	4
Drosera sp.	23	55	102		203	45	20	20	53	44	9	16	80	108	379	5	565	47	76	509	111	29	58
Drosera sp. (climbing)			4		4		1	1		1		2	3	13	21	1	31	3	7	14	6		6
Drosera sp. 1					1	1			2				1	1	1		4			2			
Drosera sp. 2			1		2	1			1				1	1	2		7	1		5	1		
Drosera stolonifera					5				4	3		1		1	3		22		1	9	2	2	3
Elythranthera brunonis									3						1								
Eriachne sp.																							1
Ericaceae sp.	1	1	1		3					1				1	2		4	1		6	1	4	1
Eucalyptus drummondii							2																
Eucalyptus marginata	11	72	125		421	87	28	38	67	128	43	55	148	210	790	12	1359	158	181	1210	336	151	223
Eucalyptus megacarpa		8	2	1	1			2			12	15	1	2	6		9		2	4	4		3
Eucalyptus patens	13	78	61	1	55	28	9	5	12	8	47	39		4	16		3		3	2	4	12	3
Eucalyptus rudis	6	9	3			2		4			6	1			1								
Eucalyptus sp.			1		1																		
Fabaceae sp.	1														1		1			2			
Gahnia aristata					1				2			1			2		2		1				
Gahnia decomposita	1	25	5			4		1			18	1									1		
*Galium ?*sp.										1								1					
Gastrolobium bilobum									1	1					1					1			
Gastrolobium calycinum					3					1					3		3		1	6			
Gastrolobium retusum						1																	
Gastrolobium sp.			1																				
Gastrolobium spinosum			2		22	6	6	3	22	23	3		4	6	26		10		5	33	13	7	4
Gastrolobium villosum					14		4	15	15	15		3	2	6	29		8		4	9			1
Glischrocaryon aureum					4	1			1	1				2	2		8	1	1	2	1		

APPENDIX I: SUMMARY OF VASCULAR PLANT SPECIES BY RECORDING SITES IN MYARA NORTH SURVEY AREA

Note: * denotes introduced species, P3 denotes Priority 3 species.

	Site-vegetation Types based on recording sites																					
Species	A	AC	AD	AW	D	DA	DG	E	G	R	CW	W	SW	PW	P	PJ	PS	PT	SP	S	ST	T	TS
Glishrocaryon sp.										1													
Gompholobium capitatum																				1			
Gompholobium cyaninum			3		40	3	5	3	2	9		1	3	13	69	1	27	2	7	32		1	1
Gompholobium knightianum			6		43	5		19	3	10	1	1	7	45	238	3	291	5	14	86	7	2	
Gompholobium marginatum	10	40	70		150	45	14	15	9	19	5	19	47	43	121	2	116	7	19	144	20	12	16
Gompholobium polymorphum		2	5		10	4	1	2		3		2	2	6	21		26	4	5	30	2	2	2
Gompholobium preissii																	1						
Gompholobium scabrum		1	1		1	1							1							2			
Gompholobium sp.					1					1					2		5	3		5			
Gompholobium tomentosum			6		13	2	2		9	1		1		1	5	1	18		6	18	2		
Goodenia pulchella									2	1													
Goodeniaceae sp.					4				1					4	9	1	11		1	4			
Grevillea bipinnatifida		5	5		5	2	30	4	33	29	1	3	4	7	33	1	11			2	1	1	
Grevillea diversifolia	1								4	5	2	2								2			
Grevillea diversifolia subsp. *diversifolia*		2			3						5	2										1	
Grevillea manglesii subsp. *manglesii*			1						2														
Grevillea monticola					1					2													
Grevillea pulchella	1		4		39	8	1	10	7	13	2	3	6	19	62		36	1	8	29	5		1
Grevillea pulchella subsp. ascendens		1	2		30	3	6	7	5	14	1		1	7	44		20		4	13	2		1
Grevillea quercifolia					1										1	1							
Grevillea sp.													1		1								
Grevillea wilsonii		2	1		38	5	5	18	2	11	1	4	4	108	484	4	563	28	94	14	9		4
Grevillea bipinnatifida							1			4													
Grevillea quercifolia							1														1		
Haemodorum laxum					2			1	1	1					4				1				
Haemodorum sp.		1	3		14	3		1	1	1				4	23		17		1	8			
Haemodorum spicatum																	1						
Hakea amplexicaulis		3	3							4				1	5		4	1		13	2		
Hakea ceratophylla	11	1	3												1				1				
Hakea cyclocarpa			2		8				3	2			1	2	19	1	14	2	3	6	1		
Hakea gilbertii			1		1						1				1								
Hakea incrassata		1						1					1	2						1			
Hakea lissocarpha	2	10	21		139	21	15	18	16	49	8	17	57	38	77		62	5	6	227	43	16	23
Hakea marginata											1												
Hakea petiolaris									2	2													

APPENDIX I: SUMMARY OF VASCULAR PLANT SPECIES BY RECORDING SITES IN MYARA NORTH SURVEY AREA

Note: * denotes introduced species, P3 denotes Priority 3 species.

	Site-vegetation Types based on recording sites																					
Species	A	AC	AD	AW	D	DA	DG	E	G	R	CW	W	SW	PW	P	PJ	PS	PT	SP	S	ST	T	TS
Hakea petiolaris subsp. *petiolaris*					1																		
Hakea prostrata	7	7	18		14	23	2		2	2				1	3		2		1				
Hakea ruscifolia		2			38	5	6	5	2	11			10	19	77	2	95	1	8	46	9	1	5
Hakea sp.	1								3						1					1			
Hakea stenoptera					3			1							7		2						
Hakea sulcata			1																				
Hakea trifurcata	1	4	3	1	5	2	1		13	3					1					3			
Hakea trisperma								1															
Hakea undulata	1	3	5		11	2	9	12	27	29	1	2	2	5	19		4			7	1		
Hardenbergia comptoniana															3		1		1	5	1		
Hemiandra pungens			1		10	3	2		1	2				1	22	1	8		1	2			
Hemiandra sp.					3	1			1	1			2	1	6	1	1						
Hemigenia incana					1		2		4				1										
Hemigenia pritzelii	1	7	6		17	5	1	1	1	4		2	2	7	35		11	1	1	10	3	1	2
Hemigenia sp.							1										2		1				
Hibbertia acerosa		4	3		13	7	3	2	1			2	25	22	46		55	14	4	73	23	5	10
Hibbertia amplexicaulis	1	8	11		86	18	7	6	4	23	3	14	68	52	124		338	70	71	486	134	61	116
Hibbertia commutata	3	4	11		150	21	12	10	20	51	4	18	84	97	361	4	787	91	119	623	190	64	121
Hibbertia huegelii		1	10		8	2	1					1	11	12	36		73	5	7	92	4		1
Hibbertia hypericoides		4	21		193	19	9	19	10	32		7	20	45	211	3	210	6	27	207	16	17	6
Hibbertia lasiopus															1		5	1		3			
Hibbertia perfoliata		7	7		46	6	1	1	4	18	4	8	20	13	56	1	119	18	7	131	72	28	37
Hibbertia quadricolor										1			2	1	2		4		2	1			
Hibbertia silvestris													1					1					
Hibbertia sp.		2	2		1	1						1	1	1	4		9			6	6		1
Hibbertia stellaris		2	7			2																	
Hovea chorizemifolia	1		5		32	1	2	1	1	9	1	3	14	27	100		280	40	35	225	42	10	28
Hovea elliptica		1			7	3		1				3	1		1		3	1	1	10	2		3
Hovea sp.					4										2		3			1			1
Hovea trisperma	2	4	16		52	3	2	7	3	14		2	8	17	58	3	103	6	8	62	18	9	12
Hovea trisperma var. *grandiflora*			1		3			1		1		1	1	5	6		22	9	1	11	3	4	8
Hyalosperma cotula			1						2														
Hybanthus floribundus			1		1			3	1		1	1	1	2	8		6			4	1		
Hypocalymma angustifolium	31	85	132	1	138	62	25	21	46	49	18	21	145	198	59	1	64	6	11	26	20	22	12
Hypocalymma cordifolium		2	1		2	1	2		1				1	2	9		9	1	2	2			

APPENDIX I: SUMMARY OF VASCULAR PLANT SPECIES BY RECORDING SITES IN MYARA NORTH SURVEY AREA

Note: * denotes introduced species, P3 denotes Priority 3 species.

	Site-vegetation Types based on recording sites																					
Species	A	AC	AD	AW	D	DA	DG	E	G	R	CW	W	SW	PW	P	PJ	PS	PT	SP	S	ST	T	TS
Hypocalymma robustum		7	9		2	1		3					1	1	4		2			4			
Hypolaena exsulca	8	35	59		27	9	1	2	2		2	3	1	4	8	1	8			2		1	173
Iridaceae sp.		2																					
Isolepis cernua			1																				
Isopogon dubius					2				1	1							6		2	1			
Isotropis cuneifolia subsp. *cuneifolia*																				2			
Jacksonia furcellata		1	7		2					1							1			2			
Johnsonia lupulina					2		1	1						2	7	1	7			4			
Juncus sp.											1												1
Kennedia coccinea		2	7		116	8	4	8	2	22	2	9	25	43	277	2	516	28	64	391	101	41	55
Kennedia prostrata	4	21	45		98	27	7	4	9	10	2	9	24	29	57	2	110	6	13	101	15	16	9
Kennedia sp.					2																		
Kingia australis	1	1						43	2	1							2			1			
Kunzea ?micrantha subsp. *micrantha*																		1					
Kunzea micrantha		1																					
Kunzea recurva	1	10	8		27	6	5	2	11	5	2	2	2	4	11		8		2	8	1	1	
Kunzea sp.					1	1	1								3		1			1			
Labichea punctata					2					1					2		6			2			1
Lagenophora huegelii	8	16	27		113	21	4	1	14	33	14	20	73	50	90	1	156	57	48	417	191	93	118
Lasiopetalum floribundum		10	2		29	2	3	4	6	18	15	17	33	50	174	3	392	79	49	432	216	88	163
Lasiopetalum glabratum			1		17		2	8		6			2	12	63		58		11	18			2
Lasiopetalum sp.			1		1					2				1	7		11		1	1			
Laxmannia sessiliflora									1	1													
Laxmannia sessiliflora ? subsp. australis					1																		
Laxmannia sp.			1		1				2	3				2	4	1							
Laxmannia squarrosa					3					1													
Lechenaultia biloba		6	19		69	9	6	9	2	14		5	23	29	149		204	16	35	120	20	6	8
Lepdosperma gracile													1	2	1		4						
Lepidobolus preissianus									1														
Lepidosperma asperatum sens. lat.		1	4		2	1				3				1	6		1						
Lepidosperma gracile sens. lat.					1					1							2	1					
Lepidosperma leptostachyum			1																				
Lepidosperma longitudinale sens. lat.	1	2	1				1				1												
Lepidosperma pubisquameum sens. lat.	1	1	5		13	1	2	1					3	3	10	1	21		1	6	1		
Lepidosperma sp.	12	23	42	1	60	13	4	5	9	9	3	5	13	33	129	2	218	12	15	118	8	2	10

APPENDIX I: SUMMARY OF VASCULAR PLANT SPECIES BY RECORDING SITES IN MYARA NORTH SURVEY AREA

Note: * denotes introduced species, P3 denotes Priority 3 species.

	Site-vegetation Types based on recording sites																					
Species	A	AC	AD	AW	D	DA	DG	E	G	R	CW	W	SW	PW	P	PJ	PS	PT	SP	S	ST	T	TS
Lepidosperma sp. (flat)					1										1		1		1				
Lepidosperma sp. (terete)															1		1		2				
Lepidosperma squamatum sens. lat.	3	13	24		58	9	6	9	3	8	1		5	15	95	2	108	4	7	41			2
Lepidosperma tenue	1		6		6	2			1	3				2	4		2	1	1	3	1		
Lepidosperma tetraquetrum	1	11			2					1	15	3										1	
Leptocarpus coangustatus											1				1								
Leptocarpus scariosus		2									4												
Leptomeria cunninghamii	1	1	5		8	4		2	4	5			8	6	11		26	2	2	29	4	1	3
Leptospermum erubescens	5	2	3		32	14	6	4	15	21	1	1	5	13	76		25	1	6	7			
Lepyrodia macra		2	1																				
Lepyrodia riparia					1																		
Leucopogon ?tenuis					1			2						1	5		1			1			
Leucopogon australis	2	5	8		1	2				1			1		1	1	2	1		1	3	1	
Leucopogon capitellatus		1	5		21	1	1	1	2	9	1	5	8	2	14		49	14	9	97	50	24	37
Leucopogon glabellus						1	1			2										1			
Leucopogon nutans		1			2										1					1			
Leucopogon propinquus										1	1						3						
Leucopogon sp.		1			1			2							2						1		3
Leucopogon verticillatus		3	1		3	1				1	1		3	1	7		14	15	1	47	37	8	39
Levenhookia pusilla					2				3	4		1			1					5			
Lindsaea linearis		8	34		25	9	2	8			2	3	6	7	12	1	6			14			
Lococarya cinerea							1			1					1		2						
Lomandra sonderi																							1
Lomandra ?caespitosa		2	1		2									1	3		7			2	1	1	1
Lomandra ?drummondii																	2						
Lomandra ?hermaphrodita					1												2	1			1		
Lomandra ?nigricans																				1			
Lomandra ?odora					1				1						5		6		1	6	3		1
Lomandra ?preissii														2	1		4		1				
Lomandra ?spartea																				1			
Lomandra britannii																				2		1	
Lomandra caespitosa		8	2		17	6		1		3	1	2	5	7	20		54	5	6	54	25	10	9
Lomandra drummondii			1		2					6		1	1	1	2		6		3	13	13	8	13
Lomandra effusa															1								
Lomandra hermaphrodita	1	8	33		151	24	9	22	4	29	4	8	36	82	347	9	597	43	72	293	58	12	30

APPENDIX I: SUMMARY OF VASCULAR PLANT SPECIES BY RECORDING SITES IN MYARA NORTH SURVEY AREA

Note: * denotes introduced species, P3 denotes Priority 3 species.

	Site-vegetation Types based on recording sites																					
Species	A	AC	AD	AW	D	DA	DG	E	G	R	CW	W	SW	PW	P	PJ	PS	PT	SP	S	ST	T	TS
Lomandra integra															1		5		1				
Lomandra micrantha					3					1				4	9		18	1	1	7	4		1
Lomandra micrantha subsp. micrantha			2		12					1			9	1	11		27	4	2	20	5	7	6
Lomandra nigricans			1		3	1							3	6	19		41	4	10	59	13	6	9
Lomandra preissii		1	1		6			2				1	1	4	15		32	4	3	25	14	5	6
Lomandra purpurea														1	4		2			3	1		1
Lomandra sericea					2							1		4	8		12	4	4	2	3	7	10
Lomandra sonderi		9	17		127	18	8	10	1	16	4	12	46	115	479	8	1022	102	124	641	146	42	89
Lomandra sp.	2	18	26		80	15	6	6	3	9	7	6	23	33	135	3	259	22	28	245	64	22	34
Lomandra spartea		3	3		83	8	3	8	5	19	3	7	31	73	262	1	388	16	52	308	39	7	16
Lomandra suaveolens								1															
Loxocarya cinerea		6	22		19	4		1	1	2	4	3	13	14	72	2	130	7	18	88	10	5	15
Lyginia barbata	3				1	1			2					1	1		1		1	1	1		
Lyginia imberbis		4	7		1										1								
Lysinema pentapetalum						1																	
Macrozamia riedlei	1	10	22		190	17	9	5	28	74	22	41	87	56	203	1	498	125	100	792	302	141	205
Marianthus drummondianus																							1
Marianthus sp.		1	12		1					1				4	10		14	1	1	1			
Melaleuca ?lateritia	5		6						1														
Melaleuca ?parviceps			1		3		1		4	3					1								
Melaleuca ?trichophylla										1					2								
Melaleuca ?viminea	1																						
Melaleuca armillaris subsp. armillaris	1																						
Melaleuca incana subsp. incana					2						1												
Melaleuca parviceps			2		1				1														
Melaleuca pauciflora	1	2	2								1												
Melaleuca preissiana	36	117	153	1	3	28	3	1	1		6			1	4		2			1			
Melaleuca rhaphiophylla	5	10	4		2			1			2												
Melaleuca sp.		6	5			1	1		3	1		1	1	1	3		1		1				
Melaleuca trichophylla													1										
Melaleuca viminea		1																					
Mesomelaena gracilis		1			4					2				1	4		3			1			
Mesomelaena tetragona	9	36	69		48	18	12	14		4	3	1	2	2	9				1	2			
Millotia tenuifolia									6	2										1			
Mirbelia dilatata	2	18	3	1	15	4	2	2	9	10	26	18	15	5	13		10	5	5	47	21	19	23

APPENDIX I: SUMMARY OF VASCULAR PLANT SPECIES BY RECORDING SITES IN MYARA NORTH SURVEY AREA

Note: * denotes introduced species, P3 denotes Priority 3 species.

	Site-vegetation Types based on recording sites																					
Species	A	AC	AD	AW	D	DA	DG	E	G	R	CW	W	SW	PW	P	PJ	PS	PT	SP	S	ST	T	TS
Monotaxis occidentalis		2			1		1		1	1			1	2	1			1					
Myrtaceae sp.		1			1					1				1			1			1			
Neurachne alopecuroidea	1	7	7		39	6	1	6	7	10		2	3	15	39	4	39	1	5	27	9	1	5
Nuytsia floribunda	8	20	25		18	6	2	3	9	4	1	1			2		2	1		2			
Olearia paucidentata									1														
Opercularia apiciflora		1	1		6	1								3	2		5		1	4		1	
Opercularia echinocephala	1	19	31		202	25	7	12	6	35	10	17	74	68	260	3	577	61	71	551	169	71	89
Opercularia hispidula														1									
Opercularia sp.					2	2						1		1			4	2	2	8	3	3	5
Opercularia vaginata					1										2		1			1			
Orchidaceae sp.	1	4	8	1	25	5	1		2	4	2	1	16	19	52	1	81	8	6	80	21	13	14
Orchidaceae sp. 1										1			1		1			1		2	1		
Orchidaceae sp. 2										1			1		1			1		2	1		
Orianthera serpyllifolia														1			3		1	4	5		
Orthrosanthus laxus					1																		
Oxalis sp.			1							1	1	1			1		1	1	1	2	1	8	5
Paraserianthes lophantha		6				1					3	1	1	1	5		18		3	8	5	1	3
Patersonia juncea	2	3	2		1					3	1				4				1				
Patersonia occidentalis	6	6	20		81	14	11	5	2	26	1	3	21	38	131	2	172	13	42	131	27	4	13
Patersonia pygmaea	2	7	11		15	8		4	1		1	2	5	13	40		47	2	2	30	8	1	3
Patersonia rudis	2	3	5		71	2	3	6	3	9	1		9	25	108	3	103	5	12	68	12	1	6
Patersonia sp.					1									2	6		6						
Pauridia sp.					5							1			1								
Pelargonium littorale	2																			1	5	3	2
Pentapeltis peltigera	1	9	12		97	15	4	6	1	17	7	12	48	66	181	1	367	48	45	274	80	33	64
Pericalymma ellipticum	17	40	57		33	15	9	8	3	5	1	1			18	1	7	3		5	3		1
Persoonia angustiflora										1				1	1					1			
Persoonia elliptica					13	1	1	1		4		2	9	13	71	2	281	25	38	128	38	4	11
Persoonia longifolia		4	13		131	19	4	3	4	23	3	11	67	74	165	4	560	70	79	500	161	84	130
Persoonia saccata					1					1							1						
Petrophile serruriae					7	1	3	4	5	4					13		4			6			
Petrophile sp.																	1						
Petrophile squamata					2				1						3								
Petrophile squamata subsp. *squamata*					2	2											1		1	1			
Petrophile striata					6					4				3	3		8		1	8			

APPENDIX I: SUMMARY OF VASCULAR PLANT SPECIES BY RECORDING SITES IN MYARA NORTH SURVEY AREA

Note: * denotes introduced species, P3 denotes Priority 3 species.

	Site-vegetation Types based on recording sites																					
Species	A	AC	AD	AW	D	DA	DG	E	G	R	CW	W	SW	PW	P	PJ	PS	PT	SP	S	ST	T	TS
Pheladenia deformis	1								2	1										2	2		
Philotheca spicata		6	13		20	6	1			2		1	3				8	1	1	7	1		2
Phyllanthus calycinus	2	7	4		105	14	5	1	18	48	9	25	88	69	126		332	78	61	397	157	63	75
Pimelea ?imbricata														1									
Pimelea ?suaveolens										1					1		1						
Pimelea ciliata										1			1				1			1	3		3
Pimelea lehmanniana subsp. *nervosa*									2	3		1	1							11	2	1	
Pimelea sp.					3				2	3		1	2	1	12		4		1	11	1	1	1
Pimelea suaveolens		1	3		43	6	2	1	8	14		4	23	31	71	2	168	15	18	91	28	8	15
Pinus pinaster					1						1			1	3		5		2	2			
Platysace compressa		15	24		96	12	2	2	2	22	16	23	41	43	186	3	569	83	75	503	166	69	120
Platysace tenuissima			3		2								1				8			4			2
Platytheca galioides					3										2								
Poaceae sp.		14	15		35	5	6	1	6	7	10	9	11	19	46		53	20	13	89	35	18	24
Podolepis lessonii									1														
Podolepis sp.																				1			
Prasophyllum sp.		1			5	2				2				5	8		37	1	1	4	1		
Proteaceae sp.															1								
Pteridium esculentum	1	16	3		6	2			2	2	27	19	1		3		8	67	4	14	111	108	157
Pterochaeta paniculata		1	1		4	2			3	1			1	1	3		5						
Pterostylis recurva						1							1	1			3		1	3	2		
Pterostylis sp.		1	2		6	1	1		4	1	1	3	2	10	47		64	4	6	51	12	5	7
Ptilotus drummondii																	2						
Ptilotus manglesii	12	9	13		48	6	5	8	5	6		5	14	33	117	2	95	8	11	49	6	11	5
Pyrorchis nigricans			2		8					2	1	2	3	3	15		32	5	9	26	6	2	7
Ranunculus colonorum															2		2		2	8	7	3	
Restio sp.			1								2			1		1				2	1		
Restionaceae sp.		2	3		2	2					2				1			1	1				1
Rytidosperma caespitosum		2			11	2	1		2	6		4	3		7	1	18	2		14	5	4	4
Santalum acuminatum									1														
Scaevola calliptera		10	21		61	7	3	7	4	15	2	5	15	25	119	2	175	13	26	140	37	14	21
Schoenus clandestinus	1	1	4		6		2	2		1				1	3								
Schoenus sp.	1	1	1																				

APPENDIX I: SUMMARY OF VASCULAR PLANT SPECIES BY RECORDING SITES IN MYARA NORTH SURVEY AREA

Note: * denotes introduced species, P3 denotes Priority 3 species.

	Site-vegetation Types based on recording sites																						
Species	A	AC	AD	AW	D	DA	DG	E	G	R	CW	W	SW	PW	P	PJ	PS	PT	SP	S	ST	T	TS
Senecio diaschides			1		9				2	1	1	1	3		6	1	11	2	1	10	3	12	16
Senecio hispidulus					5							2	1	3	2		5	1	2	7	3	3	4
Senecio quadridentatus	1											1	2		1		5		1	2	3		2
Senecio sp.	1	3	5		13	4			3	3	2	2	4	1	8		15	4	4	23	18	14	11
Sowerbaea laxiflora										1													
Sphaerolobium medium		3			10				2	1		1	3	1	8		16		3	16	2	1	2
Stackhousia monogyna									7	1													1
Stenanthemum nanum															1								
Stirlingia latifolia	2	3	20		14	6			1				1	3	25	12	23		1	10			1
Stirlingia simplex			1											2	4	1	6						
Stphelia discolor					1																		
Stylidium ?hispidum																	1						
Stylidium ?junceum			2																				
Stylidium ?lateriticola									1	1					2								
Stylidium ?thesioides		2			1			1												1			
Stylidium affine																				2			
Stylidium amoenum	2	5	9		47	4	2	5	2	31	3	4	9	27	121		211	19	32	227	50	12	23
Stylidium androsaceum					2				1	2		1					1			2	2		2
Stylidium bulbiferum			1		1					1				1	2		4			5	1		1
Stylidium calcaratum									3								1				1		
Stylidium diuroides									1					1	5		2			2	1		
Stylidium emarginata									1														
Stylidium hispidum		1	4		34	1	1	3	3	4		2	14	17	62	1	87	10	18	72	8	2	2
Stylidium junceum		3	2		12	2	2	2		1				7	28	1	45		4	9			
Stylidium lateriticola																		1					
Stylidium lineatum					1										1	1	1			1			
Stylidium piliferum	1	6	11		111	17	5	4	6	29	1	7	40	73	251	1	385	21	66	397	56	15	27
Stylidium repens			1			2		1	3	2							1						
Stylidium schoenoides					2												5	1	1	1	2		
Stylidium sp.	2	2	10		13	6	4	3	3	2			3	10	27	1	19	1	2	19		1	1
Stylidium ?diuroides									2						1								
Stypandra glauca									4														
Stypehlia sp.																	2						
Styphelia ?epacridis					1		1	1									1			1			
Styphelia ?propinqua			1										1		1		2	3	1	4	2		3

APPENDIX I: SUMMARY OF VASCULAR PLANT SPECIES BY RECORDING SITES IN MYARA NORTH SURVEY AREA

Note: * denotes introduced species, P3 denotes Priority 3 species.

	Site-vegetation Types based on recording sites																					
Species	A	AC	AD	AW	D	DA	DG	E	G	R	CW	W	SW	PW	P	PJ	PS	PT	SP	S	ST	T	TS
Styphelia discolor	1	6	12		44	8	4	3	3	14	6	2	12	16	27		45	4	11	75	18	10	14
Styphelia erectifolia					2				4	1							1			2			
Styphelia nitens		7	8		17	9	2			11	1	7	14	17	33		54	15	12	80	10	5	15
Styphelia pallida		3	2		20	5	2	2	4	2	1	2	5	8	14		8	5	1	38	16	11	10
Styphelia propinqua		1	5		28	2		1		6	1	1	9	10	26	1	38	15	17	55	32	7	23
Styphelia sp.	1	1	1		3		1			1		1		1	9		11			9	3		1
Styphelia stricta					1				2														
Styphelia tenuiflora	1	3	5		60	5	6	4	2	13			19	30	139	4	250	6	22	129	13	5	8
Synaphea ?petiolaris							1								1								
Synaphea cuneata		1	1		1									1	2								
Synaphea gracillima	1		3		5	1	3	2		1						1							
Synaphea petiolaris		5	3		9	2		7		2			1	7	23	1	26	1	2	6			
Synaphea propinqua																			1				
Synaphea sp.	4	10	20		13	7	2	7	4	2		1	1	9	33		21		2	2			
Synaphea petiolaris subsp. *petiolaris*		4	1		3		1		1				1	1	7		6		2	3			
Syphelia pallida										1													
Taxandria linearifolia	5	71	27	1	5	15	1	3		1	59	6		7	7		5	1	1	3			
Tetraria octandra															1								
Tetraria sp. Jarrah Forest (R. Davis 7391)	5	27	48		237	44	18	12	8	58	12	31	69	111	412	2	672	71	102	575	125	55	93
Tetrarrhena laevis	2	9	8		47	9	2	3	4	15	13	12	26	21	80		220	38	33	162	74	31	53
Tetratheca hirsuta	1	13	4		48	10	3	4	2	11	6	5	23	34	101		274	36	40	214	69	16	37
Tetratheca sp.															1								
Thelymitra anterifera									2														
Thelymitra crinita																				3			
Thelymitra sp.									1						1								
Thomasia glabratum					1																		
Thomasia paniculata		22	1	1	1	1					21	1		2	4		1			3		1	
Thsyanotus thyrsoides																	1						
Thysanotus dichotomus	1								1		4	2		2	7		18	2	3	7	7	3	2
Thysanotus fastigiatus		1	2		8	1				2	1	2	4	14	65		112	18	9	34	10	6	13
Thysanotus manglesii	1				2				1	2	1	4	1		2		5	1		6	4	10	6
Thysanotus multiflorus		2	1		7					3		2	3	11	28		58	2	7	23	13	4	7
Thysanotus patersonii	1									1							1		1		1		1
Thysanotus scaber	1									1										2	6		
Thysanotus sp.	1		2		1	4		1	1	1	1	1	3	4	13		16	3	2	9	8	3	2

APPENDIX I: SUMMARY OF VASCULAR PLANT SPECIES BY RECORDING SITES IN MYARA NORTH SURVEY AREA

Note: * denotes introduced species, P3 denotes Priority 3 species.

	Site-vegetation Types based on recording sites																					
Species	A	AC	AD	AW	D	DA	DG	E	G	R	CW	W	SW	PW	P	PJ	PS	PT	SP	S	ST	T	TS
Thysanotus thyrsoideus			1		6				1	2		4		1	5		15	2	2	9	7	2	4
Thysanouts fastigiatus																		1					
Trachymene pilosa		1	2		6	2			6	9	1	2	5		1	2	8	1		8	16	4	11
Tribonanthes australis	3	4			2				3														
Trichocline spathulata		1	2		89	4	7	11	2	20	1	5	24	89	356	3	705	68	80	366	78	20	49
Tricoryne elatior	1	2	1		1										1					1			
Tricoryne sp.					5	2		1		1				1									
Tripterococcus brunonis		1			7	1	1	1	3	3			1	1	7		3			3	1		
Trymalium ledifolium	2	11	15		63	13	5	21	29	27	9	9	21	58	251		430	36	27	227	31	10	18
Trymalium odoratissimum	5	9	4		23	4	1	2	20	37	38	33	19	4	3		14	8	1	53	44	34	31
Utricularia multifida	2								1														
Verticordia densiflora							1		1		1			1	1								
Verticordia pennigera									1	1													
Verticordia plumosa	1	2					4		27	4					1					1			
Verticordia plumosa var. *plumosa*			1				1			1													
Verticordia sp.			1						1						1								
Viminaria juncea	2	4	3			1									1								
Wurmbea sp.		3	2		1				4														
Xanthorrhoea gracilis	1	30	34		161	25	11	14	5	44	12	13	54	77	293	4	437	59	91	576	143	67	111
Xanthorrhoea preissii	32	96	139	1	326	74	37	28	56	98	34	45	100	98	292	4	292	45	62	569	104	47	56
Xanthosia atkinsoniana		1	4		42	9	1	5	8	15	5	4	22	26	171	1	323	33	47	250	81	28	35
Xanthosia candida	4	15	20		142	20	7	16	10	37	9	19	37	89	327	4	493	27	47	273	91	45	50
Xanthosia ciliata					1								2				1			1	1	2	
Xanthosia huegelii	1	15	24		60	15	8	1	2	10	4	4	16	13	35	1	51	7	7	79	18	17	12
Xanthosia sp.		1				1				1	1		1	2	3		3			4	1	4	3
Xylomelum occidentale		1	9		30	18				1		1	2	3	8		9		2	7	1		

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

	Species	HU1040	HU1041	HU1042	HU1043	HU1044	HU1045	HU1046	HU1047	HU1048	HU1049	HU1050	HU1075	HU1076	HU1077	HU1078	HU1079	HU1080	HU1081
	Acacia alata		0.01			0.03				0.01									
	Acacia applanata																		
	Acacia barbinervis																		
	Acacia browniana	0.01						0.13	0.49		0.31								
	Acacia celastrifolia																		
	Acacia divergens																		
	Acacia drummondii	0.04		0.01			0.05										0.08		0.01
	Acacia extensa												0.01						
	Acacia lateriticola	0.01					0.06		0.36	0.01				0.08		0.06	0.14		
	Acacia nervosa																		
	Acacia preissiana								0.05		0.66								
	Acacia pulchella	0.01													0.01				
	Acacia saligna																		
	Acacia sp.						0.01												
	Acacia stenoptera																		
	Acacia urophylla																		
	Acacia varia																		
	Acacia willdenowiana			0.29		0.01	0.04												
	Acacia drummondii subsp. candolleana																		
	Adenanthos barbiger		0.01	0.03		0.98	0.64		0.04	0.56		1.68			0.45		0.50		0.01
	Agrostocrinum scabrum														0.15	0.01			
	Aira caryophyllea													0.01					
*	*Allocasuarina fraseriana*					0.03					0.03	0.01				0.26			
	Amphipogon amphipogonoides				0.01	0.18							0.03	0.20	0.19	0.25	0.03	0.14	0.06
	Andersonia lehmanniana																		
	Anigozanthos manglesii																		
	Aotus cordifolia																		
	Aphelia cyperoides																		
	Astartea scoparia																		
	Asteraceae sp.																		
	Austrostipa eleganthissima																		
	Austrostipa mollis																		
*	*Austrostipa sp.*																		
	Babingtonia camphorosmae																		
	Banksia bipinnatifida																		
	Banksia dallanneyi subsp. dallanneyi var. dallanneyi	0.01		0.06	2.20	0.53	0.10	0.31	0.09	0.01	0.35		0.04		0.45	0.65	0.65		
*	*Banksia fraseri*																		
	Banksia grandis					0.01	0.06		0.01	0.35		0.60	0.03		0.08	<000.1	0.10		
	Banksia sessilis						0.03												
	Banksia sphaerocarpa																		
	Banksia grandis (seedling)																		
	Banksia littoralis																		
	Billardiera floribunda																		0.05
	Billardiera sp.1																		
	Billardiera variifolia														0.06	0.08			

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

	Species	HU1040	HU1041	HU1042	HU1043	HU1044	HU1045	HU1046	HU1047	HU1048	HU1049	HU1050	HU1075	HU1076	HU1077	HU1078	HU1079	HU1080	HU1081
	Billardiera fraseri																		
	Billardiera fusiformis																		
	Boronia crenulata																		
	Boronia crenulata subsp. viminea																		
	Boronia fastigiata	0.19	0.48	0.29	0.04	0.16	0.13	0.18	0.10	0.09	0.26	0.24	0.09	0.03	0.14	0.04	0.05	0.01	
	Bossiaea aquifolium							1.28	0.08	2.13	0.09				0.01		0.79	0.44	0.45
	Bossiaea ornata			0.46		0.53	0.01				0.73	0.20	0.01		0.33	0.24	0.01		0.23
	Bossiaea spinescens																		
	Bossiaea eriocarpa																0.01		
	Brachyscome pusilla																		
	Briza minor																		
	Burchardia congesta																		
	Caladenia flava														0.01			0.04	
	Caladenia macrostylis																		
	Caladenia reptans																		
	Caladenia sp.			0.05			0.01	0.03						0.01					
*	*Caladenia sp. 1*																		
	Calothamnus quadrifidus																		
	Calothamnus sp.																		
	Cassytha glabella																		
	Cassytha sp.																		
	Caustis dioica																		
	Centaurium erythraea																		
	Centrolepis aristata																		
	Chamaescilla corymbosa				0.05											0.34	0.06		
	Chorizema cordatum						0.03								0.05	0.01		0.03	
	Chorizema rhombeum								0.01										
	Clematis pubescens	0.12		0.08			0.08		0.03					0.55				0.38	
	Comesperma virgatum										0.01					0.05		0.01	
	Comesperma sp.																		
*	*Conospermum capitatum*																		
	Conospermum scaposum																		
	Conostylis aculeata																		
	Conostylis setigera	0.26		0.19	1.01	0.76	0.09	0.15	0.10	0.20	0.49		0.04						
	Conostylis setosa			0.05						0.01			0.10	0.01		0.05			
	Conostylis pusilla																		
	Conostylis serrulata	0.23			0.01										0.01	0.01	0.03		
	Corymbia calophylla	0.08	0.09	0.10	0.05	0.03	0.01	0.15	0.13		0.24		0.15	0.34	0.16	0.04	0.28	0.21	
	Corymbia calophylla (seedling)																		
	Craspedia variabilis																		
	Cryptandra arbutiflora var. arbutiflora																		
	Cryptostylis ovata																		
	Cyanicula sericea																		
	Cyathochaeta avenacea	0.01		0.41	0.18				0.01	0.10		0.01	0.71		0.01			0.01	0.01
	Cyperaceae sp.																		

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

	Species	HU1040	HU1041	HU1042	HU1043	HU1044	HU1045	HU1046	HU1047	HU1048	HU1049	HU1050	HU1075	HU1076	HU1077	HU1078	HU1079	HU1080	HU1081
	Cyrtostylis robusta																	0.13	
	Dampiera alata																		
	Dampiera hederacea																		
	Dampiera linearis					0.06							0.01		0.04				
	Dasypogon bromeliifolius																		
	Daucus glochidiatus																		
	Daviesia decurrens					0.00													
	Daviesia horrida																		
	Daviesia preissii																		
	Daviesia rhombifolia																		
	Desmocladus flexuosus			0.01	0.03	0.01						0.08							
	Desmocladus fasciculatus	0.01																	
*	*Dianella revoluta*					0.03	0.01								0.01				
	Disa bracteata																		
	Diuris longifolia																		
	Drosera bulbosa																		
	Drosera erythrorhiza		0.06	0.03	0.26		0.03	0.03	0.01			0.01	0.08	0.01					
	Drosera macrantha																		
	Drosera microphylla																		
	Drosera pallida			0.01									0.01	0.04	0.13	0.03	0.05		
	Drosera platystigma																		
	Drosera pulchella																		
	Drosera sp.	0.01	0.14			0.05	0.06		0.06					0.01	0.06	0.06	0.03		
	Drosera sp. (climbing)																		
	Drosera sp. 1																		
	Drosera sp. 2																		
	Drosera stolonifera						0.03												
	Elythranthera brunonis																		
	Erigeron sumatrensis																		
*	*Eriochilus dilatatus*												0.05						
	Eucalyptus marginata	0.23	0.41	0.30	0.15	0.14	0.16	0.39	0.56	0.23	0.35	0.38	0.58	0.73	1.14	0.66	0.65	0.45	0.43
	Eucalyptus marginata (seedling)																		
	Eucalyptus patens																		
	Eucalyptus patens (seedling)																		
	Eucalyptus sp.					0.04	0.14												
	Gahnia decomposita																		
	Gastrolobium spinosum																		
	Gastrolobium villosum																		
	Glischrocaryon aureum																		
	Gompholobium cyaninum				0.04														
	Gompholobium knightianum			0.19			0.04								0.08				
	Gompholobium marginatum			0.04	0.01		0.03					0.04							
	Gompholobium polymorphum	0.01		0.04					0.03						0.05	0.01	0.01		
	Gompholobium preissii															0.04			
	Gompholobium sp.									0.01									

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

	Species	HU1040	HU1041	HU1042	HU1043	HU1044	HU1045	HU1046	HU1047	HU1048	HU1049	HU1050	HU1075	HU1076	HU1077	HU1078	HU1079	HU1080	HU1081
*	*Gompholobium sp.1*																		
	Gompholobium tomentosum																		
	Gonocarpus cordiger																		
	Gonocarpus sp.																		
	Goodenia sp.1																		
	Goodenia trinervis																		
	Grevillea bipinnatifida																		
	Grevillea pulchella																		
	Grevillea quercifolia																		
	Grevillea synapheae																		
	Grevillea wilsonii						0.03									0.23			
	Haemodoraceae sp.																		
	Haemodorum laxum															0.01	0.03	0.01	
	Haemodorum sp.				0.01	0.03				0.03	0.06								
	Haemodorum sp. 1																		
	Haemodorum sp. 2																		
	Haemodorum spicatum																		
	Hakea amplexicaulis					0.10													
	Hakea cyclocarpa																		
	Hakea lissocarpha															0.03			
	Hakea prostrata																		
	Hakea ruscifolia															0.01			
	Hakea varia																		
	Hemiandra pungens																		
	Hemiandra pungens																		
	Hemigenia pritzelii				0.28														0.01
	Hibbertia acerosa				0.85	0.03	0.21	0.01		0.36	0.21	0.01	0.16						
	Hibbertia amplexicaulis		0.04			0.14	0.70		0.01	0.15	0.15	0.40	0.20	0.16	0.31	0.21	0.14	0.35	
	Hibbertia commutata		0.01	0.03		0.80	0.88	0.05	0.04	0.18		0.59	0.04	0.03	0.24	0.21	0.14	0.14	
	Hibbertia commutata (seedling)																		
	Hibbertia huegelii					0.01								0.05					
	Hibbertia hypericoides					0.05													
	Hibbertia lasiopus							0.03			0.05								
	Hibbertia lineata																		
	Hibbertia ovata					0.06							0.09		0.01				
	Hibbertia perfoliata					0.18						0.05							
	Hibbertia quadricolor												0.05						
	Hibbertia racemosa												0.01						
	Hibbertia sp.																		
	Hibbertia striata																		
	Hovea chorizemifolia	0.04	0.10	0.58	0.05		0.03	0.04	0.16	0.01	0.11	0.08	0.05		0.05	0.01	0.03	0.04	0.03
	Hovea trisperma																		
	Hyalosperma cotula																		
	Hybanthus calycinus												0.06		0.01			0.11	
	Hybanthus floribundus											0.34	0.01						

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

	Species	HU1040	HU1041	HU1042	HU1043	HU1044	HU1045	HU1046	HU1047	HU1048	HU1049	HU1050	HU1075	HU1076	HU1077	HU1078	HU1079	HU1080	HU1081
	Hybanthus floribundus subsp. floribundus																		
	Hydrocotyle callicarpa													0.98		0.15			
	Hypocalymma angustifolium													0.64					
	Hypochaeris glabra													0.01					
	Hypolaena exsulca																		
	Isolepis marginata																		
	Isotropis cuneifolia																		
	Jacksonia alata																		
	Juncus bufonius																		
	Kennedia coccinea											0.08			0.01				
	Kennedia prostrata																		
	Kingia australis																		
	Kunzea glabrescens																		
	Kunzea recurva																		
	Labichea punctata												0.04		0.09	0.11			
	Lachnagrostis filiformis																		
	Lagenophora huegelii		0.09				0.05	0.16	0.05	0.03				0.63	0.08		0.08		
	Lasiopetalum floribundum	0.09	0.74			1.20						0.86	0.01	0.03	0.90	0.06	0.15	1.76	0.13
	Lasiopetalum glabratum															1.18			
	Lasiopetalum glutinosum																		
	Laxmannia squarrosa																		
	Lechenaultia biloba	0.06	0.05				0.03	0.08	0.01		0.10		0.03				0.06		
	Lepidobolus preissianus subsp. preissianus																		
	Lepidosperma leptostachyum																		
	Lepidosperma longitudinale																		
	Lepidosperma pubisquameum																		
	Lepidosperma sp.																		
	Lepidosperma sp.1																		
	Lepidosperma squamatum												0.01						
	Lepidosperma tenue					0.25		0.13			0.16		0.01						
*	*Leporella fimbriata*																		
	Leptocarpus coangustatus					0.01													
	Leptomeria cunninghamii			0.00		0.04													
	Leptospermum erubescens																		
	Leucopogon australis																		
	Leucopogon capitellatus					0.01	0.08					0.04			0.18	0.03	0.04		0.01
*	*Leucopogon parviflorus*																		
	Leucopogon sprengelioides																		
	Leucopogon verticillatus					0.13					0.01	0.06			0.04		0.00		
	Levenhookia pusilla				0.15			0.01						0.01		0.41			
	Levenhookia stipitata																		
	Lindsaea linearis																		
	Lobelia sp.																		
	Lomandra brittanii													0.01	0.01				
	Lomandra caespitosa	0.81	0.36	0.08	1.23	0.02	0.08	0.06	0.13	0.40	0.43	1.15	0.43	0.29	0.08	0.09	0.16	0.04	0.14

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

Species	HU1040	HU1041	HU1042	HU1043	HU1044	HU1045	HU1046	HU1047	HU1048	HU1049	HU1050	HU1075	HU1076	HU1077	HU1078	HU1079	HU1080	HU1081
Lomandra drummondii		0.29							0.01									
Lomandra hermaphrodita	0.35	0.15	0.36	0.03	0.15	0.34	0.15	0.21	0.05	0.24	0.08	0.10	0.10		0.36	0.04		
Lomandra integra																		
Lomandra micrantha														0.69	0.08	0.83		0.18
Lomandra micrantha subsp. micrantha																		
Lomandra nigricans			0.03									0.04	0.03			0.04		
Lomandra odora			0.10		0.04	0.01												
Lomandra preissii	0.51						0.16	0.13				0.03	0.01			0.01	0.28	
Lomandra purpurea						0.03												
Lomandra sericea		0.03													0.01	0.01		
Lomandra sonderi	0.08	0.19	0.11	0.03	0.06	0.20	0.16	0.43	0.11	0.04	0.28	0.55	0.10	0.13	0.44	0.39		0.08
Lomandra sp.				0.04	0.13						0.04		0.01			0.01		
Lomandra sp.1																		
Lomandra spartea		0.06	0.13		0.18	0.21	0.09		0.04		0.13	0.09	0.04	0.11	0.13	0.06		
Loxocarya cinerea				0.01				0.15		0.10	0.13	0.01			0.28			
Lysimachia arvensis																		
Macrozamia riedlei	0.06	0.06	0.04			0.04	0.11	0.11	0.04		0.03		0.14	0.10		0.05	0.29	0.03
Macrozamia riedlei (seedling)																		
Marianthus drummondianus																		
Melaleuca parviceps																		
Melaleuca preissiana																		
Melaleuca viminea																		
Melaleuca viminea (seedling)																		
Mesomelaena graciliceps																		
Mesomelaena stygia																		
Mesomelaena tetragona																		
Microtis media																	0.30	
Millotia tenuifolia				0.10									0.04					
Mirbelia dilatata																		
Monotaxis grandiflora													0.03					
Monotaxis grandiflora var. grandiflora																		
Monotaxis occidentalis																		
Neurachne alopecuroidea											0.04				0.13			0.01
Opercularia apiciflora														0.01			0.06	0.06
Opercularia echinocephala	0.04	0.45		0.06		0.01	0.04	0.13					0.03			0.03		
Opercularia hispidula																		
Opercularia sp.																		
Opercularia vaginata					0.01													
Orchidaceae sp.																		
Orchidaceae sp. 1																		
Orchidaceae sp. 2																		
Orianthera serpyllifolia		0.09												0.01				
Oxalis corniculata																		
Paspalidium sp.?																		
Patersonia babianoides														0.03	0.01	0.04		

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

	Species	HU1040	HU1041	HU1042	HU1043	HU1044	HU1045	HU1046	HU1047	HU1048	HU1049	HU1050	HU1075	HU1076	HU1077	HU1078	HU1079	HU1080	HU1081
	Patersonia juncea																		
	Patersonia occidentalis								0.01				0.01			0.13	0.08		
	Patersonia pygmaea								0.03										
	Patersonia rudis															0.01			
*	*Pentapeltis peltigera*	0.03	0.19	0.04	0.24	0.49	0.54	0.39	0.08	0.34	0.51	0.94	0.36	0.20	0.73	0.45	0.41	0.14	
	Pericalymma ellipticum				0.01														
	Persoonia elliptica												0.00						
	Persoonia longifolia					0.10	0.01			0.01		0.01	0.06	0.06	0.21	0.01	0.01	0.01	
	Persoonia longifolia (seedling)																		
	Persoonia sp.																		
	Petrophile macrostachya																		
	Philotheca spicata							0.01				0.01							
	Philydrella drummondii																		
	Phyllanthus calycinus	0.11	0.11	0.58	0.35		0.28	0.06	0.08		0.01	0.25	0.01		0.03	0.54	0.41		
	Pimelea ciliata																		
	Pimelea lehmanniana																		
	Pimelea sp.																		
	Pimelea suaveolens			0.06				0.01								0.03			
	Platysace commutata																		
	Platysace compressa	0.01	2.31					0.84	2.13		0.04			0.16	0.31		0.34		
	Platysace filiformis			0.45		0.01	0.01				0.03								
	Platysace tenuissima	0.04			0.34								0.18						
	Poaceae sp.																		
	Podolepis capillaris																		
	Podotheca angustifolia																		
	Podotheca gnaphalioides																		
	Poranthera microphylla															0.01			
	Prasophyllum elatum																		
	Prasophyllum sp.																		
	Prasophyllum sp.1																		
	Pseudognaphalium luteoalbum				0.15														
	Pteridium esculentum		0.10		0.01	0.01												0.24	0.43
	Pterochaeta paniculata										0.03								
*	*Pterostylis barbata*																		
*	*Pterostylis pyramidalis*																		
*	*Pterostylis recurva*												0.04						
	Pterostylis sp.																		
	Pterostylis sp. 1																		
	Pterostylis vittata												0.04						
	Ptilotus drummondii				0.18														
	Ptilotus drummondii var. drummondii																		
	Ptilotus manglesii																		
	Pyrorchis nigricans															0.03			
	Ranunculus colonorum																		
	Restionaceae sp.																		

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

	Species	HU1040	HU1041	HU1042	HU1043	HU1044	HU1045	HU1046	HU1047	HU1048	HU1049	HU1050	HU1075	HU1076	HU1077	HU1078	HU1079	HU1080	HU1081
	Rytidosperma acerosum																		
	Rytidosperma caespitosum															0.19			
	Rytidosperma setaceum																		
	Rytidosperma sp.																		
	Scaevola calliptera	0.01		0.03	0.03	0.11						0.01			0.03		0.03		0.04
	Scaevola pilosa																		
	Scaevola sp.																		
	Senecio diaschides																		
	Senecio hispidulus													0.06					
	Senecio quadridentatus																		
	Senecio sp.																		
	Senecio sp.1																		
	Sonchus oleraceus																		
	Sowerbaea laxiflora					0.01													
*	*Sphaerolobium linophyllum*																		
	Sphaerolobium macranthum																		
	Sphaerolobium medium														0.01				
	Sphaerolobium sp.																		
	Stackhousia monogyna																		
	Stirlingia latifolia																		
	Stylidium amoenum		0.04	0.14	0.09		0.09									0.03	0.05		
	Stylidium androsaceum						0.03												
	Stylidium brunonianum																		
	Stylidium bulbiferum																		
	Stylidium calcaratum		0.01						0.01					0.18					
	Stylidium ciliatum																		
	Stylidium hirsutum																		
	Stylidium hispidum															0.10			
	Stylidium junceum										0.04		0.01			0.01			
	Stylidium lateriticola																		
	Stylidium lineatum																		
	Stylidium piliferum		0.65			0.01	0.05	0.05	0.10							0.01			
	Stylidium recurvum																		
	Stylidium repens																		
	Stylidium rhynchocarpum																		
	Stylidium scabridum																		
	Stylidium scariosum																		
	Stylidium schoenoides					0.01													
	Stylidium sp.																		
	Stylidium sp. 1																		
	Styphelia discolor														0.01				
*	*Styphelia hispida*																		
	Styphelia nitens		0.03			0.01		0.03	0.03	0.01	0.04	0.04			0.01				
	Styphelia pallida		0.03			0.14	0.08		0.03		0.03								
	Styphelia propinqua								0.01					0.01					0.01

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

	Species	HU1040	HU1041	HU1042	HU1043	HU1044	HU1045	HU1046	HU1047	HU1048	HU1049	HU1050	HU1075	HU1076	HU1077	HU1078	HU1079	HU1080	HU1081
	Styphelia tenuiflora	0.01				0.01	0.01			0.03			0.01		0.01	0.04	0.03		
	Synaphea sp.																		
	Taxandria linearifolia																		
	Tetraria capillaris	1.17	0.24	0.30	0.63	2.80	0.58	0.34	0.39	0.24		0.26	0.43	0.14	0.63	0.50	0.90	0.01	0.26
	Tetraria octandra				0.03											0.09			
	Tetraria sp. Jarrah Forest (R. Davis 7391)																		
	Tetrarrhena laevis	0.06	0.09	0.45		0.53	0.23	0.09	0.10		0.38	0.41	0.13	0.26	0.65	0.25	0.09	0.36	0.06
	Tetratheca hirsuta			0.03		0.10	0.14			0.10		0.30	0.03		0.33	0.09	0.06	0.01	0.05
	Thelymitra crinita						0.03						0.25	0.01	0.04		0.01		0.01
	Thelymitra macrophylla													0.03					
	Thelymitra sp.						0.04									0.01			
*	*Thomasia paniculata*																		
	Thysanotus ? scaber																		
	Thysanotus dichotomus					0.65	0.01												
	Thysanotus fastigiatus										0.04								
	Thysanotus manglesianus														0.01				
	Thysanotus multiflorus			0.11									0.03		0.01			0.05	
	Thysanotus patersonii																		
	Thysanotus sp.																0.01		
	Thysanotus sp.1																		
	Thysanotus sparteus																		
	Thysanotus tenellus	0.01	0.05					0.20	0.06		0.01								
	Thysanotus thyrsoideus	0.03			0.04	0.06	0.01						0.05		0.41	0.36	0.06	0.04	0.08
	Trachymene pilosa		0.11	0.18	0.20		0.01	0.20	0.14		0.20	0.09		0.86	0.10				0.11
	Trichocline spathulata	0.04	0.04		0.05	0.24				0.04		0.06	0.10	0.03	0.11	0.19			0.10
	Tricoryne elatior																		
	Tricoryne humilis																		
	Trifolium dubium																		
	Tripterococcus brunonis																		
	Trymalium ledifolium	0.20	0.21		0.43			0.48	0.05	0.04	0.25		0.06	0.03			0.14		
	Trymalium odoratissimum							0.04											
	Trymalium odoratissimum subsp. odoratissimum																		
	Utricularia multifida																		
	Vulpia myuros																		
	Wahlenbergia preissii																		
	Xanthorrhoea gracilis	0.04		0.11		0.06	0.35		0.05	0.21	0.04	0.39	0.50	0.03	0.25	0.45	0.09	0.03	0.04
	Xanthorrhoea preissii						0.14		0.01	0.01		0.14	0.03		0.08			0.04	
	Xanthosia atkinsoniana	0.01		0.28				0.09		0.04		0.05	0.04						0.01
	Xanthosia candida				0.06	0.03					0.04	0.16		0.06		0.14			0.01
	Xanthosia ciliata																		
	Xanthosia huegelii		0.03							0.01			0.01						
	Xanthosia singuliflora					0.01													
	Xylomelum occidentale																		

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

	Species	JD134	JD135	JD78	JD79	JD80	JD81	JD82	JD83	JD84	JD85	JD86	JD87	JD88	FMP001	FMP002	FMP003	FMP004	FMP005	FMP006	FMP007	FMP008	FMP009	FMP010
	Acacia alata									0.14														
	Acacia applanata																							
	Acacia barbinervis												0.01						2.00					
	Acacia browniana																							
	Acacia celastrifolia													0.01										
	Acacia divergens																							
	Acacia drummondii					0.01			0.03											1.00		1.00		1.00
	Acacia extensa																							1.00
	Acacia lateriticola					0.01																		1.00
	Acacia nervosa																							1.00
	Acacia preissiana																							
	Acacia pulchella	1.48	0.34			0.13	0.01					0.01		0.01	1.00			1.50	2.00	1.00				2.00
	Acacia saligna																							
	Acacia sp.															1.00								
	Acacia stenoptera																							
	Acacia urophylla	0.11	0.03	0.04	0.24	0.10			0.04		0.16	0.06		0.08	1.00			2.00	1.50	1.00		1.50	1.33	
	Acacia varia						0.03	0.23																
	Acacia willdenowiana							0.03																
	Acacia drummondii subsp. candolleana																							
	Adenanthos barbiger	0.15	0.03	0.05		0.64	0.35	0.56	0.10	0.38	0.01	0.01	1.23	0.11	1.92	1.88	1.60		2.33	1.30	2.00	1.00		3.07
	Agrostocrinum scabrum			0.01	0.01	0.01	0.03	0.06				0.02	0.01			1.00	1.00				2.00			
	Aira caryophyllea		1.88																					
*	*Allocasuarina fraseriana*	0.01		0.03		0.01	0.09	0.04		0.16		0.00	0.16											1.67
	Amphipogon amphipogonoides																							
	Andersonia lehmanniana																							
	Anigozanthos manglesii																							
	Aotus cordifolia																							
	Aphelia cyperoides																							
	Astartea scoparia																							
	Asteraceae sp.																10.00							
	Austrostipa eleganthissima																1.00	1.00						
	Austrostipa mollis																							
*	*Austrostipa sp.*																							
	Babingtonia camphorosmae																							
	Banksia bipinnatifida																							
	Banksia dallanneyi subsp. dallanneyi var. dallanneyi						0.36	1.25		1.09			1.13		4.00	6.46		5.47	3.38	3.33	1.00		6.82	
*	*Banksia fraseri*																							
	Banksia grandis	0.01	0.01	0.13		0.05	0.08	0.01	0.03	0.08	0.01	0.28	0.01	0.11	1.38		0.60		1.38	1.58		1.00	1.00	1.00
	Banksia sessilis																							
	Banksia sphaerocarpa															1.38								
	Banksia grandis (seedling)																							
	Banksia littoralis																							
	Billardiera floribunda				0.00																			
	Billardiera sp.1																							
	Billardiera variifolia												0.04											

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

	Species	JD134	JD135	JD78	JD79	JD80	JD81	JD82	JD83	JD84	JD85	JD86	JD87	JD88	FMP001	FMP002	FMP003	FMP004	FMP005	FMP006	FMP007	FMP008	FMP009	FMP010
	Billardiera fraseri						0.01																	
	Billardiera fusiformis					0.01																		
	Boronia crenulata																							
	Boronia crenulata subsp. viminea																							
	Boronia fastigiata	0.54	0.04	0.09	0.03	0.21	0.03	0.04	0.01	0.10			0.08	0.24		2.07	1.56	1.00	2.27	1.00	1.00	1.00	1.00	1.50
	Bossiaea aquifolium		0.01												1.67	1.50	1.67	1.43	1.33	2.00	1.50			
	Bossiaea ornata			0.61	0.25	0.06	0.16	0.04	0.03	0.03		0.21	3.68	0.15	1.25	2.33	1.40		1.83	1.50	1.00	1.00	2.10	2.08
	Bossiaea spinescens																							
	Bossiaea eriocarpa																							
	Brachyscome pusilla																							
	Briza minor	0.03																						
	Burchardia congesta	0.14	0.44	1.89	2.03	0.58	0.59		0.04			0.06		1.36							1.00		3.00	
	Caladenia flava	0.09	0.03	0.12	0.26	0.03	0.01	0.05		0.28	0.14	0.03		0.17										
	Caladenia macrostylis			0.03					0.01															
	Caladenia reptans						0.09		0.09															
	Caladenia sp.																							
*	*Caladenia sp. 1*																							
	Calothamnus quadrifidus		0.00																					
	Calothamnus sp.																							
	Cassytha glabella	0.36	0.06								0.08													
	Cassytha sp.																							
	Caustis dioica																							
	Centaurium erythraea		0.69																					
	Centrolepis aristata							0.23																
	Chamaescilla corymbosa									1.31			1.06			2.00		6.00						10.00
	Chorizema cordatum														1.00		1.00		1.00	2.00	2.00			
	Chorizema rhombeum																							
	Clematis pubescens	0.01	0.18	0.08	0.06				0.01		0.67	0.11		0.46								1.59	1.50	
	Comesperma virgatum	0.13	0.03	0.06	0.07	0.11	0.03	0.03	0.03				0.03	0.02				1.00						1.00
	Comesperma sp.																							
*	*Conospermum capitatum*						0.01																	
	Conospermum scaposum																							
	Conostylis aculeata								0.01				0.01	0.09										
	Conostylis setigera														1.00	1.78	1.17	1.57	2.33		2.50		1.00	2.31
	Conostylis setosa						0.03	2.06	0.01	0.17			0.65		1.00	1.25		1.60	1.00		1.00			
	Conostylis pusilla																							
	Conostylis serrulata	0.01					0.03	0.13	0.00	0.01			0.21											
	Corymbia calophylla			0.20	1.91		0.05	0.09	0.21	0.09	0.41	0.18	0.21	0.51	1.00			1.75	1.17	2.08	1.64	1.28	1.00	1.00
	Corymbia calophylla (seedling)																							
	Craspedia variabilis																					3.50		
	Cryptandra arbutiflora var. arbutiflora																							
	Cryptostylis ovata			0.11																				
	Cyanicula sericea			0.06					0.05															
	Cyathochaeta avenacea		0.05	0.11	0.17	0.17	3.78	2.58	1.99	2.01			3.19	0.29	1.00	2.00	3.00	4.17	3.83	3.14			2.25	
	Cyperaceae sp.																		1.00					

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

	Species	JD134	JD135	JD78	JD79	JD80	JD81	JD82	JD83	JD84	JD85	JD86	JD87	JD88	FMP001	FMP002	FMP003	FMP004	FMP005	FMP006	FMP007	FMP008	FMP009	FMP010
	Cyrtostylis robusta		0.05	0.10		0.78								0.75										
	Dampiera alata																							
	Dampiera hederacea																							
	Dampiera linearis						1.21	0.16				0.01	0.06	0.64				1.00	1.00					2.00
	Dasypogon bromeliifolius																							
	Daucus glochidiatus		2.26		0.04						0.17			1.17										
	Daviesia decurrens									0.03			0.04						1.00					
	Daviesia horrida																							
	Daviesia preissii																		1.00					
	Daviesia rhombifolia																							
	Desmocladus flexuosus	0.41						0.01	3.62			2.33	0.30			1.00			1.33				1.00	
	Desmocladus fasciculatus																							
*	*Dianella revoluta*																			1.00				
	Disa bracteata										0.01			0.03										
	Diuris longifolia	0.03				0.03				0.04				0.01										
	Drosera bulbosa			0.06		0.04		1.22					0.19	0.01										
	Drosera erythrorhiza	0.01		0.07			0.22						0.13	0.10										
	Drosera macrantha					0.03							0.01											
	Drosera microphylla						0.13																	
	Drosera pallida	0.30		0.03		0.03	0.03		0.18	0.16			0.03											
	Drosera platystigma							0.14																
	Drosera pulchella																							
	Drosera sp.																1.67			1.00			1.00	
	Drosera sp. (climbing)																							
	Drosera sp. 1																							
	Drosera sp. 2																							
	Drosera stolonifera							0.40			0.08													
	Elythranthera brunonis																							
	Erigeron sumatrensis		0.13																					
*	*Eriochilus dilatatus*					0.01			0.05	0.08		0.01												
	Eucalyptus marginata			2.43	2.45	0.61	0.50	0.45	1.09	0.15	1.83	0.58	0.36	1.93	1.63	1.43	2.38	1.38	1.42	2.25	1.69	2.47	0.93	1.77
	Eucalyptus marginata (seedling)																							
	Eucalyptus patens																							
	Eucalyptus patens (seedling)																							
	Eucalyptus sp.																		3.50					2.80
	Gahnia decomposita																							
	Gastrolobium spinosum																							
	Gastrolobium villosum																							1.00
	Glischrocaryon aureum									0.11			0.04											
	Gompholobium cyaninum																							2.00
	Gompholobium knightianum							0.04					0.14					1.00						1.00
	Gompholobium marginatum	0.21						0.03		0.14								1.00	1.00				1.00	
	Gompholobium polymorphum			0.03			0.03	0.71		0.06					1.00	1.00	1.00	1.60	1.00				1.00	
	Gompholobium preissii	0.29	0.10				0.18	1.20		0.48			0.61					3.00			1.00			2.20
	Gompholobium sp.																							

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

	Species	JD134	JD135	JD78	JD79	JD80	JD81	JD82	JD83	JD84	JD85	JD86	JD87	JD88	FMP001	FMP002	FMP003	FMP004	FMP005	FMP006	FMP007	FMP008	FMP009	FMP010
*	*Gompholobium sp.1*																							
	Gompholobium tomentosum																							
	Gonocarpus cordiger																						1.00	
	Gonocarpus sp.																	1.00						
	Goodenia sp.1																							
	Goodenia trinervis																							
	Grevillea bipinnatifida																							
	Grevillea pulchella																							
	Grevillea quercifolia							0.02																
	Grevillea synapheae						0.10																	
	Grevillea wilsonii	0.03					0.16									1.53			1.00					1.00
	Haemodoraceae sp.															1.00						1.00		
	Haemodorum laxum			0.01										0.01										
	Haemodorum sp.																							
	Haemodorum sp. 1																							
	Haemodorum sp. 2																							
	Haemodorum spicatum							0.01																
	Hakea amplexicaulis																							
	Hakea cyclocarpa												0.04											
	Hakea lissocarpha				0.00					0.08		0.01											1.00	
	Hakea prostrata																							
	Hakea ruscifolia					0.11		0.05					0.10											
	Hakea varia																							
	Hemiandra pungens																							
	Hemiandra pungens																							
	Hemigenia pritzelii			0.01		0.01	0.30							0.03		1.00								
	Hibbertia acerosa																	1.00					1.00	
	Hibbertia amplexicaulis	1.90	0.41	0.39	0.90	0.36		1.04	0.19	0.09	0.48	0.13		0.48	1.46	3.93	3.92	2.15	3.00	3.89	1.00	3.08		2.18
	Hibbertia commutata	0.53	0.20	0.35	0.60	0.61	0.94	0.92	0.44	1.17	0.01	0.18	0.53	0.26	2.57	2.85	2.50	3.00	6.83	1.33		10.07	3.13	1.33
	Hibbertia commutata (seedling)																							
	Hibbertia huegelii						0.01																	2.00
	Hibbertia hypericoides																					2.00		
	Hibbertia lasiopus																							
	Hibbertia lineata																							
	Hibbertia ovata																							
	Hibbertia perfoliata																1.00		2.00	2.00		2.33		
	Hibbertia quadricolor																							
	Hibbertia racemosa																							
	Hibbertia sp.														1.00					2.00		3.00	1.00	
	Hibbertia striata																							
	Hovea chorizemifolia			0.09	0.05	0.35	0.08	0.01	0.11	0.03	0.06		0.09	0.13			1.00	1.00	1.00	1.20	1.00		1.00	2.00
	Hovea trisperma	0.45	0.39	0.10	0.28	0.43	0.21	3.57	3.27	0.46	0.27	0.17		0.14										
	Hyalosperma cotula																							
	Hybanthus calycinus									0.04			0.13											
	Hybanthus floribundus																							

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

	Species	JD134	JD135	JD78	JD79	JD80	JD81	JD82	JD83	JD84	JD85	JD86	JD87	JD88	FMP001	FMP002	FMP003	FMP004	FMP005	FMP006	FMP007	FMP008	FMP009	FMP010
	Hybanthus floribundus subsp. floribundus																							
	Hydrocotyle callicarpa									1.35														
	Hypocalymma angustifolium	0.01					0.01	0.21					0.00					4.47					1.57	
	Hypochaeris glabra	0.09	5.24	0.04		0.04	0.01	0.09	0.01	0.04	0.02			0.02										
	Hypolaena exsulca						0.15	1.21																
	Isolepis marginata																							
	Isotropis cuneifolia																							
	Jacksonia alata																							
	Juncus bufonius													0.06										
	Kennedia coccinea	0.10	0.09	0.41	0.22	0.05	0.25	0.04	0.06	0.03		0.01	0.02	0.05						1.00		1.00		1.00
	Kennedia prostrata																						1.92	
	Kingia australis																							
	Kunzea glabrescens																							
	Kunzea recurva																							
	Labichea punctata	0.01		0.09		0.02	0.03	0.01				0.04	0.01			1.00		1.00		1.00				
	Lachnagrostis filiformis		2.85																					
	Lagenophora huegelii	0.89	0.89	0.26	0.14	0.08			1.27	0.08	0.70	0.05	0.01	0.38	1.00	1.00	2.00		1.00			1.30	3.79	1.00
	Lasiopetalum floribundum			0.80	0.88	1.00			5.80		0.95	0.18		0.76	2.63		2.79		5.00	3.77		3.00	7.90	3.22
	Lasiopetalum glabratum						0.92			0.94			0.01											1.00
	Lasiopetalum glutinosum						0.11						0.01											
	Laxmannia squarrosa																							
	Lechenaultia biloba		0.18	0.04					0.01	0.04			0.04	0.03	1.00	3.50	1.00	3.00						2.33
	Lepidobolus preissianus subsp. preissianus																							
	Lepidosperma leptostachyum	0.40	0.01						0.76	0.04	0.14	0.18	0.51	0.01										
	Lepidosperma longitudinale																							
	Lepidosperma pubisquameum																							
	Lepidosperma sp.															1.00	1.00	1.00						
	Lepidosperma sp.1																							
	Lepidosperma squamatum	0.20	0.01				0.13			0.13			0.59											
	Lepidosperma tenue									0.01			0.16											
*	*Leporella fimbriata*			0.08		0.04	0.24	0.24	0.46	0.26														
	Leptocarpus coangustatus																							
	Leptomeria cunninghamii	0.45			0.01	0.05			0.13						1.50									
	Leptospermum erubescens																							
	Leucopogon australis														1.00									
	Leucopogon capitellatus	0.01	0.14	0.33	1.22	0.11			0.18		0.13	0.16		0.36	1.00				2.25	1.00			1.00	
*	*Leucopogon parviflorus*																							
	Leucopogon sprengelioides																							
	Leucopogon verticillatus			0.07	0.14	0.04					0.01	0.06		0.00	1.00				2.33					
	Levenhookia pusilla	0.04						0.41	1.65	4.18						2.00	5.00	10.00					15.00	1.00
	Levenhookia stipitata																						5.00	
	Lindsaea linearis						0.48																	
	Lobelia sp.																							
	Lomandra brittanii	0.15		0.06						0.46			0.15											
	Lomandra caespitosa	0.05			0.27	0.04		0.26	0.07	0.46	0.02	0.01	0.01	0.03										

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

Species	JD134	JD135	JD78	JD79	JD80	JD81	JD82	JD83	JD84	JD85	JD86	JD87	JD88	FMP001	FMP002	FMP003	FMP004	FMP005	FMP006	FMP007	FMP008	FMP009	FMP010
Lomandra drummondii	0.15	0.21	0.48	0.65	0.86		0.07	1.01	0.26	0.24	0.41	0.03				1.00		2.00			2.25		1.00
Lomandra hermaphrodita	0.33		0.13	0.18	0.15	0.07	1.31	0.21	0.48	0.01	0.04	0.83	0.27	2.29	2.11	2.83	2.00	1.40	1.75	1.33	3.00	2.75	2.83
Lomandra integra							0.01																
Lomandra micrantha			0.20	0.03	0.20						0.01			6.00				3.80	1.60			1.00	
Lomandra micrantha subsp. micrantha																							
Lomandra nigricans			1.17	0.38	0.44	0.01		0.01		0.11	0.21		0.46			1.00				1.00	2.00	1.00	
Lomandra odora	0.15	0.24			0.11		0.71	0.94	0.19			0.09	0.05										
Lomandra preissii	0.05	0.04	0.09	0.01	0.19	0.03		0.21	0.10	0.03	0.05	0.06	0.31		1.00	3.67	1.75			1.00	1.33		
Lomandra purpurea									0.07			0.16											
Lomandra sericea																							
Lomandra sonderi			0.06		0.15	0.38	1.91	0.38	0.39			0.53	0.01	2.00	1.14	1.25	1.00	1.00	1.00	1.00	1.00	1.00	1.33
Lomandra sp.																2.50				1.00	1.00	1.00	
Lomandra sp.1																							
Lomandra spartea				0.01	0.04			0.10	0.02			0.03		1.00	1.75	1.00	1.25	1.71		1.50			1.38
Loxocarya cinerea					1.71	0.31																	
Lysimachia arvensis		0.44																					
Macrozamia riedlei	0.30	0.20	0.23	0.06	0.03			0.03		0.07	0.05		0.19	1.00			0.50		1.00	1.00	1.58	1.00	
Macrozamia riedlei (seedling)																							
Marianthus drummondianus																						2.00	
Melaleuca parviceps																							
Melaleuca preissiana																							
Melaleuca viminea																							
Melaleuca viminea (seedling)																							
Mesomelaena graciliceps							0.01																
Mesomelaena stygia																							
Mesomelaena tetragona						0.01																	
Microtis media																							
Millotia tenuifolia								0.17															
Mirbelia dilatata	0.10		0.01	0.15			0.53			0.01	0.01												
Monotaxis grandiflora						0.05			0.16			0.31	0.01										
Monotaxis grandiflora var. grandiflora																							
Monotaxis occidentalis									0.10			0.15											
Neurachne alopecuroidea	1.04	0.40	0.18	0.21	0.88	0.07	0.31	0.90	0.68	0.16	0.19	0.71	0.69	1.00				1.00					1.33
Opercularia apiciflora			0.22	0.21	0.14		0.01			0.13	0.03		0.13										
Opercularia echinocephala	0.59	0.10		0.03	0.01		0.10	0.04	1.16			0.01	0.21	1.00				3.09	2.50	1.75		3.14	2.00
Opercularia hispidula										0.52													
Opercularia sp.																							
Opercularia vaginata																							2.00
Orchidaceae sp.																	1.00						
Orchidaceae sp. 1																							
Orchidaceae sp. 2																							
Orianthera serpyllifolia																							
Oxalis corniculata	0.21	0.45		0.03									0.21										
Paspalidium sp.?																							
Patersonia babianoides			0.13	0.07		0.02	0.11	0.35		0.01	0.11	0.04	0.03										

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

	Species	JD134	JD135	JD78	JD79	JD80	JD81	JD82	JD83	JD84	JD85	JD86	JD87	JD88	FMP001	FMP002	FMP003	FMP004	FMP005	FMP006	FMP007	FMP008	FMP009	FMP010
	Patersonia juncea																							
	Patersonia occidentalis																	1.67				1.00		1.00
	Patersonia pygmaea							0.01	0.01	0.05			0.02											
	Patersonia rudis									0.20			0.25											
*	*Pentapeltis peltigera*	0.08	0.18	0.63	0.15	0.18	0.66	2.06	1.30	0.79	0.54	0.36	0.51	0.24	2.00		1.50	3.36	3.10		1.00	1.50	4.42	2.00
	Pericalymma ellipticum																		0.00					
	Persoonia elliptica										0.01		0.02											
	Persoonia longifolia		0.06	0.06	0.03	0.38	0.04	0.01	0.04		0.04	0.06	0.03	0.08	1.00	2.00	1.00		1.25	1.11		1.20	1.00	1.14
	Persoonia longifolia (seedling)																							
	Persoonia sp.																							1.00
	Petrophile macrostachya																							
	Philotheca spicata																	1.00						
	Philydrella drummondii																							
	Phyllanthus calycinus	0.10	0.06					0.01	0.01	0.09			0.01		2.00		3.00	6.68	3.00			2.33	5.47	5.06
	Pimelea ciliata	0.35							0.13	0.03											1.00	1.00		
	Pimelea lehmanniana												0.01											
	Pimelea sp.																							
	Pimelea suaveolens									0.06			0.01			1.40								
	Platysace commutata																							
	Platysace compressa			0.51	0.01									1.13			1.33		4.00	1.00	2.29		3.00	1.75
	Platysace filiformis																							
	Platysace tenuissima																							
	Poaceae sp.																1.00						1.00	
	Podolepis capillaris																							
	Podotheca angustifolia																							
	Podotheca gnaphalioides																							
	Poranthera microphylla									0.98														
	Prasophyllum elatum										0.08	0.04												
	Prasophyllum sp.																							
	Prasophyllum sp.1																							
	Pseudognaphalium luteoalbum																							
	Pteridium esculentum	0.04	0.15		0.03						0.60	0.19		1.25								1.80		
	Pterochaeta paniculata																							
*	*Pterostylis barbata*					0.09																		
*	*Pterostylis pyramidalis*						0.03	0.01	0.65	0.01			0.09											
*	*Pterostylis recurva*							0.01																
	Pterostylis sp.																							
	Pterostylis sp. 1																							
	Pterostylis vittata			0.03		0.11	0.03		0.02	0.01			0.01	0.08										
	Ptilotus drummondii																							
	Ptilotus drummondii var. drummondii																							4.00
	Ptilotus manglesii							0.02															5.80	
	Pyrorchis nigricans		0.01																					
	Ranunculus colonorum														1.00	1.25				1.00			1.00	2.75
	Restionaceae sp.																							

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

	Species	JD134	JD135	JD78	JD79	JD80	JD81	JD82	JD83	JD84	JD85	JD86	JD87	JD88	FMP001	FMP002	FMP003	FMP004	FMP005	FMP006	FMP007	FMP008	FMP009	FMP010
	Rytidosperma acerosum																							
	Rytidosperma caespitosum																							
	Rytidosperma setaceum					0.03																		
	Rytidosperma sp.																							
	Scaevola calliptera	0.23		0.64	0.46	0.09	0.54	0.08	0.34	0.60	0.48	0.05	0.06	0.34				1.00			1.00		1.40	2.00
	Scaevola pilosa										0.02													
	Scaevola sp.																							
	Senecio diaschides		0.09																					
	Senecio hispidulus								0.13	0.16														
	Senecio quadridentatus		0.01																					
	Senecio sp.																							
	Senecio sp.1																							
	Sonchus oleraceus					0.01	0.01			0.03														
	Sowerbaea laxiflora																							
*	*Sphaerolobium linophyllum*			0.01				0.17		0.01														
	Sphaerolobium macranthum																							
	Sphaerolobium medium	0.30																						
	Sphaerolobium sp.																							
	Stackhousia monogyna																						1.00	
	Stirlingia latifolia																							
	Stylidium amoenum					0.42			0.24	0.03		0.24			3.00		1.00	1.00	4.00	2.00				
	Stylidium androsaceum																4.00						6.00	
	Stylidium brunonianum																							
	Stylidium bulbiferum					0.01												1.00		1.00				1.00
	Stylidium calcaratum				0.38		0.06		0.15		0.25				1.00						6.00			
	Stylidium ciliatum															5.00				3.00	1.00			
	Stylidium hirsutum																							
	Stylidium hispidum	0.64	0.06					2.31	0.61	2.15														
	Stylidium junceum																		1.00					
	Stylidium lateriticola					0.13			0.11				0.04											
	Stylidium lineatum																	2.00						
	Stylidium piliferum						0.01		0.34						2.50	3.75	1.00	3.00	1.33	1.00	5.50		1.00	1.00
	Stylidium recurvum																							
	Stylidium repens																							
	Stylidium rhynchocarpum																							
	Stylidium scabridum																							
	Stylidium scariosum																							
	Stylidium schoenoides			0.06		0.04		0.06																
	Stylidium sp.																							
	Stylidium sp. 1																							
	Styphelia discolor		0.00	0.03	0.02		0.01				0.01									2.00			1.00	
*	*Styphelia hispida*																		2.00					2.50
	Styphelia nitens			0.00				0.20							1.50	1.50		1.00						
	Styphelia pallida											0.04	0.01	0.03										
	Styphelia propinqua	0.04	0.01	0.01	0.07		0.01	0.13					0.03	0.00	1.00	2.00		1.33	1.00	1.00				1.00

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

	Species	JD134	JD135	JD78	JD79	JD80	JD81	JD82	JD83	JD84	JD85	JD86	JD87	JD88	FMP001	FMP002	FMP003	FMP004	FMP005	FMP006	FMP007	FMP008	FMP009	FMP010
	Styphelia tenuiflora	0.01						0.01					0.01			1.00	1.00			1.00		1.00		
	Synaphea sp.																							
	Taxandria linearifolia																							
	Tetraria capillaris	0.58	0.49	1.06	1.80	0.64	0.13	0.33	0.86	0.14	3.88	1.83	2.03	2.58										
	Tetraria octandra						0.45	3.34	0.09				0.29											
	Tetraria sp. Jarrah Forest (R. Davis 7391)														4.27	1.50	1.67	6.90	3.33	3.25	2.33	2.33	3.78	4.40
	Tetrarrhena laevis	0.06	0.20	0.58	0.57	0.45	0.39	0.20	0.36	0.28	1.19	0.39	0.64	0.85	6.00	1.33	2.00	3.00	1.00	7.00		4.17	1.25	
	Tetratheca hirsuta	0.39		0.09	0.03	0.47					0.01	0.06	0.04	0.06	1.60	1.70		4.00	1.20	3.00		1.00	4.00	1.14
	Thelymitra crinita	0.14		0.06	0.04	0.13	0.38	0.06	0.15	0.19	0.15	0.05	0.13	0.18										
	Thelymitra macrophylla								0.09		0.01	0.01												
	Thelymitra sp.																	1.00						
*	*Thomasia paniculata*																							
	Thysanotus ? scaber																							
	Thysanotus dichotomus									0.26			0.29			2.00	1.00				1.00			
	Thysanotus fastigiatus														1.50	1.50	2.00	1.00	1.00		1.00		1.00	1.00
	Thysanotus manglesianus															3.00								
	Thysanotus multiflorus	0.18	0.11	0.05	0.26	0.71	0.48	1.59	1.76	1.13	0.03	0.03	0.08	0.38		1.50	1.00	1.00	1.00	1.00	2.00			1.00
	Thysanotus patersonii		0.01								0.01													
	Thysanotus sp.																							
	Thysanotus sp.1																							
	Thysanotus sparteus												0.03											
	Thysanotus tenellus																							
	Thysanotus thyrsoideus	0.89	0.29	0.10	0.02	0.08	0.36	0.34	0.56	0.75	0.03	0.06	0.05	0.14	1.00	1.00	2.00		2.80		2.00		1.75	3.20
	Trachymene pilosa	1.06	1.03	0.01	0.22	0.01	0.65	0.04	1.18	0.13	0.09			0.05			12.50						23.25	1.00
	Trichocline spathulata			0.04		0.24			0.50	0.34	0.06	0.24	0.46		2.17	1.25	1.67	1.86	2.00	1.00	1.00		2.00	1.83
	Tricoryne elatior							0.02		0.14				0.01										
	Tricoryne humilis						0.06	0.08					0.04											
	Trifolium dubium													0.04										
	Tripterococcus brunonis																							1.00
	Trymalium ledifolium	1.55	0.01			0.03				10.85					1.00	2.09		2.75	3.25				3.00	9.00
	Trymalium odoratissimum																							
	Trymalium odoratissimum subsp. odoratissimum			0.02							0.06													
	Utricularia multifida																							
	Vulpia myuros										0.19		0.15	0.24										
	Wahlenbergia preissii																							
	Xanthorrhoea gracilis	0.04	0.13	0.21	0.26	0.35	0.01	0.78	0.58	0.32	0.23	0.01	0.44	0.16		2.00		2.78				1.80		
	Xanthorrhoea preissii	0.26	0.25		0.23	0.23	0.08	0.19	0.02		0.01	0.74			1.46	1.67	1.00	2.00		1.75		1.00		
	Xanthosia atkinsoniana					0.03		1.64	1.65	0.06			0.01			1.00				1.67		1.00		5.60
	Xanthosia candida	0.31	0.01		0.08	0.71	1.11	0.93	3.67	4.16	0.24		0.07	0.13	1.00	1.00						2.50	10.00	2.71
	Xanthosia ciliata						0.01																	
	Xanthosia huegelii	0.10					0.04	0.04	0.01	0.01		0.01												1.00
	Xanthosia singuliflora																							
	Xylomelum occidentale																							

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

	Species	MY001	MY002	MY003	MY004	MY005	MY006	MY007	MY008	MY009	MY010	MY011	MY012	MY013	MY014	MY015	MY016	MY017	MY018	MY019	MY020	MY021	MY022
	Acacia alata																		1.67				1.00
	Acacia applanata			1.50																			
	Acacia barbinervis														1.00	1.00			1.33				
	Acacia browniana																						
	Acacia celastrifolia																						
	Acacia divergens											1.00											
	Acacia drummondii														1.00								
	Acacia extensa			1.50													2.00				1.00		
	Acacia lateriticola														1.00								
	Acacia nervosa																						
	Acacia preissiana																						
	Acacia pulchella			17.10		2.11	1.90					1.50					3.73	2.47			5.15		
	Acacia saligna				4.33																		
	Acacia sp.																						
	Acacia stenoptera														1.00	1.00							
	Acacia urophylla			3.47			1.00	2.00					1.00					1.67			1.45		
	Acacia varia																						
	Acacia willdenowiana																						
	Acacia drummondii subsp. candolleana																	4.72			1.00		1.00
	Adenanthos barbiger	3.00	1.75	2.55		2.47	1.69		3.33	1.83			3.06	4.29	1.20	2.00		2.60					3.00
	Agrostocrinum scabrum																						
	Aira caryophyllea																			14.86			
*	*Allocasuarina fraseriana*		1.00							1.33	1.18			1.00		1.00							1.36
	Amphipogon amphipogonoides														5.00	4.00				1.00		4.60	1.00
	Andersonia lehmanniana																4.25						
	Anigozanthos manglesii				1.00															4.63			
	Aotus cordifolia											2.67											
	Aphelia cyperoides				97.00																		
	Astartea scoparia				1.00							1.80					1.00			2.00			
	Asteraceae sp.				6.00																		
	Austrostipa eleganthissima																						
	Austrostipa mollis																2.00						
*	*Austrostipa sp.*						1.00																
	Babingtonia camphorosmae							6.85									2.50			5.25			1.00
	Banksia bipinnatifida																					3.00	
	Banksia dallanneyi subsp. dallanneyi var. dallanneyi	16.83	6.00				15.40	8.87	5.11	3.00	2.50	5.25	10.25			1.50	3.75	1.50	3.33	3.44	4.00	4.59	1.71
*	*Banksia fraseri*																						
	Banksia grandis		1.20	1.63		1.38	1.14		1.20	1.00	1.00			1.50		1.25		1.00	1.40		2.00		
	Banksia sessilis	5.50	1.00						1.00														
	Banksia sphaerocarpa																						
	Banksia grandis (seedling)	1.00	1.00			1.33				1.00													
	Banksia littoralis											1.00											
	Billardiera floribunda																						
	Billardiera sp.1															1.00							
	Billardiera variifolia																						

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

	Species	MY001	MY002	MY003	MY004	MY005	MY006	MY007	MY008	MY009	MY010	MY011	MY012	MY013	MY014	MY015	MY016	MY017	MY018	MY019	MY020	MY021	MY022
	Billardiera fraseri																						
	Billardiera fusiformis										2.50												
	Boronia crenulata											8.00											
	Boronia crenulata subsp. viminea											5.40											
	Boronia fastigiata	1.00	1.25	1.29		1.50			1.00	3.00	1.36		2.00	1.00	1.00			1.67	2.82			1.86	1.00
	Bossiaea aquifolium									6.00			2.00										
	Bossiaea ornata		1.00	5.31		3.50	1.00		8.00	2.50	2.00		1.92	1.82	2.00	1.33	1.00		2.00		2.92	3.90	2.85
	Bossiaea spinescens																						2.00
	Bossiaea eriocarpa																						
	Brachyscome pusilla																			12.86			
	Briza minor																10.00						
	Burchardia congesta																						
	Caladenia flava	1.50																3.00		2.60			
	Caladenia macrostylis																						
	Caladenia reptans																						
	Caladenia sp.	1.00				1.00			2.50	3.00	1.25		1.00										
*	*Caladenia sp. 1*	1.00																					
	Calothamnus quadrifidus																						
	Calothamnus sp.																			1.00			
	Cassytha glabella																						
	Cassytha sp.											12.00											
	Caustis dioica							4.33															
	Centaurium erythraea																						
	Centrolepis aristata				72.65															1.00			
	Chamaescilla corymbosa	6.00	4.75					3.00								2.00	5.00		1.00	1.00		5.20	3.00
	Chorizema cordatum						1.00	1.00	2.00	2.00			2.00										
	Chorizema rhombeum																						
	Clematis pubescens						1.00											2.38			1.60	1.00	
	Comesperma virgatum													1.00									
	Comesperma sp.		2.00																				
*	*Conospermum capitatum*																						
	Conospermum scaposum																			1.00			
	Conostylis aculeata																						
	Conostylis setigera	3.30	2.70			1.00	4.00	11.00	2.50	2.33	2.50	3.00	9.20						1.00				2.67
	Conostylis setosa	2.83	1.75						8.00		2.75		4.11			2.15							4.71
	Conostylis pusilla																4.43	3.00		6.00	2.50	2.20	
	Conostylis serrulata					2.00	2.40		3.25	2.00	2.00	2.33	3.80					2.00	2.00		1.60		
	Corymbia calophylla	1.00		1.00			1.00	1.00	1.00				1.00		1.33		1.00		1.00	1.33	1.00	1.00	
	Corymbia calophylla (seedling)	2.00		3.80		1.00	1.00	1.00					2.00										
	Craspedia variabilis										2.00									2.09			
	Cryptandra arbutiflora var. arbutiflora																1.67						
	Cryptostylis ovata																						
	Cyanicula sericea																						
	Cyathochaeta avenacea			1.00	5.00	4.27	1.00		5.13	5.42		6.60	5.13	1.00	5.53			6.60	1.00			3.33	4.67
	Cyperaceae sp.																						

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

	Species	MY001	MY002	MY003	MY004	MY005	MY006	MY007	MY008	MY009	MY010	MY011	MY012	MY013	MY014	MY015	MY016	MY017	MY018	MY019	MY020	MY021	MY022
	Cyrtostylis robusta																						
	Dampiera alata				2.50			5.00							2.00		4.25					1.00	
	Dampiera hederacea											2.00											
	Dampiera linearis			1.40	2.00	2.00		4.00	3.50	4.38		3.00	1.00		3.67						2.00	3.00	1.67
	Dasypogon bromeliifolius						4.00																
	Daucus glochidiatus																						
	Daviesia decurrens								1.00														1.00
	Daviesia horrida							1.00															
	Daviesia preissii																						
	Daviesia rhombifolia																						
	Desmocladus flexuosus	2.00	1.00	3.25			2.43	2.00		3.00	8.29		7.71	4.00	5.58						2.00	2.00	
	Desmocladus fasciculatus							4.45				3.50					1.71			5.25	2.67	4.00	
*	*Dianella revoluta*						1.00																
	Disa bracteata																						
	Diuris longifolia																						
	Drosera bulbosa																						
	Drosera erythrorhiza	1.67	3.33																			3.67	
	Drosera macrantha																						
	Drosera microphylla																						
	Drosera pallida																						
	Drosera platystigma																						
	Drosera pulchella																					1.00	
	Drosera sp.																				1.00	2.00	
	Drosera sp. (climbing)						1.00		1.00	3.00													
	Drosera sp. 1	2.00		2.00	1.33	3.60		3.50		1.00					1.00	1.00	1.60		1.50	1.00			1.00
	Drosera sp. 2				10.00	1.00		3.50	1.00			2.00					2.00	2.57		2.67		2.00	1.00
	Drosera stolonifera															2.00	2.00	2.33	1.67	1.00		1.00	
	Elythranthera brunonis							2.50															
	Erigeron sumatrensis																						
*	*Eriochilus dilatatus*																						
	Eucalyptus marginata	3.00	1.00	1.89		1.90	4.18	1.17	2.56	1.00	1.30	1.00	2.29	2.00	2.09	1.20		1.33	1.70	1.20	1.43	1.92	
	Eucalyptus marginata (seedling)	1.00	1.11	1.86		1.75	5.00	1.00	3.00	1.00	2.88	1.00	1.75										
	Eucalyptus patens																						
	Eucalyptus patens (seedling)											1.00											
	Eucalyptus sp.																						
	Gahnia decomposita																						
	Gastrolobium spinosum																						2.36
	Gastrolobium villosum																						2.00
	Glischrocaryon aureum																						3.33
	Gompholobium cyaninum																						
	Gompholobium knightianum	1.50		2.00		1.00	1.00		8.94	2.50													
	Gompholobium marginatum	3.25	1.00	2.00		2.00		4.71	4.17	1.67	1.50	2.50	1.00				4.82	16.75	2.00	8.44		3.44	1.67
	Gompholobium polymorphum							1.00							2.50	2.00		1.00	1.00	1.00		2.67	
	Gompholobium preissii			13.85		4.64			5.93	9.93	1.67					2.24		3.64	9.00	2.00	10.93	9.69	14.15
	Gompholobium sp.																						

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

	Species	MY001	MY002	MY003	MY004	MY005	MY006	MY007	MY008	MY009	MY010	MY011	MY012	MY013	MY014	MY015	MY016	MY017	MY018	MY019	MY020	MY021	MY022
*	*Gompholobium sp.1*														1.00								
	Gompholobium tomentosum								1.00		2.00												
	Gonocarpus cordiger																						
	Gonocarpus sp.																						
	Goodenia sp.1							2.00															
	Goodenia trinervis				12.76												3.00						
	Grevillea bipinnatifida							1.33															
	Grevillea pulchella																1.00						1.67
	Grevillea quercifolia																						
	Grevillea synapheae																						
	Grevillea wilsonii		2.25			1.00		1.00	4.25	2.27				2.00			4.00		1.00				1.00
	Haemodoraceae sp.																						
	Haemodorum laxum																						3.50
	Haemodorum sp.		1.00		3.64	1.50		3.50	1.00			1.00	1.00	1.00		1.00							3.00
	Haemodorum sp. 1				3.00			3.00					1.00			2.00	1.50						4.00
	Haemodorum sp. 2																1.33						
	Haemodorum spicatum																						
	Hakea amplexicaulis																						
	Hakea cyclocarpa							3.07	2.00														
	Hakea lissocarpha							1.00	1.00	1.00							1.00						2.00
	Hakea prostrata																1.83						
	Hakea ruscifolia																			1.00			
	Hakea varia				1.50															2.00			
	Hemiandra pungens																					2.00	
	Hemiandra pungens									3.29							3.00						
	Hemigenia pritzelii								2.00														
	Hibbertia acerosa	1.00									1.33		1.83									1.00	
	Hibbertia amplexicaulis	2.14	1.00	4.11		2.63	3.00	3.00	1.60		3.56		2.71	1.00				2.63		2.67	1.00	1.00	
	Hibbertia commutata		1.50	3.64		1.57	2.38	3.14	2.63	1.60	1.33		1.33	1.80	1.00			3.50	4.43	5.60	1.67		
	Hibbertia commutata (seedling)								4.00														
	Hibbertia huegelii				1.00								1.56									2.00	
	Hibbertia hypericoides	1.33		2.00				2.38	6.47							2.08				1.45	2.63	4.06	3.71
	Hibbertia lasiopus																						
	Hibbertia lineata							5.00															
	Hibbertia ovata																						
	Hibbertia perfoliata			2.00										1.67				3.75		3.00	1.80	3.20	
	Hibbertia quadricolor		2.28																				
	Hibbertia racemosa																						
	Hibbertia sp.										2.00												
	Hibbertia striata												1.00										
	Hovea chorizemifolia	1.75		1.00		1.29			2.00	1.00	1.44		1.40	1.80	2.00	1.00			1.00				
	Hovea trisperma							3.00			1.00			1.00									
	Hyalosperma cotula				79.40																3.00	7.50	
	Hybanthus calycinus																						
	Hybanthus floribundus						1.00	1.00								2.00			2.00				

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

	Species	MY001	MY002	MY003	MY004	MY005	MY006	MY007	MY008	MY009	MY010	MY011	MY012	MY013	MY014	MY015	MY016	MY017	MY018	MY019	MY020	MY021	MY022
	Hybanthus floribundus subsp. floribundus														2.00	2.14						1.00	
	Hydrocotyle callicarpa																						
	Hypocalymma angustifolium				2.67	1.00		8.95			1.00		1.00				3.00	2.00		1.00	1.00	1.00	
	Hypochaeris glabra			2.00	2.00							6.00	1.00							7.29	6.60		
	Hypolaena exsulca							17.00				164.29											
	Isolepis marginata																				6.00		
	Isotropis cuneifolia				3.40												1.00						
	Jacksonia alata																3.00						
	Juncus bufonius																						
	Kennedia coccinea			1.60		1.00	1.00		3.67	3.00				1.00	2.87	1.00		1.71	2.67		1.00	1.83	2.00
	Kennedia prostrata			2.86												1.50	1.00		1.75	2.46	2.09		
	Kingia australis							5.41															
	Kunzea glabrescens							1.00															
	Kunzea recurva							2.40															
	Labichea punctata	1.00	1.00								1.00		2.00					1.00					
	Lachnagrostis filiformis																						
	Lagenophora huegelii			1.00			1.00											1.50	2.50	1.00	2.81	3.00	2.00
	Lasiopetalum floribundum		1.00			2.50	3.07				4.29	2.00	1.00	1.00	4.00	1.00		2.33					3.00
	Lasiopetalum glabratum								2.50														3.25
	Lasiopetalum glutinosum																						
	Laxmannia squarrosa																6.00			2.00			
	Lechenaultia biloba	1.00				4.00	1.00	2.57	1.25	2.00		1.00			2.00	5.00	1.75		1.00			1.20	2.00
	Lepidobolus preissianus subsp. preissianus																12.40						
	Lepidosperma leptostachyum																						
	Lepidosperma longitudinale											15.00											
	Lepidosperma pubisquameum			2.00	4.00				4.00														3.50
	Lepidosperma sp.				20.67								3.00									1.00	4.00
	Lepidosperma sp.1			3.00			6.25									1.67							5.00
	Lepidosperma squamatum							11.00			3.00				4.00	1.60	2.00	1.00		1.00		1.50	1.75
	Lepidosperma tenue	3.00						2.00	6.60	3.50	1.83												
*	*Leporella fimbriata*																						
	Leptocarpus coangustatus																						
	Leptomeria cunninghamii														1.00	1.00							
	Leptospermum erubescens																		2.33				
	Leucopogon australis																						
	Leucopogon capitellatus			10.40		1.00	1.00	1.00													1.00		
*	*Leucopogon parviflorus*											1.50											
	Leucopogon sprengelioides																4.70						
	Leucopogon verticillatus	2.00					1.00								1.00				1.00				
	Levenhookia pusilla				10.00			10.00		1.00												3.00	
	Levenhookia stipitata																						
	Lindsaea linearis							1.00															
	Lobelia sp.											2.00											
	Lomandra brittanii						3.00	1.00		2.00													
	Lomandra caespitosa			7.00		1.00	1.75	4.00			2.50			1.00	1.00				2.90	1.20		5.33	4.67

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

Species	MY001	MY002	MY003	MY004	MY005	MY006	MY007	MY008	MY009	MY010	MY011	MY012	MY013	MY014	MY015	MY016	MY017	MY018	MY019	MY020	MY021	MY022
Lomandra drummondii																					1.00	
Lomandra hermaphrodita	4.00	1.00	1.00	2.00	2.58	1.86	2.50	2.86	2.36	2.60		2.22	1.00	1.83	1.78		3.79	3.38	1.50		2.00	2.83
Lomandra integra																						
Lomandra micrantha	1.00					4.00	4.00	5.00	2.00	2.00				1.00						1.00		
Lomandra micrantha subsp. micrantha														2.00								
Lomandra nigricans						3.00											5.60	1.00		4.43		
Lomandra odora														2.00								
Lomandra preissii						2.00	1.88	1.50	4.00	1.75		2.33	1.00	1.00							2.75	2.20
Lomandra purpurea																						
Lomandra sericea																						
Lomandra sonderi	1.00	2.55	3.33		2.78	1.20		4.14	3.83	4.77		7.36	7.75	1.63			3.00	2.00	1.00		4.00	
Lomandra sp.	1.00	1.00	1.00	1.00			1.50			1.33										4.33		
Lomandra sp.1															1.00							
Lomandra spartea	1.50	1.00			1.33	1.50	2.29	1.00	2.00	8.17		1.00	6.10	1.50	2.00	1.33	2.00				1.50	1.50
Loxocarya cinerea						1.00			1.00	4.70	3.00	3.25	2.00	3.00								
Lysimachia arvensis																20.00						
Macrozamia riedlei		1.00	2.09		1.00	1.38				1.00	1.50		1.00	1.00				1.00	1.00	1.25	1.00	
Macrozamia riedlei (seedling)						3.00																
Marianthus drummondianus																						
Melaleuca parviceps																3.00						
Melaleuca preissiana																						
Melaleuca viminea				4.77																		
Melaleuca viminea (seedling)				7.00																		
Mesomelaena graciliceps																					1.00	
Mesomelaena stygia				11.00																		
Mesomelaena tetragona				8.13																		
Microtis media																						
Millotia tenuifolia																26.50			15.63	14.17		
Mirbelia dilatata						2.60	1.00				5.00											
Monotaxis grandiflora																						
Monotaxis grandiflora var. grandiflora									2.00						1.00						6.00	6.50
Monotaxis occidentalis																						
Neurachne alopecuroidea	2.00		1.33	1.00	1.00	2.50	11.00			1.00	6.83	1.80	3.00	2.67	2.00	5.13	2.00	1.00	1.50		1.00	2.20
Opercularia apiciflora																						
Opercularia echinocephala			4.37	1.00	2.00	4.82	6.50	1.50	4.00	2.00	1.00				2.40		10.56	6.85	7.00	10.63	2.00	3.00
Opercularia hispidula																						
Opercularia sp.										2.00	2.00											
Opercularia vaginata																						
Orchidaceae sp.														1.00								
Orchidaceae sp. 1														1.83								
Orchidaceae sp. 2																1.00						
Orianthera serpyllifolia																						
Oxalis corniculata																						
Paspalidium sp.?															2.00							
Patersonia babianoides			1.50		1.00	1.00	1.00	2.00	2.00	2.50		1.25	1.50		1.33			2.25	2.00			1.50

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

	Species	MY001	MY002	MY003	MY004	MY005	MY006	MY007	MY008	MY009	MY010	MY011	MY012	MY013	MY014	MY015	MY016	MY017	MY018	MY019	MY020	MY021	MY022
	Patersonia juncea				8.89																		3.00
	Patersonia occidentalis			2.00	1.67			2.00	1.60	1.00					1.00		1.00	1.50		2.25	1.00		1.67
	Patersonia pygmaea				13.00			2.29					1.00				1.67						1.00
	Patersonia rudis							1.50	2.43	2.00			3.50					5.00					
*	*Pentapeltis peltigera*	1.00	3.80	5.00		1.00	2.40	4.00	1.86	4.83	4.00	2.00	4.73		4.74			2.60	1.50	1.50		3.88	2.25
	Pericalymma ellipticum				1.20			4.45		1.00							4.80						
	Persoonia elliptica																						
	Persoonia longifolia			1.00		1.00	1.50				1.00										1.00	2.00	
	Persoonia longifolia (seedling)		1.00				1.00																
	Persoonia sp.																						
	Petrophile macrostachya																						1.00
	Philotheca spicata							1.33												1.00			
	Philydrella drummondii				1.83																		
	Phyllanthus calycinus	6.09	1.00			4.38	1.00				2.75		2.55				1.00	3.63	1.50		2.65		
	Pimelea ciliata							2.00									3.50	1.00					
	Pimelea lehmanniana																						
	Pimelea sp.																1.00						
	Pimelea suaveolens	1.00						6.00								1.00	1.00	2.33		1.33		1.00	2.00
	Platysace commutata	2.86	1.67	5.89		5.30	7.92	2.00		1.00	1.00		14.18					3.20	3.50		11.22		1.00
	Platysace compressa																						
	Platysace filiformis																						
	Platysace tenuissima																						
	Poaceae sp.																						
	Podolepis capillaris				9.33																		
	Podotheca angustifolia																			5.00			1.00
	Podotheca gnaphalioides																20.00						
	Poranthera microphylla																					13.50	2.40
	Prasophyllum elatum																						
	Prasophyllum sp.															1.00							
	Prasophyllum sp.1					1.00			1.00														
	Pseudognaphalium luteoalbum																						
	Pteridium esculentum						4.11					1.67			3.10						3.67		
	Pterochaeta paniculata									16.43												5.00	2.00
*	*Pterostylis barbata*																						
*	*Pterostylis pyramidalis*																						
*	*Pterostylis recurva*																						
	Pterostylis sp.	1.00	1.00																				
	Pterostylis sp. 1														1.00	1.00							
	Pterostylis vittata																						
	Ptilotus drummondii																						
	Ptilotus drummondii var. drummondii																						
	Ptilotus manglesii									3.00	5.00					1.83	2.50						2.00
	Pyrorchis nigricans																						
	Ranunculus colonorum																						
	Restionaceae sp.																1.00						

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

	Species	MY001	MY002	MY003	MY004	MY005	MY006	MY007	MY008	MY009	MY010	MY011	MY012	MY013	MY014	MY015	MY016	MY017	MY018	MY019	MY020	MY021	MY022
	Rytidosperma acerosum																				1.33		
	Rytidosperma caespitosum		1.00		1.00	1.00		2.67															1.00
	Rytidosperma setaceum																						
	Rytidosperma sp.							3.00															
	Scaevola calliptera	1.00					2.00	1.00	4.70	9.00	1.50		1.00		2.38		2.00	2.00			1.50	8.20	2.00
	Scaevola pilosa																						
	Scaevola sp.			1.00			1.00																
	Senecio diaschides																		1.25	2.00	2.00		
	Senecio hispidulus																						
	Senecio quadridentatus																						
	Senecio sp.				1.00															1.50	2.00		
	Senecio sp.1																			6.00			
	Sonchus oleraceus																						
	Sowerbaea laxiflora			2.00	3.40		1.00				1.00		1.00										
*	*Sphaerolobium linophyllum*																						
	Sphaerolobium macranthum							1.00															
	Sphaerolobium medium			1.00			2.00	2.67							1.00							1.00	3.57
	Sphaerolobium sp.							2.00			1.00		1.00										
	Stackhousia monogyna												1.00										
	Stirlingia latifolia									4.40													
	Stylidium amoenum		1.00	1.50		4.00			5.25					2.33	1.83				5.00			5.00	1.00
	Stylidium androsaceum					1.00	1.50						1.00								5.69		3.00
	Stylidium brunonianum							2.00															
	Stylidium bulbiferum																						
	Stylidium calcaratum															1.00							
	Stylidium ciliatum							4.00														3.33	
	Stylidium hirsutum															1.00			5.33			10.14	
	Stylidium hispidum								8.00						1.00		3.50	2.50	3.00		9.00		
	Stylidium junceum																						
	Stylidium lateriticola																						
	Stylidium lineatum																						
	Stylidium piliferum	2.43	2.00	2.00		2.33	3.50		4.38	3.83						1.00	3.50	2.88	4.40	4.00	2.50	8.00	3.17
	Stylidium recurvum				22.14																		
	Stylidium repens																4.00					1.00	
	Stylidium rhynchocarpum														1.50								
	Stylidium scabridum					1.50		6.33	4.33		2.00	3.33										5.56	6.50
	Stylidium scariosum																					12.29	7.63
	Stylidium schoenoides										1.00				1.00	1.00			1.50			1.00	
	Stylidium sp.				20.00				3.00	2.00													
	Stylidium sp. 1								4.00														
	Styphelia discolor					3.00		1.00															
*	*Styphelia hispida*																						
	Styphelia nitens	2.67							1.00														
	Styphelia pallida												5.00										
	Styphelia propinqua	1.50						1.00	1.00		5.00	1.00		1.00					6.00		1.00		

APPENDIX J1: SUMMARY OF DENSITY ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: All data is plants/m^2 and rounded to 2 decimals places (so if 0.00 then value is < 0.01)

	Species	MY001	MY002	MY003	MY004	MY005	MY006	MY007	MY008	MY009	MY010	MY011	MY012	MY013	MY014	MY015	MY016	MY017	MY018	MY019	MY020	MY021	MY022
	Styphelia tenuiflora							1.50	1.00						1.00					1.00			
	Synaphea sp.							2.00															
	Taxandria linearifolia											10.00											
	Tetraria capillaris			1.00		5.17	4.00	5.00	9.33	2.00	3.80		1.50	4.29									
	Tetraria octandra			2.00			3.25	3.36	2.00	2.67		2.00	6.50	1.00		1.00	1.00	1.00		2.67		7.38	6.29
	Tetraria sp. Jarrah Forest (R. Davis 7391)	7.57	2.54	2.00		2.20	2.50	9.00	8.33	15.00	11.45		3.00	26.50	1.50	5.71	5.20	3.50	2.82	3.25	1.75	8.75	8.00
	Tetrarrhena laevis	1.50	1.00	1.80		1.00	2.00	4.25		3.00	3.00	1.00	2.60	1.00	2.50		1.50	1.00	1.00		2.00	1.33	
	Tetratheca hirsuta			2.00		4.00			1.33		1.25		1.00	1.00	2.29	1.00			1.43			1.75	2.00
	Thelymitra crinita										1.00	1.33	1.00										
	Thelymitra macrophylla																						
	Thelymitra sp.								1.00		1.00	1.00											
*	*Thomasia paniculata*								2.00			1.89											
	Thysanotus ? scaber																						6.50
	Thysanotus dichotomus								1.00	4.00								1.50					
	Thysanotus fastigiatus						1.00							2.00			2.00						
	Thysanotus manglesianus																				1.80		
	Thysanotus multiflorus			2.25		1.20	1.75	3.50		2.00	1.67	1.50			4.13	3.33	4.00	5.40	3.50	1.00	3.00	3.00	7.60
	Thysanotus patersonii						1.00		2.00														
	Thysanotus sp.						1.00			1.00									1.00				
	Thysanotus sp.1					1.50			1.00		1.00					1.00	2.67			1.00			2.00
	Thysanotus sparteus																						
	Thysanotus tenellus																						
	Thysanotus thyrsoideus								3.00	1.00	1.00										1.50	1.40	
	Trachymene pilosa		1.75				1.00										1.00			6.33	3.83	2.00	
	Trichocline spathulata	2.40	2.50		2.00	2.00	2.00		2.00	3.40	3.38		2.67	4.75	3.33	1.50	2.33	1.33	3.00			5.00	1.67
	Tricoryne elatior			16.22	4.00	5.00	8.14					3.33	14.60									1.67	
	Tricoryne humilis																						2.67
	Trifolium dubium																						
	Tripterococcus brunonis																2.00		2.00				6.25
	Trymalium ledifolium	5.50					1.00		5.70	2.00	1.71					1.00	4.00						
	Trymalium odoratissimum	2.00						3.00															
	Trymalium odoratissimum subsp. odoratissimum																						
	Utricularia multifida				9.60																		
	Vulpia myuros																						
	Wahlenbergia preissii																				3.00		
	Xanthorrhoea gracilis	1.50	1.50			5.50	2.88		2.45	1.57	2.56	2.00	1.75	1.00	3.09			3.50		1.00		1.89	1.00
	Xanthorrhoea preissii				1.80			3.55	1.00	2.50	1.00	4.83	3.50	4.00	1.33		1.00			1.00		1.00	1.00
	Xanthosia atkinsoniana	1.00	1.00			4.00	1.60			11.86	4.71	1.00	2.00					2.14	5.11		1.50	1.00	
	Xanthosia candida	2.00				2.75		10.36	4.90	7.10	3.20			1.50	4.40	1.60	2.60	4.92	2.00		2.60	7.27	3.00
	Xanthosia ciliata																						
	Xanthosia huegelii				4.50		1.00	3.00	3.00								2.00	3.00		10.38	4.00	2.00	
	Xanthosia singuliflora																						
	Xylomelum occidentale																			3.56			

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	HU1040	HU1041	HU1042	HU1043	HU1044	HU1045	HU1046	HU1047	HU1048	HU1049	HU1050	HU1075	HU1076	HU1077	HU1078	HU1079	HU1080	HU1081
Acacia alata		0.01			0.30				0.20									
Acacia applanata																		
Acacia barbinervis																		
Acacia browniana	0.50						5.20	19.60		6.30								
Acacia celastrifolia																		
Acacia divergens																		
Acacia drummondii	0.03		0.30			2.30										0.10		0.05
Acacia drummondii subsp. *candolleana*																		
Acacia extensa												0.00						
Acacia incrassata																		
Acacia lateriticola	3.60					5.00		25.00	0.50				0.04		0.01	0.26		
Acacia nervosa																		
Acacia preissiana								3.00		14.40								
Acacia pulchella	0.01													0.00				
Acacia saligna																		
Acacia stenoptera																		
Acacia urophylla																		
Acacia varia																		
Acacia willdenowiana			18.30		0.10	1.10												
Acacia sp.						0.02												
Adenanthos barbiger		0.03	0.40		59.50	43.80		1.60	26.72		39.90			1.29		3.67		0.26
Agrostocrinum scabrum														0.01	0.00			
* *Aira caryophyllea*													0.00					
Allocasuarina fraseriana					6.00					1.70	0.50				20.97			
Amphipogon amphipogonoides				0.02	2.81							0.00	0.04	0.02	0.06	0.01	0.08	0.01
Amphipogon laguroides																		
Andersonia latiflora																		
Andersonia lehmanniana																		
Anigozanthos manglesii																		
Aotus cordifolia																		
Aphelia cyperoides																		

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	HU1040	HU1041	HU1042	HU1043	HU1044	HU1045	HU1046	HU1047	HU1048	HU1049	HU1050	HU1075	HU1076	HU1077	HU1078	HU1079	HU1080	HU1081
Astartea scoparia																		
* Asteraceae sp.																		
Austrostipa elegantissima																		
Austrostipa mollis																		
Austrostipa sp.																		
* *Avena fatua*																		
Babingtonia camphorosmae																		
Banksia bipinnatifida																		
Banksia dallanneyi subsp. *dallanneyi* var. *dallanneyi*	1.00		2.90	56.35	19.00	5.00	9.50	1.75	0.25	56.70		0.15		0.64	0.81	0.75		
Banksia fraseri																		
Banksia grandis					4.50	1.30		0.10	22.97		29.20	4.50		3.99	0.03	1.42		
Banksia grandis (seedling)																		
Banksia littoralis																		
Banksia sessilis						0.30												
Banksia sphaerocarpa																		
Baumea juncea																		
Billardiera floribunda																		0.01
Billardiera variifolia														0.00	0.10			
Billardiera fraseri																		
Billardiera fusiformis																		
Billardiera sp.1																		
Boronia crenulata																		
Boronia crenulata subsp. *viminea*																		
Boronia fastigiata	1.49	4.48	4.80	1.52	3.60	2.10	1.81	0.61	0.50	4.90	2.90	0.02	0.01	0.02	0.00	0.01	0.00	
Boronia molloyae																		
Bossiaea aquifolium							165.00	12.00	211.50	1.40				0.00		6.64	18.68	5.00
Bossiaea ornata			6.00		5.98	0.10				20.40	2.90	0.00		0.03	0.01	0.00		0.03
Bossiaea eriocarpa																0.00		
Bossiaea spinescens																		
Brachyscome pusilla																		
* *Briza minor*																		

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	HU1040	HU1041	HU1042	HU1043	HU1044	HU1045	HU1046	HU1047	HU1048	HU1049	HU1050	HU1075	HU1076	HU1077	HU1078	HU1079	HU1080	HU1081
Bulbine semibarbata																		
Burchardia congesta																		
Caladenia flava														0.00			0.00	
Caladenia macrostylis																		
Caladenia reptans																		
Caladenia sp.			0.29			0.01	0.06						0.00					
Caladenia sp. 1																		
Calothamnus quadrifidus																		
Calothamnus sp.																		
Cassytha glabella																		
Cassytha racemosa																		
Cassytha sp.																		
Caustis dioica																		
* *Centaurium erythraea*																		
Centella asiatica																		
Centrolepis drummondiana																		
Centrolepis aristata																		
Chamaescilla corymbosa				0.40											0.02	0.01		
Chorizema cordatum						0.30								0.00	0.00		0.00	
Chorizema ilicifolium																		
Chorizema rhombeum								0.80										
Clematis pubescens	2.55		4.40			2.70		0.20					1.57				0.41	
Comesperma calymega																		
Comesperma virgatum										0.10					0.00		0.00	
Comesperma sp.																		
Conospermum capitatum																		
Conospermum scaposum																		
Conostylis aculeata																		
Conostylis setigera	3.75		2.60	3.90	16.20	1.40	0.70	0.72	0.77	5.70		0.02						
Conostylis setosa			0.70						0.01			0.05	0.00		0.00			
Conostylis pusilla																		

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

	Species	HU1040	HU1041	HU1042	HU1043	HU1044	HU1045	HU1046	HU1047	HU1048	HU1049	HU1050	HU1075	HU1076	HU1077	HU1078	HU1079	HU1080	HU1081
	Conostylis serrulata	3.90			0.10										0.03	0.00	0.01		
	Corymbia calophylla	1.47	0.88	3.00	0.42	0.30	0.50	1.35	5.40		17.80		10.49	9.66	3.58	3.01	1.82	7.22	
	Corymbia calophylla (seedling)																		
	Craspedia variabilis																		
	Cryptandra arbutiflora var. *arbutiflora*																		
	Cryptostylis ovata																		
	Cyanicula sericea																		
	Cyathochaeta avenacea	0.02		78.00	1.70				0.10	4.60		0.00	1.88		0.01			0.00	0.05
*	*Cyperus rotundus*																		
	Cyperaceae sp.																		
	Cyrtostylis robusta																	0.01	
	Dampiera alata																		
	Dampiera hederacea																		
	Dampiera linearis					0.90							0.00		0.00				
	Dampiera pedunculata																		
	Dasypogon bromeliifolius																		
	Daucus glochidiatus																		
	Daviesia decurrens					0.00													
	Daviesia horrida																		
	Daviesia physodes																		
	Daviesia preissii																		
	Daviesia rhombifolia																		
	Desmocladus fasciculatus	0.01																	
	Desmocladus flexuosus			0.20	0.10	0.40						0.14							
	Dianella revoluta					0.10	1.50								0.00				
	Dichopogon capillipes																		
*	*Disa bracteata*																		
	Diuris longifolia																		
	Drosera bulbosa																		
	Drosera erythrorhiza		0.15	0.08	1.18		0.50	0.03	0.05			0.10	0.00	0.00					
	Drosera macrantha																		

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

	Species	HU1040	HU1041	HU1042	HU1043	HU1044	HU1045	HU1046	HU1047	HU1048	HU1049	HU1050	HU1075	HU1076	HU1077	HU1078	HU1079	HU1080	HU1081
	Drosera microphylla																		
	Drosera pallida			0.05									0.00	0.01	0.01	0.00	0.00		
	Drosera platystigma																		
	Drosera pulchella																		
	Drosera sp.	0.05	0.58			0.16	0.35		0.32					0.00	0.01	0.00	0.01		
	Drosera sp. (climbing)																		
	Drosera sp. 1																		
	Drosera sp. 2																		
	Drosera stolonifera						0.50												
	Elythranthera brunonis																		
	Empodisma gracillimum																		
*	*Erigeron sumatrensis*																		
	Eriochilus dilatatus												0.00						
	Eriochilus scaber																		
	Eriochilus tenuis																		
	Eucalyptus marginata	14.21	6.69	7.50	23.38	1.54	5.88	3.87	12.29	1.42	71.70	23.32	26.96	24.81	22.15	12.97	53.17	33.03	22.94
	Eucalyptus marginata (seedling)																		
	Eucalyptus megacarpa																		
	Eucalyptus patens																		
	Eucalyptus patens (seedling)																		
	Eucalyptus rudis																		
	Eucalyptus sp.					0.14	8.30												
	Euchiton sphaericus																		
	Gahnia decomposita																		
	Gastrolobium ebracteolatum																		
	Gastrolobium spinosum																		
	Gastrolobium villosum																		
	Glischrocaryon aureum																		
	Gompholobium capitatum																		
	Gompholobium cyaninum				0.03														
	Gompholobium knightianum			3.40			1.50								0.01				

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	HU1040	HU1041	HU1042	HU1043	HU1044	HU1045	HU1046	HU1047	HU1048	HU1049	HU1050	HU1075	HU1076	HU1077	HU1078	HU1079	HU1080	HU1081
Gompholobium marginatum			0.70	0.10		0.20					0.13							
Gompholobium polymorphum	0.01		0.30					0.60						0.02	0.00	0.01		
Gompholobium preissii															0.00			
Gompholobium tomentosum																		
Gompholobium sp.									0.20									
Gompholobium sp.1																		
Gonocarpus benthamii																		
Gonocarpus cordiger																		
Gonocarpus sp.																		
Goodenia sp.1																		
Goodenia trinervis																		
Grevillea bipinnatifida																		
Grevillea pulchella																		
Grevillea quercifolia																		
Grevillea synapheae																		
Grevillea variifolia																		
Grevillea wilsonii						22.00									5.69			
Haemodorum laxum															0.00	0.01	0.00	
Haemodocum spicatum																		
Haemodorum sp.				0.20	0.30				2.50	0.30								
Haemodorum sp. 1																		
Haemodorum sp. 2																		
Haemodoraceae sp.																		
Hakea amplexicaulis					6.20													
Hakea cyclocarpa																		
Hakea lissocarpha															0.01			
Hakea prostrata																		
Hakea ruscifolia															0.02			
Hakea varia																		
Hemiandra pungens																		
Hemigenia pritzelii				0.42														0.00

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	HU1040	HU1041	HU1042	HU1043	HU1044	HU1045	HU1046	HU1047	HU1048	HU1049	HU1050	HU1075	HU1076	HU1077	HU1078	HU1079	HU1080	HU1081
Hibbertia acerosa				21.44	0.90	7.20	0.01		12.10	12.00	1.00	0.64						
Hibbertia amplexicaulis		0.25			1.50	15.40		0.40	0.95	3.70	2.40	0.02	0.01	0.05	0.05	0.04	0.20	
Hibbertia commutata		0.01	0.30		13.20	23.40	4.50	1.10	3.67		9.55	0.01	0.02	0.20	0.18	0.04	0.06	
Hibbertia commutata (seedling)																		
Hibbertia diamesogenos																		
Hibbertia huegelii					0.20								0.06					
Hibbertia hypericoides					1.25													
Hibbertia lasiopus							1.50			2.80								
Hibbertia lineata																		
Hibbertia ovata					0.90							0.16		0.00				
Hibbertia perfoliata					1.70						0.50							
Hibbertia quadricolor												0.06						
Hibbertia racemosa												0.05						
Hibbertia sp.																		
Hibbertia striata																		
Hovea chorizemifolia	0.13	0.64	7.90	0.07		1.05	0.10	0.92	0.02	1.00	0.34	0.00		0.01	0.00	0.01	0.01	0.00
Hovea trisperma																		
Hyalosperma cotula																		
Hybanthus calycinus												0.01		0.00			0.02	
Hybanthus debilissimus																		
Hybanthus floribundus											7.77	0.00						
Hybanthus floribundus subsp. *floribundus*																		
Hydrocotyle callicarpa													0.00		0.00			
Hypocalymma angustifolium													2.23					
Hypocalymma cordifolium																		
* *Hypochaeris glabra*													0.00					
Hypolaena exsulca																		
Isolepis marginata																		
Isotoma hypocrateriformis																		
Isotropis cuneifolia																		
Jacksonia alata																		

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	HU1040	HU1041	HU1042	HU1043	HU1044	HU1045	HU1046	HU1047	HU1048	HU1049	HU1050	HU1075	HU1076	HU1077	HU1078	HU1079	HU1080	HU1081
* *Juncus bufonius*																		
Juncus planifolius																		
Juncus subsecundus																		
Kennedia coccinea											0.36			0.01				
Kennedia prostrata																		
Kingia australis																		
Kunzea glabrescens																		
Kunzea recurva																		
Labichea punctata												0.00		0.01	0.02			
Lachnagrostis filiformis																		
Lagenophora huegelii		0.40				1.20	0.19	0.40	0.02				0.04	0.01		0.02		
Lasiopetalum floribundum	29.00	32.80			146.72						117.50	0.10	3.85	6.28	0.00	1.13	9.48	1.35
Lasiopetalum glabratum															0.53			
Lasiopetalum glutinosum																		
Laxmannia squarrosa																		
Lechenaultia biloba	0.41	0.07				0.40	0.20	0.10		0.90		0.00				0.00		
Lepidobolus preissianus subsp. *preissianus*																		
Lepidosperma gracile																		
Lepidosperma leptostachyum																		
Lepidosperma longitudinale																		
Lepidosperma pubisquameum																		
Lepidosperma squamatum												0.00						
Lepidosperma tenue					4.00		1.10			4.40		0.00						
Lepidosperma tetraquetrum																		
Lepidosperma sp.																		
Lepidosperma sp.1																		
Leporella fimbriata																		
Leptocarpus coangustatus					0.01													
Leptomeria cunninghamii			0.00		6.00													
Leptospermum erubescens																		
Leucopogon australis																		

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	HU1040	HU1041	HU1042	HU1043	HU1044	HU1045	HU1046	HU1047	HU1048	HU1049	HU1050	HU1075	HU1076	HU1077	HU1078	HU1079	HU1080	HU1081
Leucopogon capitellatus					0.30	11.00					0.20			0.29	0.00	0.01		0.05
Leucopogon hirsutus																		
Leucopogon parviflorus																		
Leucopogon sprengelioides																		
Leucopogon verticillatus					6.10					2.00	1.30			0.19		0.02		
Levenhookia pusilla				0.03			1.00						0.00		0.01			
Levenhookia stipitata																		
Lindsaea linearis																		
Liparophyllum capitatum																		
Lobelia gibbosa																		
Lobelia sp.																		
Lomandra brittanii													0.00	0.00				
Lomandra caespitosa	27.60	2.53	1.20	8.63	0.50	2.00	0.32	1.82	3.12	8.10	29.10	0.51	0.33	0.05	0.01	0.03	0.00	0.39
Lomandra drummondii		7.35							0.20									
Lomandra hermaphrodita	1.01	0.20	9.00	0.32	2.90	7.70	2.43	1.01	0.43	3.70	0.32	0.03	0.05		0.03	0.01		
Lomandra integra																		
Lomandra micrantha														2.05	0.03	0.82		0.37
Lomandra micrantha subsp. *micrantha*																		
Lomandra nigricans			4.00									0.00	0.00			0.01		
Lomandra odora			1.90		0.40	0.10												
Lomandra preissii	3.20						0.30	1.00				0.01	0.01			0.02	0.11	
Lomandra purpurea						0.30												
Lomandra sericea		0.07													0.00	0.01		
Lomandra sonderi	3.50	7.80	6.60	0.80	1.00	19.60	1.00	20.50	4.20	6.70	35.50	1.61	0.02	0.37	0.98	1.44		0.40
Lomandra sp.				0.01	3.20						0.80		0.00			0.00		
Lomandra sp.1																		
Lomandra spartea		0.60	5.10		3.80	17.50	4.10		0.08		4.50	0.01	0.06	0.01	0.14	0.01		
Loxocarya cinerea				0.01				0.60		1.20	6.35	0.00			0.11			
Lyperanthus serratus																		
Lysimachia arvensis																		
Macrozamia riedlei	33.50	34.50	9.00			57.00	42.60	82.40	13.00		7.10		2.20	2.83		0.98	13.10	1.01

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	HU1040	HU1041	HU1042	HU1043	HU1044	HU1045	HU1046	HU1047	HU1048	HU1049	HU1050	HU1075	HU1076	HU1077	HU1078	HU1079	HU1080	HU1081
Macrozamia riedlei (seedling)																		
Marianthus drummondianus																		
Melaleuca incana																		
Melaleuca parviceps																		
Melaleuca preissiana																		
Melaleuca viminea																		
Melaleuca viminea (seedling)																		
Mesomelaena graciliceps																		
Mesomelaena stygia																		
Mesomelaena tetragona																		
Microtis media																	0.02	
Millotia tenuifolia				0.02									0.00					
Mirbelia dilatata																		
Monotaxis grandiflora													0.01					
Monotaxis grandiflora var. *grandiflora*																		
Monotaxis occidentalis																		
Neurachne alopecuroidea											0.10				0.01			0.01
Olax benthamiana																		
Opercularia apiciflora														0.00			0.03	0.02
Opercularia echinocephala	0.70	1.16		0.19		0.50	0.30	1.42					0.01			0.01		
Opercularia hispidula																		
Opercularia vaginata					0.10													
Opercularia sp.																		
Orchidaceae sp.																		
Orchidaceae sp. 1																		
Orchidaceae sp. 2																		
Orianthera serpyllifolia		0.03												0.01				
* *Oxalis compressa*																		
* *Oxalis corniculata*																		
Paraserianthes lophantha																		
Paspalidium sp.?																		

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	HU1040	HU1041	HU1042	HU1043	HU1044	HU1045	HU1046	HU1047	HU1048	HU1049	HU1050	HU1075	HU1076	HU1077	HU1078	HU1079	HU1080	HU1081
Patersonia babianoides														0.00	0.00	0.00		
Patersonia juncea																		
Patersonia occidentalis								0.10				0.03			0.25	0.16		
Patersonia pygmaea								0.05										
Patersonia rudis															0.00			
Pentapeltis peltigera	0.03	0.24	0.40	0.21	5.70	6.75	1.24	0.52	0.85	3.80	6.49	0.09	0.11	0.11	0.04	0.10	0.02	
Pericalymma ellipticum				0.80														
Persoonia elliptica												0.10						
Persoonia longifolia					10.50	0.50			1.50		2.00	0.07	0.24	1.41	0.01	0.01	0.10	
Persoonia longifolia (seedling)																		
Persoonia sp.																		
Petrophile macrostachya																		
Pheladenia deformis																		
Philotheca spicata							0.01				0.10							
Philydrella drummondii																		
Philydrella pygmaea																		
Phyllangium paradoxum																		
Phyllanthus calycinus	6.00	2.80	37.40	20.55		27.90	3.10	4.20		0.10	9.00	0.00		0.28	1.96	0.86		
Pimelea ciliata																		
Pimelea lehmanniana																		
Pimelea suaveolens			2.80				0.05								0.01			
Pimelea sp.																		
Plantago lanceolata																		
Platysace commutata																		
Platysace compressa	0.01	37.20					5.54	40.40		0.30			0.01	0.02		0.07		
Platysace filiformis			9.30		2.00	0.10				0.20								
Platysace tenuissima	1.00			1.00								0.00						
Poaceae sp.																		
Podolepis capillaris																		
Podotheca angustifolia																		
Podotheca gnaphalioides																		

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	HU1040	HU1041	HU1042	HU1043	HU1044	HU1045	HU1046	HU1047	HU1048	HU1049	HU1050	HU1075	HU1076	HU1077	HU1078	HU1079	HU1080	HU1081
Poranthera microphylla															0.00			
Prasophyllum brownii																		
Prasophyllum elatum																		
Prasophyllum sp.																		
Prasophyllum sp.1																		
Pseudognaphalium luteoalbum				0.62														
Pteridium esculentum		8.20		0.02	0.42												1.32	2.25
Pterochaeta paniculata										0.10								
Pterostylis barbata																		
Pterostylis pyramidalis																		
Pterostylis recurva												0.00						
Pterostylis vittata												0.00						
Pterostylis sp.																		
Pterostylis sp. 1																		
Ptilotus drummondii				0.54														
Ptilotus drummondii var. *drummondii*																		
Ptilotus manglesii																		
Pyrorchis nigricans															0.00			
Ranunculus colonorum																		
Ranunculus muricatus																		
Restionaceae sp.																		
Rytidosperma acerosum																		
Rytidosperma caespitosum															0.02			
Rytidosperma setaceum																		
Rytidosperma sp.																		
Scaevola calliptera	0.01		0.10	0.03	0.96						0.02			0.01		0.00		0.01
Scaevola sp.																		
Scaevola pilosa																		
Senecio diaschides																		
Senecio hispidulus													0.01					
Senecio sp.																		

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

	Species	HU1040	HU1041	HU1042	HU1043	HU1044	HU1045	HU1046	HU1047	HU1048	HU1049	HU1050	HU1075	HU1076	HU1077	HU1078	HU1079	HU1080	HU1081
	Senecio sp.1																		
	Senecio quadridentatus																		
*	*Sonchus oleraceus*																		
	Sowerbaea laxiflora					0.20													
	Sphaerolobium linophyllum																		
	Sphaerolobium macranthum																		
	Sphaerolobium medium														0.00				
	Sphaerolobium sp.																		
	Stachystemon vermicularis																		
	Stackhousia monogyna																		
	Stirlingia latifolia																		
	Stylidium amoenum		0.30	0.90	0.06		0.40									0.00	0.01		
	Stylidium androsaceum						0.04												
	Stylidium brunonianum																		
	Stylidium bulbiferum																		
	Stylidium calcaratum		0.10						0.10					0.00					
	Stylidium ciliatum																		
	Stylidium crassifolium																		
	Stylidium hirsutum																		
	Stylidium junceum										0.20		0.00			0.00			
	Stylidium lateriticola																		
	Stylidium lineatum																		
	Stylidium piliferum		1.48			0.10	0.70	0.40	0.41							0.00			
	Stylidium recurvum																		
	Stylidium repens																		
	Stylidium rhynchocarpum																		
	Stylidium scabridum																		
	Stylidium scariosum																		
	Stylidium schoenoides					0.50													
	Stylidium spathulatum																		
	Stylidium thesioides																		

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	HU1040	HU1041	HU1042	HU1043	HU1044	HU1045	HU1046	HU1047	HU1048	HU1049	HU1050	HU1075	HU1076	HU1077	HU1078	HU1079	HU1080	HU1081
Stylidium hispidum															0.01			
Stylidium sp.																		
Stylidium sp. 1																		
Styphelia discolor														0.00				
Styphelia erubescens																		
Styphelia hispida																		
Styphelia nitens		1.00			3.00		1.70	0.90	0.25	2.00	8.20			0.10				
Styphelia pallida		0.90			7.50	5.00		0.20		1.00								
Styphelia propinqua								0.02					0.10					0.03
Styphelia tenuiflora	1.50				4.00	8.00			2.50			0.00		0.05	0.01	0.13		
Synaphea sp.																		
Taxandria linearifolia																		
Tetraria capillaris	5.17	3.80	3.20	1.65	85.80	17.80	1.35	4.04	1.22		0.40	0.16	0.08	0.13	0.06	1.12	0.00	0.09
Tetraria octandra				0.05											0.02			
Tetraria sp. Jarrah Forest (R. Davis 7391)																		
Tetrarrhena laevis	6.16	0.36	4.60		2.69	1.38	0.48	0.43		3.60	2.69	0.02	0.07	0.40	0.05	0.01	0.05	0.02
Tetratheca hirsuta			0.20		0.68	1.90			0.26		2.34	0.01		0.03	0.00	0.00	0.00	0.00
Thelymitra antennifera																		
Thelymitra crinita						0.05						0.02	0.00	0.00		0.00		0.00
Thelymitra macrophylla													0.01					
Thelymitra sp.						0.15									0.00			
Thomasia paniculata																		
Thomasia pauciflora																		
Thysanotus anceps																		
Thysanotus dichotomus					27.40	0.10												
Thysanotus fastigiatus										0.30								
Thysanotus gracilis																		
Thysanotus manglesianus														0.00				
Thysanotus multiflorus			0.70									0.00		0.00			0.00	
Thysanotus patersonii																		
Thysanotus ? scaber																		

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

	Species	HU1040	HU1041	HU1042	HU1043	HU1044	HU1045	HU1046	HU1047	HU1048	HU1049	HU1050	HU1075	HU1076	HU1077	HU1078	HU1079	HU1080	HU1081
	Thysanotus sp.																0.00		
	Thysanotus sp.1																		
	Thysnaotus sparteus																		
	Thysanotus tenellus	0.02	0.20					0.92	0.11		0.10								
	Thysanotus thyrsoideus	0.20			0.30	0.29	0.20						0.00		0.01	0.01	0.00	0.01	0.01
	Trachymene pilosa		0.35	0.29	0.47		0.01	0.61	0.23		4.50	0.80		0.02	0.01				0.00
	Trichocline spathulata	0.05	0.05		0.05	0.88				0.03		0.07	0.01	0.00	0.01	0.02			0.01
	Tricoryne elatior																		
	Tricoryne humilis																		
	Tripterococcus brunonis																		
*	*Trifolium dubium*																		
	Tripterococcus brunonis																		
	Trymalium ledifolium	1.10	11.00		10.17			16.02	3.20	0.71	8.90		0.00	0.03			0.07		
	Trymalium odoratissimum							0.10											
	Trymalium odoratissimum subsp. *odoratissimum*																		
	Trymalium spatulatum																		
	Utricularia multifida																		
	Viminaria juncea																		
*	*Vulpia myuros*																		
	Wahlenbergia preissii																		
	Wurmbea dioica																		
	Xanthorrhoea gracilis	0.60		12.50		11.30	61.10		4.50	29.10	3.50	57.60	6.65	0.03	1.86	2.37	0.37	0.06	0.35
	Xanthorrhoea preissii						22.60		58.70	9.80		20.00	0.01		4.15			3.09	
	Xanthosia atkinsoniana	0.01		2.80				0.18		0.04		0.05	0.01						0.00
	Xanthosia candida				0.07	0.20					0.50	2.65		0.02		0.01			0.00
	Xanthosia ciliata																		
	Xanthosia huegelii		0.02							0.01			0.00						
	Xanthosia singuliflora					0.05													
	Xylomelum occidentale																		

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	JD134	JD135	JD78	JD79	JD80	JD81	JD82	JD83	JD84	JD85	JD86	JD87	JD88	FMP001	FMP002	FMP003	FMP004	FMP005	FMP006	FMP007	FMP008	FMP009	FMP010
Acacia alata									0.06														
Acacia applanata																							
Acacia barbinervis												0.01						5.00					
Acacia browniana																							
Acacia celastrifolia													0.06										
Acacia divergens																							
Acacia drummondii					0.00			0.00											0.20		0.10		0.20
Acacia drummondii subsp. *candolleana*																							
Acacia extensa																							0.50
Acacia incrassata																							
Acacia lateriticola					0.01																		0.10
Acacia nervosa																							0.75
Acacia preissiana																							
Acacia pulchella	20.90	12.70			0.11	0.00					0.40		0.01	0.40			1.15	0.72	0.01				0.10
Acacia saligna																							
Acacia stenoptera																							
Acacia urophylla	1.10	1.66	0.17	0.98	1.75			0.03		1.86	0.69		0.31	0.10			1.00	1.43	0.50		0.50	0.88	
Acacia varia						0.04	0.07																
Acacia willdenowiana							0.03																
Acacia sp.															0.20								
Adenanthos barbiger	1.17	0.25	0.03		5.75	2.31	3.94	0.58	5.21	0.02	0.01	5.73	1.71	2.87	4.37	2.83		2.67	2.45	2.00	3.67		5.36
Agrostocrinum scabrum			0.01	0.01	0.01	0.06	0.02				0.02	0.01			0.65	0.35				0.30			
* *Aira caryophyllea*		0.03																					
Allocasuarina fraseriana	0.00		0.46		8.73	25.70	0.01		0.26		2.10	20.33				40.00							16.86
Amphipogon amphipogonoides																							
Amphipogon laguroides																							
Andersonia latiflora																							
Andersonia lehmanniana																							
Anigozanthos manglesii																							
Aotus cordifolia																							
Aphelia cyperoides																							

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	JD134	JD135	JD78	JD79	JD80	JD81	JD82	JD83	JD84	JD85	JD86	JD87	JD88	FMP001	FMP002	FMP003	FMP004	FMP005	FMP006	FMP007	FMP008	FMP009	FMP010
Astartea scoparia																							
* Asteraceae sp.																0.10							
Austrostipa elegantissima																0.50	0.10						
Austrostipa mollis																							
Austrostipa sp.																							
* *Avena fatua*																							
Babingtonia camphorosmae																							
Banksia bipinnatifida																							
Banksia dallanneyi subsp. *dallanneyi* var. *dallanneyi*						0.59	1.70		1.60			3.66		4.50	8.31		5.81	3.69	2.33	3.00		6.32	
Banksia fraseri															0.50								
Banksia grandis	0.30	0.25	5.95		1.36	0.69	0.03	0.00	0.00	0.00	8.16	0.17	1.81	13.76		2.13		7.87	13.91		5.70	2.00	0.50
Banksia grandis (seedling)																							
Banksia littoralis																							
Banksia sessilis																							
Banksia sphaerocarpa															7.00								
Baumea juncea																							
Billardiera floribunda				0.00																			
Billardiera variifolia												0.01											
Billardiera fraseri						0.02																	
Billardiera fusiformis					0.00																		
Billardiera sp.1																							
Boronia crenulata																							
Boronia crenulata subsp. *viminea*																							
Boronia fastigiata	0.58	0.15	0.21	0.10	0.29	0.08	0.05	0.00	0.07			0.09	0.22		1.05	0.52	0.50	0.96	0.10	0.30	0.20	0.67	0.18
Boronia molloyae																							
Bossiaea aquifolium		5.00												6.38	8.46	1.28	4.15	2.30	9.51	1.70			
Bossiaea ornata			2.26	0.41	0.10	0.22	0.04	0.00	0.02		0.91	11.41	0.37	0.15	0.88	0.26		0.31	0.46	0.48	0.50	0.44	0.30
Bossiaea eriocarpa																							
Bossiaea spinescens																							
Brachyscome pusilla																							
* *Briza minor*	0.00																						

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	JD134	JD135	JD78	JD79	JD80	JD81	JD82	JD83	JD84	JD85	JD86	JD87	JD88	FMP001	FMP002	FMP003	FMP004	FMP005	FMP006	FMP007	FMP008	FMP009	FMP010
Bulbine semibarbata																							
Burchardia congesta	0.01	0.05	0.16	0.10	0.03	0.06		0.01			0.00		0.26							0.10		0.50	
Caladenia flava	0.01	0.00	0.01	0.01	0.01	0.00	0.00		0.04	0.01	0.00		0.01										
Caladenia macrostylis			0.00					0.00															
Caladenia reptans						0.02		0.01															
Caladenia sp.																							
Caladenia sp. 1																							
Calothamnus quadrifidus		0.05																					
Calothamnus sp.																							
Cassytha glabella	0.08	0.07								0.85													
Cassytha racemosa																							
Cassytha sp.																							
Caustis dioica																							
* *Centaurium erythraea*		0.00																					
Centella asiatica																							
Centrolepis drummondiana																							
Centrolepis aristata							0.00																
Chamaescilla corymbosa									0.20			0.12			0.10		0.10						0.75
Chorizema cordatum														0.10		0.60		0.30	0.88	1.50			
Chorizema ilicifolium																							
Chorizema rhombeum																							
Clematis pubescens	0.10	0.36	0.24	0.16				0.20		2.51	0.60		2.65	0.35							2.10	1.20	
Comesperma calymega																							
Comesperma virgatum	0.04	0.02	0.02	0.01	0.02	0.00	0.01	0.00				0.01	0.00				0.15						0.10
Comesperma sp.																							
Conospermum capitatum						0.01																	
Conospermum scaposum																							
Conostylis aculeata								0.01				0.01	0.08										
Conostylis setigera														0.30	0.40	0.26	0.37	0.50		1.36		0.28	0.45
Conostylis setosa						0.01	0.74	0.01	0.09			0.71		0.10	0.26		0.35	0.20		0.55			
Conostylis pusilla																							

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

	Species	JD134	JD135	JD78	JD79	JD80	JD81	JD82	JD83	JD84	JD85	JD86	JD87	JD88	FMP001	FMP002	FMP003	FMP004	FMP005	FMP006	FMP007	FMP008	FMP009	FMP010
	Conostylis serrulata	0.01					0.06	0.23	0.03	0.05			0.28											
	Corymbia calophylla			0.62	30.57		0.57	0.07	0.52	0.04	14.33	1.82	9.87	9.65	11.40			13.61	15.88	20.21	16.98	6.88	14.33	0.50
	Corymbia calophylla (seedling)																							
	Craspedia variabilis																					0.75		
	Cryptandra arbutiflora var. *arbutiflora*																							
	Cryptostylis ovata			0.02																				
	Cyanicula sericea			0.01					0.00															
	Cyathochaeta avenacea		0.00	0.08	1.20	0.24	13.48	7.98	5.85	7.17			15.34	1.54	0.10	0.40	0.90	3.63	1.44	2.04			0.48	
*	*Cyperus rotundus*																							
	Cyperaceae sp.																		0.20					
	Cyrtostylis robusta		0.03	0.00		0.14								0.10										
	Dampiera alata																							
	Dampiera hederacea																							
	Dampiera linearis						0.44	0.03				0.05	0.02	0.19				0.20	0.50					0.10
	Dampiera pedunculata																							
	Dasypogon bromeliifolius																							
	Daucus glochidiatus		0.09		0.00						0.01			0.45										
	Daviesia decurrens									0.02			0.68						0.75					
	Daviesia horrida																							
	Daviesia physodes																							
	Daviesia preissii																		1.50					
	Daviesia rhombifolia															0.20								
	Desmocladus fasciculatus																							
	Desmocladus flexuosus	1.15						0.01	2.79			8.91	0.66			0.10			0.17				0.20	
	Dianella revoluta																			1.45				
	Dichopogon capillipes																							
*	*Disa bracteata*										0.00			0.01										
	Diuris longifolia	0.00				0.00				0.01				0.00										
	Drosera bulbosa			0.00		0.02		0.17					0.01	0.01										
	Drosera erythrorhiza	0.00		0.03			0.06						0.06	0.07										
	Drosera macrantha					0.15							0.01											

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	JD134	JD135	JD78	JD79	JD80	JD81	JD82	JD83	JD84	JD85	JD86	JD87	JD88	FMP001	FMP002	FMP003	FMP004	FMP005	FMP006	FMP007	FMP008	FMP009	FMP010
Drosera microphylla						0.00																	
Drosera pallida	0.03		0.05		0.01	0.00		0.22	0.04			0.01											
Drosera platystigma							0.01																
Drosera pulchella																							
Drosera sp.																0.04			0.10			0.20	
Drosera sp. (climbing)																							
Drosera sp. 1																							
Drosera sp. 2																							
Drosera stolonifera							0.05			0.05													
Elythranthera brunonis																							
Empodisma gracillimum																							
* *Erigeron sumatrensis*		0.01																					
Eriochilus dilatatus					0.00			0.00	0.01		0.00												
Eriochilus scaber																							
Eriochilus tenuis																							
Eucalyptus marginata			51.90	35.71	19.86	14.87	0.19	1.08	0.89	35.67	21.71	44.12	60.29	28.17	23.54	16.01	31.50	36.15	22.55	13.16	23.47	30.79	14.21
Eucalyptus marginata (seedling)																							
Eucalyptus megacarpa																							
Eucalyptus patens																							
Eucalyptus patens (seedling)																							
Eucalyptus rudis																							
Eucalyptus sp.																		0.15					0.46
Euchiton sphaericus																							
Gahnia decomposita																							
Gastrolobium ebracteolatum																							
Gastrolobium spinosum																							
Gastrolobium villosum																							0.10
Glischrocaryon aureum									0.03			0.02											
Gompholobium capitatum																							
Gompholobium cyaninum																							0.50
Gompholobium knightianum							0.01					0.10					0.20						0.50

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	JD134	JD135	JD78	JD79	JD80	JD81	JD82	JD83	JD84	JD85	JD86	JD87	JD88	FMP001	FMP002	FMP003	FMP004	FMP005	FMP006	FMP007	FMP008	FMP009	FMP010
Gompholobium marginatum	0.03						0.00		0.01								0.24	0.10				0.20	
Gompholobium polymorphum			0.02			0.02	0.29		0.07					0.20	0.20	0.70	0.19	0.10				0.18	
Gompholobium preissii	0.30	0.29				0.03	0.13		0.09			0.27					0.75			0.20			0.26
Gompholobium tomentosum																							
Gompholobium sp.																							
Gompholobium sp.1																							
Gonocarpus benthamii																							
Gonocarpus cordiger																						0.20	
Gonocarpus sp.																	0.05						
Goodenia sp.1																							
Goodenia trinervis																							
Grevillea bipinnatifida																							
Grevillea pulchella																							
Grevillea quercifolia							0.24																
Grevillea synapheae						0.07																	
Grevillea variifolia																							
Grevillea wilsonii	0.13					4.76									18.56			15.00					3.00
Haemodorum laxum			0.00										0.00										
Haemodocum spicatum							0.01																
Haemodorum sp.																							
Haemodorum sp. 1																							
Haemodorum sp. 2																							
Haemodoraceae sp.															0.10						0.20		
Hakea amplexicaulis																							
Hakea cyclocarpa												0.61											
Hakea lissocarpha				0.05					0.22		0.11											1.20	
Hakea prostrata																							
Hakea ruscifolia					0.82		0.69					0.92											
Hakea varia																							
Hemiandra pungens																							
Hemigenia pritzelii			0.00		0.01	0.00							0.00		0.75								

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	JD134	JD135	JD78	JD79	JD80	JD81	JD82	JD83	JD84	JD85	JD86	JD87	JD88	FMP001	FMP002	FMP003	FMP004	FMP005	FMP006	FMP007	FMP008	FMP009	FMP010
Hibbertia acerosa																	0.08					0.10	
Hibbertia amplexicaulis	1.39	0.18	0.20	0.57	0.47		0.69	0.08	0.01	1.19	0.18		0.40	0.48	1.69	1.03	0.38	1.32	0.71	0.25	2.38		0.87
Hibbertia commutata	0.59	0.45	0.38	0.63	0.71	0.83	0.51	0.23	0.53	0.01	0.31	0.58	0.22	2.18	2.15	1.00	1.50	8.25	1.32		10.93	2.64	0.61
Hibbertia commutata (seedling)																							
Hibbertia diamesogenos																							
Hibbertia huegelii						0.00																	1.50
Hibbertia hypericoides																					5.40		
Hibbertia lasiopus																							
Hibbertia lineata																							
Hibbertia ovata																							
Hibbertia perfoliata																1.00		1.00	1.50		0.92		
Hibbertia quadricolor																							
Hibbertia racemosa																							
Hibbertia sp.														1.00					0.40		1.50	0.20	
Hibbertia striata																							
Hovea chorizemifolia			0.12	0.07	0.38	0.11	0.00	0.05	0.01	0.11		0.10	0.16			0.32	0.10	0.05	0.34	0.08		0.01	0.30
Hovea trisperma	0.32	0.32	0.15	0.15	0.26	0.23	0.65	0.39	0.08	0.39	0.22		0.24										
Hyalosperma cotula																							
Hybanthus calycinus									0.01			0.06											
Hybanthus debilissimus																							
Hybanthus floribundus																							
Hybanthus floribundus subsp. *floribundus*																							
Hydrocotyle callicarpa									0.01														
Hypocalymma angustifolium	0.01					0.09	0.09					0.01					8.42					1.90	
Hypocalymma cordifolium																							
* *Hypochaeris glabra*	0.05	0.58	0.01		0.00	0.00	0.00	0.00	0.00	0.00			0.00										
Hypolaena exsulca						0.20	1.75																
Isolepis marginata																							
Isotoma hypocrateriformis																							
Isotropis cuneifolia																							
Jacksonia alata																							

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	JD134	JD135	JD78	JD79	JD80	JD81	JD82	JD83	JD84	JD85	JD86	JD87	JD88	FMP001	FMP002	FMP003	FMP004	FMP005	FMP006	FMP007	FMP008	FMP009	FMP010
* *Juncus bufonius*													0.03										
Juncus planifolius																							
Juncus subsecundus																							
Kennedia coccinea	0.39	0.08	0.40	0.20	0.11	0.58	0.02	0.13	0.06		0.01	0.01	0.07						0.10		0.10		0.10
Kennedia prostrata																						0.60	
Kingia australis																							
Kunzea glabrescens																							
Kunzea recurva																							
Labichea punctata	0.03		0.09		0.02	0.02	0.01				0.03	0.02			0.10		0.10		0.20				
Lachnagrostis filiformis		0.01																					
Lagenophora huegelii	0.17	0.16	0.08	0.04	0.04			0.44	0.03	0.32	0.04	0.00	0.13	0.20	0.20	0.06		0.20			0.21	0.73	1.00
Lasiopetalum floribundum			21.62	16.73	10.65			4.90		16.18	1.38		21.60	2.66	3.50	8.11		6.89	4.47		5.22	5.21	0.90
Lasiopetalum glabratum						0.78			0.78			0.02											0.20
Lasiopetalum glutinosum						0.35						0.28											
Laxmannia squarrosa																							
Lechenaultia biloba		0.10	0.01					0.01	0.01			0.04	0.03	0.10	1.51	0.10	0.75						0.37
Lepidobolus preissianus subsp. *preissianus*																							
Lepidosperma gracile																							
Lepidosperma leptostachyum	0.12	0.03						0.38	0.01	0.27	1.27	0.65	0.03										
Lepidosperma longitudinale																							
Lepidosperma pubisquameum																							
Lepidosperma squamatum	0.03	0.01				0.18			0.06			1.95											
Lepidosperma tenue									0.01			0.07											
Lepidosperma tetraquetrum																							
Lepidosperma sp.															1.00	0.50	0.10						
Lepidosperma sp.1																							
Leporella fimbriata			0.00		0.00	0.00	0.00	0.01	0.02														
Leptocarpus coangustatus																							
Leptomeria cunninghamii	1.49			0.03	0.11			0.21						1.58									
Leptospermum erubescens																	0.10						
Leucopogon australis														1.50									

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	JD134	JD135	JD78	JD79	JD80	JD81	JD82	JD83	JD84	JD85	JD86	JD87	JD88	FMP001	FMP002	FMP003	FMP004	FMP005	FMP006	FMP007	FMP008	FMP009	FMP010
Leucopogon capitellatus	0.24	0.42	1.92	5.91	0.55			0.25		0.22	2.69		3.96	4.13				0.63	2.00			2.20	
Leucopogon hirsutus																							
Leucopogon parviflorus																							
Leucopogon sprengelioides																							
Leucopogon verticillatus			1.01	1.28	1.02					0.75	0.66		0.10	1.00				1.50					
Levenhookia pusilla	0.00						0.50	0.01	0.02						0.10	0.10	0.08					0.13	0.05
Levenhookia stipitata																						0.05	
Lindsaea linearis						0.67																	
Liparophyllum capitatum																							
Lobelia gibbosa																							
Lobelia sp.																							
Lomandra brittanii	0.04		0.00						0.03			0.01											
Lomandra caespitosa	0.03			0.09	0.02		0.34	0.01	0.46	0.01	0.01	0.01	0.05										
Lomandra drummondii	0.36	0.50	1.10	2.35	1.82		0.06	1.43	0.36	1.05	1.09	0.05				1.00		0.80			1.38		0.10
Lomandra hermaphrodita	0.07		0.08	0.05	0.07	0.02	0.43	0.03	0.15	0.01	0.08	0.36	0.12	0.66	0.59	1.40	0.38	0.30	0.21	0.47	0.40	0.63	0.28
Lomandra integra							0.00																
Lomandra micrantha			0.27	0.00	0.50						0.00			2.27				1.59	0.34			0.50	
Lomandra micrantha subsp. *micrantha*																							
Lomandra nigricans			1.41	0.10	0.20	0.00		0.01		0.07	0.11		0.19			0.50				0.50	0.50	0.10	
Lomandra odora	0.07	0.08			0.03		0.47	0.19	0.03			0.00	0.02										
Lomandra preissii	0.02	0.02	0.00	0.00	0.09	0.09		0.05	0.05	0.01	0.05	0.04	0.16		0.10	1.53	0.90			0.20	1.33		
Lomandra purpurea									0.03			0.16											
Lomandra sericea																							
Lomandra sonderi			0.50		1.09	0.82	5.21	0.51	1.66			2.61	0.23	4.00	2.41	3.25	3.50	3.00	1.60	4.50	0.50	1.50	1.65
Lomandra sp.																1.50				0.80	1.00	0.50	
Lomandra sp.1																							
Lomandra spartea				0.00	0.12			0.09	0.02			0.01		0.63	1.28	0.18	0.39	0.83		0.40			0.45
Loxocarya cinerea					2.22	0.46																	
Lyperanthus serratus																							
Lysimachia arvensis		0.00																					
Macrozamia riedlei	10.98	5.55	3.88	1.67	1.10			1.33		2.59	1.67		4.17	0.33	2.50	0.50	1.00		9.33	27.50	18.21	3.75	

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	JD134	JD135	JD78	JD79	JD80	JD81	JD82	JD83	JD84	JD85	JD86	JD87	JD88	FMP001	FMP002	FMP003	FMP004	FMP005	FMP006	FMP007	FMP008	FMP009	FMP010
Macrozamia riedlei (seedling)																							
Marianthus drummondianus																						0.83	
Melaleuca incana																							
Melaleuca parviceps																							
Melaleuca preissiana																							
Melaleuca viminea																							
Melaleuca viminea (seedling)																							
Mesomelaena graciliceps							0.02																
Mesomelaena stygia																							
Mesomelaena tetragona						1.50																	
Microtis media																							
Millotia tenuifolia								0.00															
Mirbelia dilatata	0.43		0.60	5.00			0.14																
Monotaxis grandiflora						0.20			0.22			0.35	5.00										
Monotaxis grandiflora var. *grandiflora*																							
Monotaxis occidentalis									0.02			0.05											
Neurachne alopecuroidea	0.23	0.10	0.12	0.22	0.40	0.04	0.10	0.32	0.21	0.05	0.26	0.46	0.77	0.40				0.10					0.20
Olax benthamiana																							
Opercularia apiciflora			0.23	0.08	0.11		0.03			0.23	0.05		0.07										
Opercularia echinocephala	0.22	0.04		0.04	0.02		0.01	0.00	0.11			0.01	0.26	0.28				1.03	1.00	0.71		0.61	0.10
Opercularia hispidula										2.34													
Opercularia vaginata																							0.45
Opercularia sp.																							
Orchidaceae sp.																	0.01						
Orchidaceae sp. 1																							
Orchidaceae sp. 2																							
Orianthera serpyllifolia																							
* *Oxalis compressa*																							
* *Oxalis corniculata*	0.02	0.03		0.00									0.05										
Paraserianthes lophantha																							
Paspalidium sp.?																							

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	JD134	JD135	JD78	JD79	JD80	JD81	JD82	JD83	JD84	JD85	JD86	JD87	JD88	FMP001	FMP002	FMP003	FMP004	FMP005	FMP006	FMP007	FMP008	FMP009	FMP010
Patersonia babianoides			0.01	0.01		0.00	0.05	0.01		0.00	0.00	0.00	0.01										
Patersonia juncea																							
Patersonia occidentalis																	0.90				1.96		0.71
Patersonia pygmaea							0.00	0.00	0.02			0.01											
Patersonia rudis									0.34			1.86											
Pentapeltis peltigera	0.44	0.19	1.25	0.23	0.13	0.90	1.19	0.59	0.31	13.33	2.09	0.39	0.33	0.20		0.10	0.42	0.38		0.13	0.15	0.50	0.37
Pericalymma ellipticum																		2.00					
Persoonia elliptica										0.00		4.25											
Persoonia longifolia		0.39	0.19	0.20	2.07	1.09	0.01	0.12		9.76	0.43	2.26	2.14	0.95	8.00	1.00		4.38	2.40		1.98	3.67	2.36
Persoonia longifolia (seedling)																							
Persoonia sp.																							0.20
Petrophile macrostachya																							
Pheladenia deformis																							
Philotheca spicata																	1.00						
Philydrella drummondii																							
Philydrella pygmaea																							
Phyllangium paradoxum																							
Phyllanthus calycinus	0.11	0.21					0.00	0.00	0.13			0.00		0.20		0.50	11.71	1.50			2.67	3.02	3.59
Pimelea ciliata	2.55							2.44	0.01											0.10	0.25		
Pimelea lehmanniana												0.04											
Pimelea suaveolens									0.03			0.05			0.46								
Pimelea sp.																							
Plantago lanceolata																							
Platysace commutata																							
Platysace compressa			1.93	0.01									2.37			0.13		3.01	0.16	0.83		2.50	0.34
Platysace filiformis																							
Platysace tenuissima																							
Poaceae sp.																0.30						0.10	
Podolepis capillaris																							
Podotheca angustifolia																							
Podotheca gnaphalioides																							

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	JD134	JD135	JD78	JD79	JD80	JD81	JD82	JD83	JD84	JD85	JD86	JD87	JD88	FMP001	FMP002	FMP003	FMP004	FMP005	FMP006	FMP007	FMP008	FMP009	FMP010
Poranthera microphylla									0.01														
Prasophyllum brownii																							
Prasophyllum elatum										0.02	0.01												
Prasophyllum sp.																							
Prasophyllum sp.1																							
Pseudognaphalium luteoalbum																							
Pteridium esculentum	0.22	1.83		0.03						7.11	3.52		15.14								4.99		
Pterochaeta paniculata																							
Pterostylis barbata					0.02																		
Pterostylis pyramidalis						0.00	0.00	0.04	0.00			0.01											
Pterostylis recurva							0.00																
Pterostylis vittata			0.02		0.05	0.00		0.00	0.01			0.01	0.01										
Pterostylis sp.																							
Pterostylis sp. 1																							
Ptilotus drummondii																							
Ptilotus drummondii var. *drummondii*																							0.55
Ptilotus manglesii							0.01															1.70	
Pyrorchis nigricans		0.00																					
Ranunculus colonorum														0.10	0.14				0.05			0.10	0.28
Ranunculus muricatus																							
Restionaceae sp.																							
Rytidosperma acerosum																							
Rytidosperma caespitosum																							
Rytidosperma setaceum					0.00																		
Rytidosperma sp.																							
Scaevola calliptera	0.13		0.22	0.71	0.05	0.24	0.03	0.15	0.13	0.67	0.02	0.01	0.12	0.10	0.14				0.05			0.10	0.28
Scaevola sp.																							
Scaevola pilosa										0.02													
Senecio diaschides		0.03																					
Senecio hispidulus								0.04	0.00														
Senecio sp.																							

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	JD134	JD135	JD78	JD79	JD80	JD81	JD82	JD83	JD84	JD85	JD86	JD87	JD88	FMP001	FMP002	FMP003	FMP004	FMP005	FMP006	FMP007	FMP008	FMP009	FMP010
Senecio sp.1																							
Senecio quadridentatus		0.00																					
* *Sonchus oleraceus*					0.00	0.00			0.00														
Sowerbaea laxiflora																							
Sphaerolobium linophyllum			0.00				0.07		0.01														
Sphaerolobium macranthum																							
Sphaerolobium medium	0.15																						
Sphaerolobium sp.																							
Stachystemon vermicularis																							
Stackhousia monogyna																						0.50	
Stirlingia latifolia																							
Stylidium amoenum					0.06			0.04	0.00		0.31			0.50		0.10	0.02	0.10	0.05				
Stylidium androsaceum																0.04						0.12	
Stylidium brunonianum																							
Stylidium bulbiferum					0.00												0.02		0.50				0.06
Stylidium calcaratum				0.01		0.00		0.00		0.01				0.10						0.10			
Stylidium ciliatum															0.05		0.05		0.09	0.02			
Stylidium crassifolium																							
Stylidium hirsutum																							
Stylidium junceum																		0.10					
Stylidium lateriticola					0.01			0.02				0.02											
Stylidium lineatum																	2.00						
Stylidium piliferum						0.00		0.02						0.10	0.41	0.04	0.63	0.10	0.19	0.65		0.20	0.10
Stylidium recurvum																							
Stylidium repens																							
Stylidium rhynchocarpum																							
Stylidium scabridum																							
Stylidium scariosum																							
Stylidium schoenoides			0.01		0.01		0.01																
Stylidium spathulatum																							
Stylidium thesioides																							

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	JD134	JD135	JD78	JD79	JD80	JD81	JD82	JD83	JD84	JD85	JD86	JD87	JD88	FMP001	FMP002	FMP003	FMP004	FMP005	FMP006	FMP007	FMP008	FMP009	FMP010
Stylidium hispidum	0.06	0.02					0.20	0.07	0.09														
Stylidium sp.																							
Stylidium sp. 1																							
Styphelia discolor		0.15	0.11	0.02		0.01				0.40									1.30			0.20	
Styphelia erubescens																							
Styphelia hispida																		0.20					0.20
Styphelia nitens			0.18				0.31							10.00	1.35		4.35						
Styphelia pallida											0.22	0.07	0.06										
Styphelia propinqua	0.60	0.01	0.10	0.24		0.00	0.06					0.03	0.01	1.00	1.00		0.50	0.33	1.50				1.00
Styphelia tenuiflora	0.02						0.01					0.04			2.24	0.50			2.00		0.65		
Synaphea sp.																							
Taxandria linearifolia																							
Tetraria capillaris	0.13	0.03	0.98	0.75	0.31	0.08	0.09	0.15	0.02	6.07	2.90	1.11	1.54										
Tetraria octandra						0.42	1.89	0.03				0.40											
Tetraria sp. Jarrah Forest (R. Davis 7391)														2.61	0.63	1.29	4.43	1.82	2.25	1.39	2.17	1.37	1.67
Tetrarrhena laevis	0.03	0.09	0.61	0.52	0.29	0.19	0.06	0.14	0.12	0.94	0.60	0.39	0.88	0.50	0.27	0.31	0.52	0.36	1.50		0.96	0.35	
Tetratheca hirsuta	1.09		0.29	0.00	0.57					0.05	0.17	0.06	0.03	0.13	0.17		1.00	0.22	0.55		0.10	0.50	0.13
Thelymitra antennifera																							
Thelymitra crinita	0.01		0.01	0.01	0.01	0.06	0.00	0.02	0.05	0.07	0.04	0.03	0.02										
Thelymitra macrophylla								0.00		0.00	0.00												
Thelymitra sp.																	0.05						
Thomasia paniculata																							
Thomasia pauciflora																							
Thysanotus anceps																							
Thysanotus dichotomus									0.17			0.95			0.75	1.00				0.50			
Thysanotus fastigiatus														0.55	0.34	0.10	0.20	0.20		0.40		0.50	0.25
Thysanotus gracilis																							
Thysanotus manglesianus															2.50								
Thysanotus multiflorus	0.02	0.05	0.02	0.07	0.20	0.12	0.08	0.09	0.07	0.01	0.00	0.03	0.14		0.68	0.17	0.20	0.75	0.50	0.17			0.30
Thysanotus patersonii		0.01								0.03													
Thysanotus ? scaber																							

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	JD134	JD135	JD78	JD79	JD80	JD81	JD82	JD83	JD84	JD85	JD86	JD87	JD88	FMP001	FMP002	FMP003	FMP004	FMP005	FMP006	FMP007	FMP008	FMP009	FMP010
Thysanotus sp.																							
Thysanotus sp.1																							
Thysnaotus sparteus												0.11											
Thysanotus tenellus																							
Thysanotus thyrsoideus	0.01	0.01	0.01	0.00	0.00	0.01	0.02	0.01	0.03	0.01	0.01	0.00	0.01	0.05	0.20	0.14		0.37		0.18		0.08	0.24
Trachymene pilosa	0.01	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00			0.00			0.25						0.69	0.10
Trichocline spathulata			0.01		0.09			0.22	0.18	0.03	0.22	0.12		0.09	0.11	0.22	0.10	0.21	0.08	0.20		0.75	0.15
Tricoryne elatior							0.01		0.08				0.01										
Tricoryne humilis						0.03	0.02					0.03											
Tripterococcus brunonis																							0.08
* *Trifolium dubium*																							
Tripterococcus brunonis																							
Trymalium ledifolium	6.58	0.00			0.02				0.53					0.30	1.69		1.74	1.08				0.98	5.46
Trymalium odoratissimum																							
Trymalium odoratissimum subsp. *odoratissimum*			0.01							3.95													
Trymalium spatulatum																							
Utricularia multifida																							
Viminaria juncea																							
* *Vulpia myuros*										0.01		0.04	0.09										
Wahlenbergia preissii																							
Wurmbea dioica																							
Xanthorrhoea gracilis	0.18	4.30	9.01	2.03	0.76	0.18	4.37	5.75	2.74	8.93	0.03	5.02	2.98		8.76		3.92				7.10		
Xanthorrhoea preissii	14.82	26.80		19.66	16.15	9.48	11.15	2.28		0.10	39.65			19.84	6.00	3.50	5.54		18.89		42.50		
Xanthosia atkinsoniana					0.01		0.05	0.04	0.01			0.03			0.15				1.23		0.10		1.67
Xanthosia candida	0.10	0.00		0.03	0.23	0.16	0.08	0.15	0.21	1.40		0.03	0.67	0.06	0.10						0.18	3.95	0.44
Xanthosia ciliata						0.10																	
Xanthosia huegelii	0.01					0.00	0.01	0.01	0.00		0.00												0.20
Xanthosia singuliflora																							
Xylomelum occidentale																							

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	MY001	MY002	MY003	MY004	MY005	MY006	MY007	MY008	MY009	MY010	MY011	MY012	MY013	MY014	MY015	MY016	MY017	MY018	MY019	MY020	MY021	MY022
Acacia alata																		1.05				0.01
Acacia applanata			0.04																			
Acacia barbinervis														0.35	0.23			0.17				
Acacia browniana																						
Acacia celastrifolia																						
Acacia divergens											4.50											
Acacia drummondii														2.00								
Acacia drummondii subsp. *candolleana*																	5.17			0.20		0.10
Acacia extensa			0.35													3.00				4.00		
Acacia incrassata																						
Acacia lateriticola														0.50								
Acacia nervosa																						
Acacia preissiana																						
Acacia pulchella			19.25		0.07	0.16					0.16					5.24	1.45			6.89		
Acacia saligna				3.51																		
Acacia stenoptera														0.51	0.10							
Acacia urophylla			1.49			0.05	0.01					0.02					1.17			0.88		
Acacia varia																						
Acacia willdenowiana																						
Acacia sp.																						
Adenanthos barbiger	2.55	1.95	3.57		2.48	1.83		1.93	1.47			2.91	2.34	1.09	2.17		2.30					1.39
Agrostocrinum scabrum																						
* *Aira caryophyllea*																			0.27			
Allocasuarina fraseriana		14.23							9.96	19.78		5.00	25.92		38.09			1.75				21.63
Amphipogon amphipogonoides														1.00	0.20				0.05		0.27	0.21
Amphipogon laguroides																						
Andersonia latiflora																						
Andersonia lehmanniana																0.51						
Anigozanthos manglesii				0.10															1.24			
Aotus cordifolia											0.04											
Aphelia cyperoides				0.46																		

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	MY001	MY002	MY003	MY004	MY005	MY006	MY007	MY008	MY009	MY010	MY011	MY012	MY013	MY014	MY015	MY016	MY017	MY018	MY019	MY020	MY021	MY022
Astartea scoparia				3.00							11.50					8.50			2.00			
* Asteraceae sp.				0.01																		
Austrostipa elegantissima																						
Austrostipa mollis																0.50						
Austrostipa sp.						0.01																
* *Avena fatua*																						
Babingtonia camphorosmae																						
Banksia bipinnatifida																					2.25	
Banksia dallanneyi subsp. *dallanneyi* var. *da*	7.66	2.60				13.84	1.50	0.80	0.69	0.15	2.53	1.43			1.88	4.78	1.15	1.90	3.16	4.00	4.76	0.74
Banksia fraseri																						
Banksia grandis		2.74	3.56		14.08	7.03		8.20	4.43	25.00			1.05		6.33		2.25	7.53		20.00		
Banksia grandis (seedling)	0.01	2.50			5.17				0.02													
Banksia littoralis											60.00											
Banksia sessilis	0.54	1.00						2.00														
Banksia sphaerocarpa																						
Baumea juncea																						
Billardiera floribunda											25.00				25.00							
Billardiera variifolia							75.00	575.00														
Billardiera fraseri																						
Billardiera fusiformis										0.05												
Billardiera sp.1															0.30							
Boronia crenulata											12.66											
Boronia crenulata subsp. *viminea*											7.10											
Boronia fastigiata	0.06	0.44	0.08		0.28			0.10	0.53	0.06		0.05	0.01	0.01			0.92	1.02			0.50	0.05
Boronia molloyae																						
Bossiaea aquifolium									0.06			0.05										
Bossiaea ornata		0.01	0.62		0.30	0.01		0.14	0.02	0.02		0.02	0.06	0.63	0.24	0.10		0.49		0.53	0.31	0.43
Bossiaea eriocarpa																						
Bossiaea spinescens																						1.20
Brachyscome pusilla																			0.95			
* *Briza minor*																0.10						

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	MY001	MY002	MY003	MY004	MY005	MY006	MY007	MY008	MY009	MY010	MY011	MY012	MY013	MY014	MY015	MY016	MY017	MY018	MY019	MY020	MY021	MY022
Bulbine semibarbata																						
Burchardia congesta																						
Caladenia flava	0.02																0.40		0.17			
Caladenia macrostylis																						
Caladenia reptans																						
Caladenia sp.	0.01				0.01			0.02	0.01	0.01		0.01										
Caladenia sp. 1	0.01																					
Calothamnus quadrifidus																						
Calothamnus sp.																			5.00			
Cassytha glabella																						
Cassytha racemosa																						
Cassytha sp.											0.75											
Caustis dioica							0.69															
* *Centaurium erythraea*																						
Centella asiatica																						
Centrolepis drummondiana																						
Centrolepis aristata				1.27															0.01			
Chamaescilla corymbosa	0.05	0.26					0.35								0.18	1.00		0.10	0.02		0.16	0.06
Chorizema cordatum						0.03	0.20	0.10	0.05			0.05										
Chorizema ilicifolium																						
Chorizema rhombeum	0.40																					
Clematis pubescens						0.04											1.48			0.92	0.10	
Comesperma calymega																						
Comesperma virgatum													0.02									
Comesperma sp.		0.02																				
Conospermum capitatum																						
Conospermum scaposum																			0.50			
Conostylis aculeata																						
Conostylis setigera	0.03	0.12			0.04	0.05	0.15	0.03	0.03	0.10	0.30	0.09						0.20				0.26
Conostylis setosa	0.31	0.19						0.10		0.07		0.12			0.70							1.09
Conostylis pusilla																0.63	0.50		1.13	0.20	0.50	

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	MY001	MY002	MY003	MY004	MY005	MY006	MY007	MY008	MY009	MY010	MY011	MY012	MY013	MY014	MY015	MY016	MY017	MY018	MY019	MY020	MY021	MY022
Conostylis serrulata					0.29	0.02		0.14	0.35	0.35	0.77	0.17					1.25	0.30		1.20		
Corymbia calophylla	19.01		7.05			9.60	15.75	1.06			7.50	4.22		18.50		50.00		26.00	33.40	40.00	5.50	
Corymbia calophylla (seedling)	0.03		0.03		0.01	0.01	13.00					1.50										
Craspedia variabilis										0.11									0.42			
Cryptandra arbutiflora var. *arbutiflora*																0.21						
Cryptostylis ovata																						
Cyanicula sericea																						
Cyathochaeta avenacea			0.30	4.00	0.66	0.02		2.05	1.67		7.49	1.15	0.01	8.67			2.55	1.00			3.33	2.83
* *Cyperus rotundus*																						
Cyperaceae sp.																						
Cyrtostylis robusta																						
Dampiera alata				0.02			0.04							0.03		0.63					0.02	
Dampiera hederacea											0.20											
Dampiera linearis			0.15	0.02	0.01		0.04	0.04	0.03		0.01	0.01		0.50						0.24	0.10	0.12
Dampiera pedunculata																						
Dasypogon bromeliifolius						0.80																
Daucus glochidiatus																						
Daviesia decurrens								0.01														0.10
Daviesia horrida							2.20															
Daviesia physodes																						
Daviesia preissii																						
Daviesia rhombifolia																						
Desmocladus fasciculatus							0.04				0.04					0.12			0.89	1.07	0.31	
Desmocladus flexuosus	0.22	0.16	0.12			0.02	0.01		0.04	0.51		0.07	0.09	1.92						0.50	0.02	
Dianella revoluta						0.20																
Dichopogon capillipes																						
* *Disa bracteata*																					5.00	
Diuris longifolia																						
Drosera bulbosa																						
Drosera erythrorhiza	0.01	0.03																			0.17	
Drosera macrantha																						

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	MY001	MY002	MY003	MY004	MY005	MY006	MY007	MY008	MY009	MY010	MY011	MY012	MY013	MY014	MY015	MY016	MY017	MY018	MY019	MY020	MY021	MY022
Drosera microphylla																					0.01	
Drosera pallida																				0.01	0.05	
Drosera platystigma						0.01		0.01	0.20													
Drosera pulchella	0.02		0.17	0.05	0.04		0.04		0.02					0.10	0.15	0.18		0.13	0.10			0.01
Drosera sp.				0.02	0.01		0.04	0.01			0.03					0.30	0.16		0.24		0.13	0.01
Drosera sp. (climbing)															0.21	0.31	0.30	0.31	0.15		0.11	
Drosera sp. 1							0.06															
Drosera sp. 2																						
Drosera stolonifera																						
Elythranthera brunonis																						
Empodisma gracillimum																						
* *Erigeron sumatrensis*																						
Eriochilus dilatatus																						
Eriochilus scaber																						
Eriochilus tenuis																						
Eucalyptus marginata	7.17	14.28	35.40		17.56	18.88	3.93	23.82	35.07	6.66	23.75	34.94	0.47	27.30	24.78		31.01	20.55	40.00	15.20	32.97	
Eucalyptus marginata (seedling)	0.01	0.52	0.02		1.27	1.03	11.00	0.97	3.01	0.72	1.30	1.75										
Eucalyptus megacarpa																						
Eucalyptus patens											37.50											
Eucalyptus patens (seedling)											0.06											
Eucalyptus rudis																						
Eucalyptus sp.																						
Euchiton sphaericus																						
Gahnia decomposita											10.00											
Gastrolobium ebracteolatum																						
Gastrolobium spinosum																						0.48
Gastrolobium villosum																						0.60
Glischrocaryon aureum																						0.80
Gompholobium capitatum																						
Gompholobium cyaninum																						
Gompholobium knightianum	0.03		0.10		0.01	0.01		0.16	0.02													

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	MY001	MY002	MY003	MY004	MY005	MY006	MY007	MY008	MY009	MY010	MY011	MY012	MY013	MY014	MY015	MY016	MY017	MY018	MY019	MY020	MY021	MY022
Gompholobium marginatum	0.03	0.02	0.02		0.03		0.05	0.04	0.04	0.02	0.04	0.01				0.44	3.13	3.16	1.24		0.67	0.17
Gompholobium polymorphum							0.01							0.12	0.50		0.10	0.02	0.01		0.20	
Gompholobium preissii			0.96		0.04			0.09	0.22	0.01					0.33		0.59	1.10	0.15	1.75	1.37	3.72
Gompholobium tomentosum								0.20		0.01												
Gompholobium sp.																						
Gompholobium sp.1														0.10								
Gonocarpus benthamii																						
Gonocarpus cordiger																						
Gonocarpus sp.																						
Goodenia sp.1							0.05															
Goodenia trinervis				0.32												0.61						
Grevillea bipinnatifida							31.67															
Grevillea pulchella																2.00						0.93
Grevillea quercifolia																						
Grevillea synapheae																						
Grevillea variifolia																						
Grevillea wilsonii		1.53			6.00		0.20	3.72	7.84				0.05			2.00		4.00				15.00
Haemodorum laxum																						0.13
Haemodocum spicatum																						
Haemodorum sp.		0.02		0.11	0.02		0.05	0.01			0.01	0.02	0.01		0.10							1.00
Haemodorum sp. 1				0.03			0.07					0.04			0.20	0.30						1.50
Haemodorum sp. 2																0.10						
Haemodoraceae sp.																						
Hakea amplexicaulis																						
Hakea cyclocarpa							8.25	10.00														
Hakea lissocarpha							1.00	1.10	0.10							3.50						2.30
Hakea prostrata																16.64						
Hakea ruscifolia																			0.40			
Hakea varia				11.19															0.50			
Hemiandra pungens									0.04							0.92					0.50	
Hemigenia pritzelii								0.01														

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	MY001	MY002	MY003	MY004	MY005	MY006	MY007	MY008	MY009	MY010	MY011	MY012	MY013	MY014	MY015	MY016	MY017	MY018	MY019	MY020	MY021	MY022
Hibbertia acerosa	0.02									0.03		0.02									0.25	
Hibbertia amplexicaulis	0.05	0.02	0.31		0.08	0.05	0.02	0.04		0.06		0.10	0.02				0.78		0.67	0.55	0.50	
Hibbertia commutata		0.80	0.78		0.03	0.05	1.77	0.16	0.46	0.04		0.01	0.33	0.01			0.63	1.27	4.32	0.53		
Hibbertia commutata (seedling)								0.01														
Hibbertia diamesogenos																						
Hibbertia huegelii				0.13								0.21									12.50	
Hibbertia hypericoides	0.04		0.10				1.61	11.66							4.15				1.97	4.47	7.50	4.19
Hibbertia lasiopus			0.14																			
Hibbertia lineata							6.50															
Hibbertia ovata																						
Hibbertia perfoliata			0.20										0.20				1.09		2.00	0.80	1.30	
Hibbertia quadricolor		1.53																				
Hibbertia racemosa																						
Hibbertia sp.										0.02												
Hibbertia striata												0.05										
Hovea chorizemifolia	0.03		0.20		0.03			0.04	0.02	0.02		0.02	0.05	0.34	0.30			0.18				
Hovea trisperma							0.02			0.01			0.06									
Hyalosperma cotula				1.72																0.05	0.08	
Hybanthus calycinus																						
Hybanthus debilissimus																						
Hybanthus floribundus						0.01	0.01								0.02			0.20				
Hybanthus floribundus subsp. *floribundus*														0.40	0.36						0.10	
Hydrocotyle callicarpa																						
Hypocalymma angustifolium				5.67	0.02		5.32			0.10		0.07				3.40	0.50		1.00	0.25	4.00	
Hypocalymma cordifolium																						
* *Hypochaeris glabra*			0.20	0.01							0.10	0.01							0.55	0.56		
Hypolaena exsulca							5.51				15.29											
Isolepis marginata																				0.21		
Isotoma hypocrateriformis																						
Isotropis cuneifolia				0.03												0.10						
Jacksonia alata																0.80						

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	MY001	MY002	MY003	MY004	MY005	MY006	MY007	MY008	MY009	MY010	MY011	MY012	MY013	MY014	MY015	MY016	MY017	MY018	MY019	MY020	MY021	MY022
* *Juncus bufonius*																						
Juncus planifolius																						
Juncus subsecundus																						
Kennedia coccinea			0.66		0.02	0.01		0.37	0.05				0.03	2.34	0.01		0.69	1.23		0.30	1.25	0.50
Kennedia prostrata			0.36												0.20	0.11		1.35	2.32	1.36		
Kingia australis							5.10															
Kunzea glabrescens							5.00															
Kunzea recurva							13.60															
Labichea punctata	0.02	0.01								0.01		0.05					0.80					
Lachnagrostis filiformis																						
Lagenophora huegelii			0.01			0.01											0.15	0.15	0.10	0.36	0.43	0.30
Lasiopetalum floribundum		0.10			0.37	0.34				10.56	19.02	0.01	0.50	8.07	0.20		0.50					0.35
Lasiopetalum glabratum								0.02														0.30
Lasiopetalum glutinosum																						
Laxmannia squarrosa																0.09			0.10			
Lechenaultia biloba	0.02				0.03	0.01	0.03	0.01	0.02		0.01			0.20	0.50	1.43		0.09			0.10	0.05
Lepidobolus preissianus subsp. *preissianus*																5.00						
Lepidosperma gracile																						
Lepidosperma leptostachyum																						
Lepidosperma longitudinale											2.00											
Lepidosperma pubisquameum			0.20	0.53				0.02														0.35
Lepidosperma squamatum							0.40			0.20				2.25	0.32	1.50	0.20		0.30		1.00	0.45
Lepidosperma tenue	1.23						0.02	0.08	0.06	0.02												
Lepidosperma tetraquetrum																						
Lepidosperma sp.				5.10								0.30									0.10	1.00
Lepidosperma sp.1			0.30			0.06									0.17							0.10
Leporella fimbriata																						
Leptocarpus coangustatus																						
Leptomeria cunninghamii														0.30	0.20							
Leptospermum erubescens																		1.47	0.03			
Leucopogon australis																						

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	MY001	MY002	MY003	MY004	MY005	MY006	MY007	MY008	MY009	MY010	MY011	MY012	MY013	MY014	MY015	MY016	MY017	MY018	MY019	MY020	MY021	MY022
Leucopogon capitellatus	0.20		7.32		0.06	0.01	0.01													4.00		
Leucopogon hirsutus																						
Leucopogon parviflorus											0.76											
Leucopogon sprengelioides																0.50						
Leucopogon verticillatus	0.02					0.01								4.00				0.01				
Levenhookia pusilla				0.04			0.05		0.01												0.02	
Levenhookia stipitata																						
Lindsaea linearis							0.01															
Liparophyllum capitatum																						
Lobelia gibbosa																						
Lobelia sp.											0.03											
Lomandra brittanii						0.02	0.01		0.02													
Lomandra caespitosa			0.83		0.10	0.51	0.02			0.08			0.02	0.10				0.92	0.74		3.00	3.17
Lomandra drummondii																					0.50	
Lomandra hermaphrodita	0.02	0.20	0.01	0.14	0.04	0.05	0.08	0.03	0.05	0.09		0.02	0.01	0.36	0.59		0.61	0.50	0.13		0.26	0.34
Lomandra integra																						
Lomandra micrantha	0.02					0.04	0.04	0.05	0.02	0.03				1.75						1.00		
Lomandra micrantha subsp. *micrantha*														6.50								
Lomandra nigricans						0.05											3.00	0.50		2.50		
Lomandra odora														0.20								
Lomandra preissii						0.02	0.05	0.03	1.50	0.18		0.03	0.01	0.10							4.00	0.76
Lomandra purpurea																						
Lomandra sericea																						
Lomandra sonderi	0.01	1.08	2.15		2.67	0.56		1.00	1.30	2.40		1.47	2.10	1.66			2.53	1.60	2.00		0.30	
Lomandra sp.	0.02	0.01	0.01	0.01			0.02			0.02										4.17		
Lomandra sp.1															0.10							
Lomandra spartea	0.06	0.35			0.03	0.06	0.07	0.01	0.02	0.26		0.12	0.74	0.53	0.34	0.15	0.30				0.61	0.78
Loxocarya cinerea						0.01			0.10	0.13	0.65	0.10	0.23	0.43								
Lyperanthus serratus																						
Lysimachia arvensis																2.25						
Macrozamia riedlei		5.00	10.51		17.88	9.70				3.01	4.15		5.43	20.40				2.65	0.25	9.10	1.00	

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	MY001	MY002	MY003	MY004	MY005	MY006	MY007	MY008	MY009	MY010	MY011	MY012	MY013	MY014	MY015	MY016	MY017	MY018	MY019	MY020	MY021	MY022
Macrozamia riedlei (seedling)						0.01																
Marianthus drummondianus																						
Melaleuca incana																						
Melaleuca parviceps																17.56						
Melaleuca preissiana				15.00																		
Melaleuca viminea				0.37																		
Melaleuca viminea (seedling)				0.32																		
Mesomelaena graciliceps																					0.40	
Mesomelaena stygia				2.50																		
Mesomelaena tetragona				2.50																		
Microtis media																						
Millotia tenuifolia																0.44			0.26	0.29		
Mirbelia dilatata						0.25	2.00				0.11											
Monotaxis grandiflora																						
Monotaxis grandiflora var. *grandiflora*									0.02						0.10						1.00	0.23
Monotaxis occidentalis																						
Neurachne alopecuroidea	0.02		0.08	0.03	0.02	0.04	0.31			0.04	0.11	0.02	0.10	1.20	0.25	0.32	0.40	0.11	0.08		0.10	0.20
Olax benthamiana																						
Opercularia apiciflora																						
Opercularia echinocephala			0.24	0.01	0.03	0.10	0.04	0.01	0.04	0.03	0.01				0.28		1.76	1.10	0.77	2.28	0.05	0.50
Opercularia hispidula																						
Opercularia vaginata																						
Opercularia sp.										0.01	0.02											
Orchidaceae sp.														0.01								
Orchidaceae sp. 1														0.08								
Orchidaceae sp. 2																0.10						
Orianthera serpyllifolia																						
* *Oxalis compressa*																						
* *Oxalis corniculata*																						
Paraserianthes lophantha																						
Paspalidium sp.?															0.20							

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	MY001	MY002	MY003	MY004	MY005	MY006	MY007	MY008	MY009	MY010	MY011	MY012	MY013	MY014	MY015	MY016	MY017	MY018	MY019	MY020	MY021	MY022
Patersonia babianoides			0.02		0.01	0.01	0.01	0.02	0.02	0.03		0.01	0.02		0.14			0.28	0.10			0.07
Patersonia juncea				2.84																		0.35
Patersonia occidentalis			0.80	0.20			0.48	0.98	0.74					0.65		0.01	0.26		1.68	0.80		1.30
Patersonia pygmaea				4.00			0.04					0.05				0.18						0.30
Patersonia rudis							0.13	0.71	0.50			0.08					1.75					
Pentapeltis peltigera	0.01	0.09	0.50		0.01	0.02	0.04	0.02	0.03	0.03	0.03	0.05		0.64			0.38	0.15	0.28		0.23	0.38
Pericalymma ellipticum				0.22			1.70		3.00							17.25						
Persoonia elliptica																						
Persoonia longifolia			1.50		2.00	1.25				0.50										0.73	1.50	
Persoonia longifolia (seedling)		1.00				1.00																
Persoonia sp.																						
Petrophile macrostachya																						0.60
Pheladenia deformis																						
Philotheca spicata							0.24												2.50			
Philydrella drummondii				0.05																		
Philydrella pygmaea																						
Phyllangium paradoxum																						
Phyllanthus calycinus	4.81	0.01			3.04	4.00				7.65		1.12				0.01	3.59	2.25		4.56		
Pimelea ciliata							0.05									1.96	0.10					
Pimelea lehmanniana																						
Pimelea suaveolens	0.01						0.09								0.20	0.05	0.57		1.50		2.00	0.10
Pimelea sp.																0.10						
Plantago lanceolata																						
Platysace commutata																						
Platysace compressa	0.36	0.02	0.48		0.15	0.27	0.02		0.01	0.01		0.10					0.27	0.40		7.02		0.10
Platysace filiformis																						
Platysace tenuissima																						
Poaceae sp.																						
Podolepis capillaris				0.05																		
Podotheca angustifolia																			0.08			0.03
Podotheca gnaphalioides																0.10						

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	MY001	MY002	MY003	MY004	MY005	MY006	MY007	MY008	MY009	MY010	MY011	MY012	MY013	MY014	MY015	MY016	MY017	MY018	MY019	MY020	MY021	MY022
Poranthera microphylla																					0.11	0.03
Prasophyllum brownii																						
Prasophyllum elatum																						
Prasophyllum sp.															0.10							
Prasophyllum sp.1					0.01			0.01														
Pseudognaphalium luteoalbum																						
Pteridium esculentum						6.98					1.70			7.26						5.00		
Pterochaeta paniculata									0.08												0.05	0.02
Pterostylis barbata																						
Pterostylis pyramidalis																						
Pterostylis recurva																						
Pterostylis vittata																						
Pterostylis sp.	0.01	0.01																				
Pterostylis sp. 1														0.01	0.10							
Ptilotus drummondii																						
Ptilotus drummondii var. *drummondii*																						
Ptilotus manglesii									0.03	0.10					0.24	0.18						0.45
Pyrorchis nigricans																						
Ranunculus colonorum																						
Ranunculus muricatus																						
Restionaceae sp.																1.20						
Rytidosperma acerosum																				0.37		
Rytidosperma caespitosum		0.02		0.02	0.10		0.01															0.10
Rytidosperma setaceum																						
Rytidosperma sp.							0.02															
Scaevola calliptera	0.02					0.03	0.02	0.11	0.50	0.01		0.02		0.36		0.20	0.75			0.19	0.66	0.85
Scaevola sp.			0.11			0.02																
Scaevola pilosa																						
Senecio diaschides																		0.06	0.53	1.00		
Senecio hispidulus																						
Senecio sp.				0.10															0.55	2.00		

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	MY001	MY002	MY003	MY004	MY005	MY006	MY007	MY008	MY009	MY010	MY011	MY012	MY013	MY014	MY015	MY016	MY017	MY018	MY019	MY020	MY021	MY022
Senecio sp.1																			1.00			
Senecio quadridentatus																						
* *Sonchus oleraceus*																						
Sowerbaea laxiflora			0.02	0.06		0.01				0.01		0.01										
Sphaerolobium linophyllum							0.50															
Sphaerolobium macranthum			0.10			0.10	0.11							0.10							0.10	0.29
Sphaerolobium medium							0.03			0.01		0.01										
Sphaerolobium sp.																						
Stachystemon vermicularis																						
Stackhousia monogyna												0.01										
Stirlingia latifolia									10.68													
Stylidium amoenum		0.01	0.30		0.04			0.06					0.03	0.14				0.19			0.05	0.01
Stylidium androsaceum					0.01	0.02						0.01								0.21		0.03
Stylidium brunonianum							0.02															
Stylidium bulbiferum																						
Stylidium calcaratum															0.20							
Stylidium ciliatum							0.01														0.17	
Stylidium crassifolium																						
Stylidium hirsutum															0.01			0.18			0.59	
Stylidium junceum																						
Stylidium lateriticola																						
Stylidium lineatum																						
Stylidium piliferum	0.01	0.02	0.01		0.02	0.03		0.04	0.04						0.01	0.06	0.51	0.58	0.30	0.06	0.20	0.13
Stylidium recurvum				0.20																		
Stylidium repens																0.33					0.20	
Stylidium rhynchocarpum														0.35								
Stylidium scabridum					0.02		0.12	0.04		0.02	0.13										0.30	0.45
Stylidium scariosum																					6.73	0.48
Stylidium schoenoides										0.01				0.10	0.01			0.15			0.07	
Stylidium spathulatum																						
Stylidium thesioides																						

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	MY001	MY002	MY003	MY004	MY005	MY006	MY007	MY008	MY009	MY010	MY011	MY012	MY013	MY014	MY015	MY016	MY017	MY018	MY019	MY020	MY021	MY022
Stylidium hispidum								0.10						0.10		0.35	0.55	0.25		0.10		
Stylidium sp.				0.08				0.01	0.01													
Stylidium sp. 1								0.01														
Styphelia discolor					0.10		0.60															
Styphelia erubescens																						
Styphelia hispida																						
Styphelia nitens	2.45							0.10														
Styphelia pallida												0.05										
Styphelia propinqua	2.35						0.50	1.00		0.22	0.08		2.65					0.30		0.38		
Styphelia tenuiflora							0.02	0.50						0.10					6.00			
Synaphea sp.							0.05															
Taxandria linearifolia											38.56											
Tetraria capillaris			0.02		0.71	0.02	0.03	0.45	0.02	0.47		0.31	1.33									
Tetraria octandra			1.20			0.21	0.11	0.03	0.03		0.02	0.05	0.03		0.10	0.30	0.20		0.33		0.51	0.53
Tetraria sp. Jarrah Forest (R. Davis 7391)	1.84	2.26	0.02		0.07	0.40	0.57	0.09	0.31	0.48		0.03	0.55	0.23	1.10	1.46	1.28	0.56	1.63	0.65	1.28	2.05
Tetrarrhena laevis	0.01	0.01	0.03		0.03	0.02	0.03		0.02	0.03	0.03	0.04	0.03	1.10		0.10	0.10	0.10		0.11	0.10	
Tetratheca hirsuta			0.14		0.04			0.02		0.04		0.01	0.01	0.27	0.10			0.16			0.15	0.20
Thelymitra antennifera																						
Thelymitra crinita										0.02	0.03	0.01										
Thelymitra macrophylla																						
Thelymitra sp.								0.02		0.01	0.01											
Thomasia paniculata								0.02			0.86											
Thomasia pauciflora																						
Thysanotus anceps																						
Thysanotus dichotomus								0.01	0.06								0.05					
Thysanotus fastigiatus						0.03							0.05			0.20						
Thysanotus gracilis																						
Thysanotus manglesianus																				0.13		
Thysanotus multiflorus			0.03		0.01	0.27	0.07		0.03	0.09	0.03			0.60	0.39	0.40	0.84	0.40	0.20	0.52	0.20	0.98
Thysanotus patersonii						0.01		0.01														
Thysanotus ? scaber																						0.30

APPENDIX J2: SUMMARY OF FOLIAGE COVER ON PERMANENT PLOTS IN MYARA NORTH SURVEY AREA AND NEARBY MYARA REGION

Note: if cover is 0.00 then value is <0.01

Species	MY001	MY002	MY003	MY004	MY005	MY006	MY007	MY008	MY009	MY010	MY011	MY012	MY013	MY014	MY015	MY016	MY017	MY018	MY019	MY020	MY021	MY022
Thysanotus sp.						0.01			0.01									0.01				
Thysanotus sp.1					0.01			0.01		0.01					0.10	0.53			0.20			0.06
Thysnaotus sparteus																						
Thysanotus tenellus																						
Thysanotus thyrsoideus								0.03	0.01	0.01										0.06	0.10	
Trachymene pilosa		0.01				0.01										0.01			0.16	0.08	0.05	
Trichocline spathulata	0.02	0.03		0.01	0.02	0.02		0.02	0.02	0.03		0.10	0.06	0.06	0.04	1.87	0.07	0.13			0.23	0.05
Tricoryne elatior			1.54	0.02	0.04	0.37					0.01	0.04									0.14	
Tricoryne humilis																						0.14
Tripterococcus brunonis																0.08		0.10				0.73
* *Trifolium dubium*																						
Tripterococcus brunonis																						
Trymalium ledifolium																						
Trymalium odoratissimum	2.63					0.01		0.95	0.02	0.23					0.01	2.75						
Trymalium odoratissimum subsp. *odoratissim*	0.01						0.30															
Trymalium spatulatum																						
Utricularia multifida				0.04																		
Viminaria juncea																						
* *Vulpia myuros*																						
Wahlenbergia preissii																				0.02		
Wurmbea dioica																						
Xanthorrhoea gracilis	2.66	2.83			3.09	3.29		2.54	1.20	2.81	2.17	2.46	0.13	13.95			9.50	2.00	12.00		4.31	4.00
Xanthorrhoea preissii				25.57			10.72	1.00	2.00	3.50	16.33	15.27	27.11	16.20		3.50			17.17		23.01	6.10
Xanthosia atkinsoniana	0.01	0.01			0.03	0.02			0.05	0.03	0.01	0.01					0.36	0.94		0.30	0.10	
Xanthosia candida	0.01				0.03		0.08	0.05	0.07	0.08			0.03	0.47	0.08	0.13	0.74	0.17		0.22	0.44	0.18
Xanthosia ciliata																						
Xanthosia huegelii				0.10		0.02	0.03	0.01								0.03	0.50		1.94	0.37	0.25	
Xanthosia singuliflora																						
Xylomelum occidentale			6.00																20.49			

Appendix C - GHD Terrestrial Fauna Survey and Black Cockatoo Habitat Assessment for Huntly Mine - Myara North

Terrestrial Fauna Survey and Black Cockatoo Habitat Assessment for Huntly Mine - Myara North

Pinjarra Alumina Refinery Revised Proposal

Alcoa of Australia Limited

August 2021

→ The Power of Commitment

GHD
Level 10, 999 Hay Street
Perth, WA 6000, Australia
T 61 8 6222 8222 | **F** 61 8 9463 6012 | **E** permail@ghd.com | **ghd.com**

Document status

Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
S3	A	G.G, R.B.C, M.R, L.G	C.G, H. M		M. B		8/2/2021
S3	B	G.G, R.B.C,,L.G	A.I		M. B		27/04/2021
S3	C	G.G, R.B.C,,L.G			M.B		25/05/2021
S4	1				M.B		02/09/2021

© GHD 2021

This document is and shall remain the property of GHD. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

Executive summary

Alcoa of Australia Limited (Alcoa) is proposing to increase production at the Pinjarra Alumina Refinery by 5 per cent from 5 million tonnes per annum (Mtpa) to 5.25 Mtpa and transition the Huntly Bauxite Mine to the proposed Myara North and Holyoake mine regions (the Proposal). The Proposal is located in the Peel Region of Western Australia (WA), approximately 100 km south-east of Perth

The Proposal will be subject to environmental impact assessment under Part IV of the WA *Environmental Protection Act 1986* (EP Act), and the *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act). The environmental impact assessment will be via a Public Environmental Review (PER).

This Terrestrial Vertebrate Fauna Survey and Black Cockatoo Habitat Assessment (the Survey) has been prepared to support the EPA assessment of the Proposal and addresses the Myara North mine region of the Proposal.

Survey Area

The Survey Area comprises the Myara North Development Envelope (DE) and adjacent conveyor and haul road corridors. The Survey Area lies in Jarrahdale State Forest and is bordered by Jarrahdale town and Serpentine National Park to the west, Monadnocks Conservation Park to the east, and the existing Myara mine region to the south. The Survey Area covers approximately 18,000 hectares (ha).

The Survey included a desktop assessment, a consolidation of previous fauna studies, and a detailed and targeted vertebrate fauna survey undertaken in the Myara North region in winter (June/July) and spring (November) of 2020. The Survey included a Black Cockatoo habitat assessment in accordance with Commonwealth guidance and a targeted assessment of Carter's Freshwater Mussel.

Survey Results

The Survey Area consists of eight broad fauna habitat types: Bullich forest, Granite outcrop, Blackbutt forest, Flooded Gum woodland, Jarrah -Marri forest, Melaleuca dampland. Mine rehabilitation and Pine plantation. Jarrah-Marri forest predominated at 83% of the Survey Area. A small portion of the Survey Area comprises rural cleared land.

The conservation value of each fauna habitat type is specific to the locally occurring conservation significant fauna species and the type of usage by those species. All three Black Cockatoos were recorded primarily throughout the Marri-Jarrah forest, however all habitat types will be utilised for foraging by either one or all of the species. Melaleuca Damplands and riparian areas comprising Bullich Forest, Blackbutt Forest and Marri-Jarrah Forest support a Quokka population with records scattered throughout the Survey Area. Chuditch are wide ranging and expected to use all habitat types at a relatively low density.

In total 13 conservation significant species were recorded in the Survey Area including the Quokka, Chuditch, Brush-tailed Phascogale, Western Brush Wallaby, Forest Red-tailed Black Cockatoo, Baudin's Cockatoo, Carnaby's Cockatoo, Western False Pipistrelle, Southern Death Adder, Quenda, Rakali, Masked Owl and Peregrine Falcon. All species identified are likely to have significant populations and habitat present within the Survey Area. With regard to migratory shorebirds, the Survey Area lacks open water bodies that feature shallow shorelines for foraging habitat. The creek lines and vegetated dampland areas within the Survey Area are not suitable for migratory shorebirds.

Carter's Freshwater Mussel was targeted during the survey but no presence was recorded. The species is known to reside in the Serpentine Dam on the southern edge of the Survey Area and while mussels may disperse upstream from the Dam during winter/spring flows, all streams are seasonal and any dispersing mussels are unlikely to survive the extended dry summer period. Therefore, significant populations are unlikely in the Survey Area.

The DBCA NatureMap search identified 185 vertebrate fauna taxa previously recorded within 20 km radius of the Survey Area. This total included 28 mammals, 113 birds, 32 reptiles and 12 amphibians.

The detailed and targeted program recorded 132 vertebrate fauna species utilising the Survey Area, including 23 mammals, 76 birds, 26 reptiles and seven amphibians. Of these, eight introduced species (mammals and birds) were identified.

Fire was observed to cause substantial impact to fauna habitats of the Survey Areas. Large areas of the Survey Area had been burnt within the last 2 to 3 years impacting fauna habitat. During the Survey the north west portion of the Survey Area was prescribed burned in October 2020.

Contents

1. Introduction **1**
1.1 Project background 1
1.2 Purpose and scope of this report 1
1.3 Survey Area 1
1.4 Scope of works 1
1.5 Limitations and assumptions 2
1.6 Project terminology and definitions 3

2. Methodology **4**
2.1 Relevant legislation, conservation codes and background information 4
2.2 Desktop assessment 4
2.3 Field survey 5
2.3.1 Survey details and timing 5
2.3.2 Guiding documents 7
2.3.3 Permits and ethics 7
2.3.4 Habitat assessment 7
2.3.5 Fauna identification and nomenclature 8
2.3.6 Trapping program 8
2.3.7 Black Cockatoo habitat assessment 20
2.3.8 Other Searches 21
2.3.9 Summary of survey effort 24
2.3.10 Species accumulation 26
2.3.11 Fauna survey limitations 27
2.4 Climate data for survey period 27

3. Desktop Assessment **29**
3.1 Climate 29
3.2 Geology and land systems 29
3.2.1 Geology 29
3.2.2 Land systems 29
3.3 Surface water and hydrology 29
3.4 Land use 30
3.4.1 Crown reserves and estates 30
3.4.2 Environmentally Sensitive Areas 30
3.4.3 Regional Ecological linkages 30
3.5 Vegetation 30
3.5.1 Broad vegetation mapping and extents 30
3.6 Fauna 31
3.6.1 Fauna diversity 31
3.6.2 Conservation Significant Fauna 31
3.7 Previous Studies 32

4. Survey Results **38**
4.1 Fauna Habitats 38
4.1.1 Fauna habitat linkages 38
4.1.2 Quality of habitat 38
4.2 Fauna Diversity 43
4.2.1 Mammals 43

4.2.2 Birds 43
4.2.3 Amphibians 45
4.2.4 Reptiles 45
4.2.5 Introduced Species 45
4.3 Conservation Significant Fauna 46
4.3.1 Accumulation curve 58
4.3.2 Black cockatoo habitat assessment 58
4.3.2.1 Foraging habitat 58
4.3.2.2 Breeding habitat 58
4.3.2.3 Roosting habitat 59
4.3.3 Carter's Freshwater Mussel 63
5. Conclusions 64
6. References 65

Table index

Table 1 Project terminology and definitions 3
Table 2 Extent of data searches 5
Table 3 Myara North survey details and timing 6
Table 4 Fauna references 8
Table 5 Targeted Chuditch cage trap lines summary 10
Table 6 Avifauna survey effort 11
Table 7 Camera trap locations 13
Table 8 Bat detector locations 15
Table 9 Bird acoustics recorder locations 16
Table 10 Carter's Freshwater Mussel transect summary 17
Table 11 Additional Rakali active search summary 18
Table 12 Quokka assessment summary 19
Table 13 Active diurnal search summary 22
Table 14 Nocturnal search summary 23
Table 15 Summary of fauna survey effort 25
Table 16 Fauna survey limitations 27
Table 17 Weather data for survey period (Phase 1 and 2) 28
Table 18 Reserves within the Survey Area 30
Table 19 Previous studies considered relevant to Myara North Survey Area 33
Table 20 Major habitat types within the Survey Area 39
Table 21 Mammal families recorded during the field survey 43
Table 22 Bird families recorded during the field surveys 44
Table 23 Amphibian families recorded during the field surveys 45
Table 24 Reptile families recorded during the field surveys 45
Table 25 Summary of likelihood of occurrence assessment for conservation significant fauna 47
Table 26 Black Cockatoo habitat usage 60
Table 27 Black Cockatoo potential breeding trees from transect data 61
Table 28 Black cockatoo foraging habitat assessment 62

Appendices

Appendix A Map figures
Appendix B Relevant legislation, background information and conservation codes
Appendix C Desktop searches
Appendix D Fauna field data

Acronyms

DE	Development Envelope
DBCA	Department of Biodiversity, Conservation and Attractions
DBH	Diameter Breast Height
DAWE	The Department of Agriculture Water and Energy
DEE	Department of the Environment and Energy
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities
DSEWHA	Department of Environment, Water, Heritage and the Arts (Canberra)
EMRC	Environmental Management and Research Consultants
EPA	Environmental Protection Authority
EPBC	Environment Protection Biodiversity Conservation
EP	Environmental Protection
ERD	Environmental Review Document
ESD	Environmental Scoping Document
FRTBC	Forest Red-tail Black Cockatoo
GoWA	Government of Western Australia
IBSA	Index of Biodiversity Surveys for Assessments
LOO	Likelihood of Occurrence
LTFMP	Long Term Fauna Monitoring Program
MNES	Matters of National Environmental Significance
PMST	Protected Matters Search Tool
SM	Song Meter
SOP	Standard Operating Procedure
SRE	Short-Range Endemic

1. Introduction

1.1 Project background

Alcoa of Australia Limited (Alcoa) is proposing to increase production at the Pinjarra Alumina Refinery by 5 per cent from 5 million tonnes per annum (Mtpa) to 5.25 Mtpa and transition the Huntly Bauxite Mine to the proposed Myara North and Holyoake mine regions (the Proposal). The Proposal is located in the Peel Region of Western Australia (WA), approximately 100 km south-east of Perth

The Proposal will be subject to environmental impact assessment under Part IV of the WA *Environmental Protection Act 1986* (EP Act), and the *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act). The environmental impact assessment will be via a Public Environmental Review (PER).

This Terrestrial Vertebrate Fauna Survey and Black Cockatoo Habitat Assessment (the Survey) has been prepared to support the EPA assessment of the Proposal and addresses the Myara North region of the Proposal. Separate reports address the Holyoake region, Pinjarra Refinery, Short-Range Endemic (SRE) invertebrate fauna, aquatic fauna, and subterranean fauna.

1.2 Purpose and scope of this report

The purpose of the surveys was to support the environmental assessment of the Project under Part IV of the *Environmental Protection Act 1986* (EP Act) and under *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Specifically, the survey was to identify ecological values to support environment impact assessment of the Project against the EPA's Terrestrial Fauna factor and on MNES, including threatened and migratory fauna. The surveys will inform mine planning to avoid and minimise impacts to conservation values, enable quantification of impacts, and inform mine management arrangements.

This Survey report has been prepared in accordance with the Environmental Scoping Document (ESD) prepared for the Proposal under Part IV of the EP Act. The Survey has been undertaken in accordance with EPA (2020) *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment* and relevant Commonwealth guidance on surveys for relevant threatened and migratory species.

This Survey report details the results of desktop assessment, a consolidation of previous fauna studies, and the findings of a detailed and targeted vertebrate fauna surveys undertaken in the Myara North region in winter (June/July) and spring (November) of 2020. The Survey includes a black cockatoo habitat assessment in accordance with Commonwealth guidance.

1.3 Survey Area

The Survey Area comprises the Myara North Development Envelope (DE) and adjacent conveyor and haul road corridors, as presented in Figure 1, Appendix A. The Survey Area lies in Jarrahdale State Forest and is bordered by Jarrahdale town and Serpentine National Park to the west, Monadnocks Conservation Park to the east, and the existing Myara mine region to the south. The Survey Area covers approximately 18,000 ha (refer Figure 1, Appendix A).

The Study Area comprises the Survey Area with a 10 km buffer and defines the limits of desktop database searches as described in Section 2.2.

1.4 Scope of works

The scope of works was to:

– Complete a comprehensive desktop assessment comprising terrestrial vertebrate fauna database search for the Study Area to determine the presence, or likely presence, of conservation significant vertebrate fauna species
– Review relevant literature relating to terrestrial vertebrate fauna within Alcoa's ML1SA mineral lease, with particular focus on conservation significant fauna

– Undertake a two-season detailed and targeted (Forest Red-tailed Black Cockatoo, Carnaby's Cockatoo, Baudin's Cockatoo, Chuditch, Quokka, and other priority species) vertebrate fauna survey within the Survey Area
– Provide a technical report (this document) detailing the results and findings of the survey
– Submit fauna survey data to the Index of Biodiversity Surveys for Assessments (IBSA) in accordance with Statutory requirements.
– Though not a vertebrate species, a targeted survey was undertaken for the threatened aquatic invertebrate Carters Freshwater Mussel as part of the field survey program. The targeted survey was undertaken further to the findings of a desktop aquatic fauna assessment (WRM 2021) which identified the potential presence of the species in the Survey Area.

1.5 Limitations and assumptions

This report: has been prepared by GHD for Alcoa of Australia Limited and may only be used and relied on by Alcoa of Australia Limited for the purpose agreed between GHD and Alcoa of Australia Limited as set out in section 1.4 of this report.

GHD otherwise disclaims responsibility to any person other than Alcoa of Australia Limited arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. Site conditions may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. The opinions, conclusions and recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Alcoa of Australia Limited and others who provided information to GHD (including Government authorities)], which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

1.6 Project terminology and definitions

Some common project terminology are described below in Table 1.

Table 1 Project terminology and definitions

Term (Abbreviation)	Definition/Use
Alcoa of Australia Limited (Alcoa)	Proponent of the Project and client of GHD for this Project.
GHD Pty Ltd (GHD)	Consultant engaged by Alcoa to prepare environmental approvals documentation and supporting technical studies for the Proposal.
Mining region	Sub-regions that comprise the Huntly Mine, including current (Myara), past (Del Park, Huntly 1 & 2, White, McCoy and O'Neil) and future (Myara North, Holyoake), etc.
Survey Area	Myara North Development Envelope and associated infrastructure corridor.
Study Area	The Survey Area with a 10 km buffer used to define the limits of desktop database searches.
Haul Road	Truck and mine infrastructure access road linking into existing corridors.
Conveyor Corridor	New conveyor through the Myara region connecting to the Myara North Development Envelope.
Detailed fauna survey	As per EPA 2020 describing the type of survey required, replaces wording from EPA 2016 for Level 2 assessment.
Targeted fauna survey	As per EPA 2020 describing the type of survey required, refers to undertaking targeted assessments for specific fauna species.

2. Methodology

2.1 Relevant legislation, conservation codes and background information

In WA some ecological communities, flora and fauna are protected under both Australian Government and State Government legislation. In addition, regulatory authorities provide a range of guidance and information on expected standards and protocols for environmental surveys.

An overview of key legislation and guidelines, conservation codes and background information relevant to the Survey is provided in Appendix B.

2.2 Desktop assessment

The desktop assessment comprises a review of various databases and literature sources (listed below) related to the environmental and ecological nature of the Survey Area.

The desktop assessment included a review of:

– The Department of Agriculture Water and Energy (DAWE), formerly Department of the Environment and Energy (DEE) Protected Matters Search Tool (PMST) to identify communities and species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) potentially occurring within the Study Area (DAWE 2020) (Appendix C).
– The DBCA *NatureMap* database for fauna species previously recorded within the Study Area (DBCA 2007–) (Appendix C).
– Existing datasets including previous broad-scale vegetation mapping of the Survey Area, aerial photography, geology/soils and hydrology information to provide background information on the variability of the environment, likely vegetation units and fauna habitats and to identify areas with the potential to contain Threatened and Priority fauna species.
– Literature provided by Alcoa and relating to fauna recorded in Alcoa's ML1SA mining lease within the Northern Jarrah Forest, (refer Table 19).

Due to the varying complexity of the reviewed data, various search extents were used to best display the targeted information. The extent used on each database as well as the literature review is displayed in Table 2.

Table 2 Extent of data searches

Component	Extent	Rationale
Regional biogeography	Region	This is a regional characterisation.
Climate	Karnet	Closest reliable weather station
Geology	Study Area	Broad classification with low number of outputs in Study Area
Land systems	Study Area	Broad classification with low number of outputs in Study Area
Surface water and hydrology	Study Area	Considered important to include surface water sources in proximity to the survey are which may be used by fauna as a drinking water supply and which may impact habitat type and availability.
Conservation reserves	Study Area	To consider protected land in and in proximity to the Survey Area.
DBCA Managed Lands	Study Area	To consider protected land in and in proximity to the Survey Area.
Environmentally Sensitive Areas	Study Area	To consider protected land in and in proximity to the Survey Area.
Regional Ecological Linkages	Study Area	To consider protected land in and in proximity to the Survey Area.
Broad vegetation mapping	Survey Area	Fairly detailed and complex data
Fauna species databases	Study Area	Search area extended due to motile nature of some fauna
Literature review	Region	Much of the literature was from Alcoa's Huntly Mine sites and surrounding forest to the south of the current Survey Area. Available literature was reviewed if applicable to terrestrial fauna.

2.3 Field survey

2.3.1 Survey details and timing

Field surveys were performed between 25 June and 13 November 2020 and consisted of five site visits from one to eleven days in duration. Most of the survey timing falls within the recommended survey timing for the southern climatic region for all species groups (EPA 2020). However, the first phase was undertaken in winter 2020 outside of the recommended period. This was undertaken to fulfil the survey schedule and the ability to maximise reptile detection via hand searches during seasonally low activity periods. It is unlikely that this survey timing adversely influenced the potential detection of mammal, bird or amphibian via the captures and recording methods used as these fauna groups remain active throughout the year and are detectable during winter. Survey timing and personnel are represented in Table 3.

Table 3 Myara North survey details and timing

Field Trip	Dates	Task	Duration	Zoologist/Ecologist	Years of experience of field personnel
1	25 June 2020	Reconnaissance, camera and bat detector deployment	1 day	Principal Zoologist	20
				Senior Zoologist	20
2	29 June - 9 July 2020	Phase 1 Survey: Detailed and Targeted fauna surveys (including trapping) within the Survey Area, identification and mapping of potential Black Cockatoo breeding trees and selected large hollows.	11 days	Senior Zoologist	20
				Senior Zoologist	20
				Zoologist	5
				Ecologist	10
				Ecologist	3
				Graduate Ecologist	2
				Graduate Ecologist	2
				Hydrologist (field hand)	2
3	24 June, 16, 20-21, 27 July, 23 August 2020	Assessment of black cockatoo trees and habitat identified in Myara North	6 days	Black cockatoo specialist	20
4	7 September -16 September 2020	Collection of cameras deployed during Phase 1 survey	7 days	Zoologist	5
				Graduate Ecologist	2
	28-29 October, 11 November 2020	Assessment of black cockatoo trees and habitat identified in proposed Myara North facilities location	3 days	Black cockatoo specialist	20
5	3 November – 13 November 2020 (excluding weekend due to car rally)	Phase 2 Survey: Detailed and Targeted fauna surveys (including trapping) within the Survey Area, Carters Freshwater Mussel assessment, Quokka assessment, Chuditch assessment, Black Cockatoo assessment.	10 days	Principal Zoologist	20
				Senior Zoologist	20
				Senior Zoologist	20
				Zoologist	5
				Graduate Ecologist	2
				Graduate Ecologist	2
6	22 December 2020	Collection of cameras deployed in Phase 2 survey.	2 days	Senior Zoologist	20
				Zoologist	5
				Ecologist	3
				Graduate Ecologist	2

2.3.2 Guiding documents

The Survey methodology and data collection employed was scoped according to EPA *Technical Guidance – Sampling methods for terrestrial vertebrate fauna* (EPA 2016a) and *Technical Guidance –Terrestrial Fauna Surveys* (EPA 2016b). However, during mobilisation of the Survey the updated *Technical Guidance –Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA 2020) was released. Where practicable the EPA (2020) guidance was followed.

The following Commonwealth survey guidance was adopted where relevant:

– EPBC Act Referral guidelines for three threatened black cockatoo species: Carnaby's cockatoo, Baudin's cockatoo and Forest red-tailed black cockatoo (Commonwealth Department of the Sustainability, Environment, Water, Population and Communities 2012a).
– Survey guidelines for Australia's threatened birds (Commonwealth Department of the Environment, Water, Heritage and the Arts 2010).
– Survey guidelines for Australia's threatened mammals (Commonwealth Department of the Sustainability, Environment, Water, Population and Communities 2011).
– Survey guidelines for Australia's threatened reptiles (Commonwealth Department of the Sustainability, Environment, Water, Population and Communities 2011).

2.3.3 Permits and ethics

A Section 40 Authorisation to Take or disturb threatened Fauna (Licence Number: 2020-0075), and a Regulation 27 (Licence No. BA27000269) to take Fauna for biological assessment was obtained from DBCA prior to undertaking the fauna surveys. The fauna survey (specifically trapping and animal handling) was undertaken in accordance with Standard Operating Procedures (SOPs) which were required to be followed under the conditions of GHD's fauna trapping permit. At the time of survey, compliance with these SOPs was accepted by DBCA as evidence of ethical treatment of animals.

2.3.4 Habitat assessment

The Survey Area was assessed for fauna habitat type based on floristic species, structural complexity, connectivity, hydrology, disturbance, type and extent of resource availability and value for fauna. Specifically, the assessment included:

– Habitat structure (e.g. vegetation type, presence/absence of overstorey, midstorey, understorey, and ground cover).
– Description of geomorphology, topography and substrate where applicable.
– Presence/absence of refuge including: fallen timber (coarse woody debris), hollow-bearing trees and stags and rocks/breakaways, and the type and extent of each refuge.
– Location of the habitat within the Survey Area in comparison to the habitat within the surrounding landscape.
– Habitat connectivity of refugia i.e. low dense vegetation associated with drainage lines and damplands within the Jarrah Forest, and identification of wildlife corridors for habitat specialist fauna, namely Quokka and Quenda within and immediately adjacent to the Survey Area.
– Identification and evaluation of key habitat features and types identified during the desktop assessment relevant to fauna of conservation significance.
– Evaluation of the likelihood of occurrence of conservation significant fauna within the environments present (based on presence of suitable habitats and species recorded)
– A representative photograph of each habitat type to complement description of habitat characteristics.

Habitat types have been delineated to align with Mattiske (2021) vegetation community types. That is, each habitat type represents one or more vegetation types. Refer to section 4.1.

2.3.5 Fauna identification and nomenclature

Identification of fauna species was made in the field using available field guides and electronic guides (Table 4). Where identification was not possible, photographs of specimens were collected to be later identified.

Table 4 Fauna references

Fauna group	Field guide
Mammals	Menkhorst and Knight (2010), Van Dyck and Strahan (2008)
Bats	Churchill (2008), Menkhorst and Knight (2010)
Birds	Morcombe (2004)
Reptiles	Wilson and Swan (2017), Storr *et al*. (1999), Storr *et. al*. (2002)
Amphibians	Tyler and Doughty (2009)

Nomenclature

Nomenclature used in this report follows that used by the WA Museum as reported on *NatureMap*. This nomenclature is deemed the most up-to-date species information for WA fauna, with the exception of birds, which follows Christidis and Boles (2008).

2.3.6 Trapping program

The same sampling techniques and trap layouts were used during both phases of the Survey and involved a series of standardised systematic trapping quadrat sites comprising pit-fall traps, Elliott box traps, cage traps and funnel traps. Details of each trap type used are provided below. During both phases, a total of twelve quadrats were established across the Survey Area and each quadrat was systematically surveyed (trapped) for seven to eight nights. Trap quadrat details are presented in Table 15 and locations shown in Figure 3,Appendix A.

The trap quadrats were selected to sample across the major habitat types occurring within the Survey Area. Traps sites were established during the first phase of trapping and closed upon survey completion, before being reopened during the second phase of trapping and removed upon survey completion. During Phase 2 of the survey, traps were closed for three nights after four nights of being opened, and then reopened again for a further four nights (see section 2.3.11). Initial design focused on undertaking a detailed assessment (EPA 2020) however through refinement, it developed into a targeted focused survey for conservation significant species identified in the Likelihood of Occurrence assessment (section 3.6.2) as discussed below.

Potential SRE fauna bycatch was collected throughout the Phase 2 survey and provided to Phoenix Environmental for identification and assessment of SRE fauna (Phoenix 2021). Specimens collected were only those from SRE candidate groups such as isopods, mygalomorphs, scorpions, millipedes, and planarians.

Pit-trap with drift fence

Seven (7) pit-traps were established at each quadrat within the Survey Area. Pit-traps comprised of 20 litre (L) plastic buckets (30 cm diameter, 40 cm deep) at each quadrat. A 50 m long flywire drift fence (30 cm high) bisected the pits; directing fauna into them. Pits were spaced at seven metre intervals along the fence. Soil and an egg carton were placed within each pit to provide shade and protection for captured animals.

Species targeted through this method were the Dell's Skink (*Ctenotus delli*) and Southern Death Adder (*Acanthophis antarcticus*). There are no specific guidelines on the assessment of these reptiles specifically in Western Australia, however detection methods were derived from DSEWPaC (2011a).

Funnel traps

Twelve (12) funnel traps were used along the drift fence at each quadrat. Traps were placed such that animals were directed into them from the drift fence in between the pit traps. Funnel traps were covered with insulating materials to minimise heat or cold exposure to animals.

Species targeted through this method were the Dell's Skink and Southern Death Adder. There are no specific guidelines on the assessment of these reptiles specifically in Western Australia, however detection methods derived from DSEWPaC (2011a).

Elliot box traps

One line of ten (10) Elliot ® box traps was established at each quadrat and positioned approximately 50 m away (and parallel to) the drift fence. Traps were placed approximately ten metres apart and baited with universal bait (a mixture of peanut butter, rolled oats and sardines). Elliott traps were located within shady areas or covered with vegetation to minimise exposure to captured animals. Where practicable Elliot traps were placed (strapped) in trees and onto logs to increase the likelihood of arboreal mammal captures.

Species targeted through this method include Brush-tailed Phascogale (*Phascogale tapoatafa wambenger*). The techniques utilised for this species were derived from Orell (2004), Scida and Gration (2017) and DSEWPaC (2011b).

Cage traps

Two (2) cage traps (with approximate dimensions 26 by 23 by 66 cm) were located at each quadrat site. These traps were placed at each end of the line of Elliot traps approximately 100 m apart. Cage traps were baited with universal bait and chicken wings.

Species targeted through this method include Brush-tailed Phascogale, Chuditch (*Dasyurus geoffroii*) and Quenda (*Isoodon fusciventer*). Specific survey guidelines exist for the Chuditch and this technique derived from DSEWPaC (2011b). Brush-tailed Phascogale and Quenda are also trapped via cage traps (Orell 2004).

Targeted cage trap lines

Cage traps (with approximate dimensions 26 by 23 by 66 cm) were deployed for a minimum of seven nights along five transects during both survey phases to target Brush-tailed Phascogale, Chuditch and Quenda. Each transect consisted of ten cage traps. These cages were baited with chicken wings as per recommendations from Alcoa (McGregor *et al*. 2014). For each trap deployed, the time and date deployed and recovered, as well as the GPS coordinates were recorded (see Table 5). Cage trap locations are presented in Figure 3, Appendix A.

Captured Chuditch were to be capture-marked-released to assess population size. Upon capture, gender, reproductive stage and health index would be recorded. Health index was rated on a scale from 1 to 3 after feeling the base of the Chuditch tail where a scale of 1 meant that bones could be felt and the Chuditch may be in poor health, and a scale of 3 meant that tail vertebrates could not be felt due to a layer of fat and the Chuditch was considered in excellent health. Photographs would then be taken of the Chuditch's head and back, one spot on the back would then be coloured with permanent marker before a second dorsal photograph was recorded and the Chuditch was released in a suitable hollow or burrow.

Cages would be closed if females carrying pouch young were recaptured, or any Chuditch was re-captured three consecutive nights in a row.

Table 5 Targeted Chuditch cage trap lines summary

Transect Number	Site name I.D	Habitat type	Location		Nights deployed	
			Easting	Northing	Phase 1	Phase 2
Transect 1	Cage trap 1	Jarrah Marri forest	419221	6422973	7 nights per cage trap	7 nights per cage trap
	Cage trap 2		419394	6422892		
	Cage trap 3		419514	6422675		
	Cage trap 4		419509	6422420		
	Cage trap 5		419565	6422228		
	Cage trap 6		419650	6422018		
	Cage trap 7		419761	6421852		
	Cage trap 8		419942	6421709		
	Cage trap 9		420119	6421576		
	Cage trap 10		420454	6421525		
Transect 2	Cage trap 11	Blackbutt forest	421648	6419061	7 nights per cage trap	7 nights per cage trap
	Cage trap 12		421627	6418960		
	Cage trap 13		421566	6418876		
	Cage trap 14		421507	6418709		
	Cage trap 15		421512	6418688		
	Cage trap 16		421542	6418576		
	Cage trap 17		421588	6418460		
	Cage trap 18		421554	6418336		
	Cage trap 19		421622	6418278		
	Cage trap 20		421670	6418167		
Transect 3	Cage trap 21	Jarrah Marri forest	428918	6412191	7 nights per cage trap	7 nights per cage trap
	Cage trap 22		429050	6412366		
	Cage trap 23		429269	6412380		
	Cage trap 24		429411	6412288		
	Cage trap 25		429604	6412250		
	Cage trap 26		429777	6412335		
	Cage trap 27		429896	6412492		
	Cage trap 28		430073	6412581		
	Cage trap 29		430240	6412663		
	Cage trap 30		430324	6412836		
Transect 4	Cage trap 31	Jarrah Marri forest	426343	6421760	7 nights per cage trap	7 nights per cage trap
	Cage trap 32		426311	6421557		
	Cage trap 33		426318	6421336		
	Cage trap 34		426370	6421155		
	Cage trap 35		426408	6420976		
	Cage trap 36		426292	6420861		
	Cage trap 37		426092	6420769		
	Cage trap 38		425938	6420749		
	Cage trap 39		425737	6420688		

Transect Number	Site name I.D	Habitat type	Location		Nights deployed	
			Easting	Northing	Phase 1	Phase 2
	Cage trap 40		425617	6420560		
Transect 5	Cage trap 41	Bullich and Blackbutt forest (for phase 2 this site was moved slightly due to a prescribed burn scar) to Jarrah Marri forest	418126	6419947	7 nights per cage trap	7 nights per cage trap
	Cage trap 42		418053	6420152		
	Cage trap 43		418040	6420333		
	Cage trap 44		418048	6420531		
	Cage trap 45		418030	6420734		
	Cage trap 46		417907	6420899		
	Cage trap 47		417881	6421081		
	Cage trap 48		417737	6421205		
	Cage trap 49		417716	6421245		
	Cage trap 50		417657	6421297		
Total of each Phase					**350**	**350**
Combined Total Effort					**700**	

Avifauna

Avifauna surveys were undertaken at each of the quadrat sites and opportunistically for a combined total of 2340 minutes. Avifauna surveys were undertaken at each of the quadrat sites. Each survey comprised of a 20 minute census of birds within an unbounded 2 ha area, which is the standard method used by Birds Australia for the Bird Atlas project. Birds detected visually (using binoculars) and/or aurally over a 20 minute period were recorded. Numbers of each species observed were also recorded.

All systematic bird surveys were undertaken either within four hours of dawn or two hours of dusk, as these are the times of day when birds are most active. In addition to systematic surveys, observations of birds were also made opportunistically throughout the survey activities. These are not part of the systematic quadrat surveys but add a significant proportion of the bird species observed.

Avifauna survey effort is displayed in Table 6.

Table 6 Avifauna survey effort

Site Type	Location		Habitat type	Survey effort (minutes)
	Easting	Northing		
Phase 1				
TL1	419173	6422951	Jarrah Marri forest	90
TL2	421559	6418605	Blackbutt forest	90
TL3	424227	6416681	Melaleuca dampland	90
TL4	426987	6413519	Jarrah Marri forest	90
TL5	427900	6412972	Granite outcrop Assoc.	90
TL6	427604	6410609	Flooded Gum woodland	90
TL7	428302	6417251	Jarrah Marri forest	90
TL8	426279	6422853	Jarrah Marri forest	90
TL9	424253	6425012	Jarrah Marri forest	90
TL10	424816	6421905	Jarrah Marri forest	90
TL11	420735	6417238	Granite outcrop	90
TL12	413197	6421772	Jarrah Marri forest	90

Site Type	Location		Habitat type	Survey effort (minutes)
	Easting	Northing		
Opportunistic	415684	6414906	Not recorded	30
Opportunistic	414570	6418045	Not recorded	30
Opportunistic	429971	6410176	Not recorded	30
Opportunistic	414320	6420879	Not recorded	30
Opportunistic	418523	6417302	Not recorded	30
Opportunistic	416068	6422764	Not recorded	30
Phase 1 Total				**1,260**
Phase 2				
TL1	419173	6422951	Jarrah Marri forest (recently burnt)	90
TL2	421559	6418605	Blackbutt forest	90
TL3	424227	6416681	Melaleuca dampland	90
TL4	426987	6413519	Jarrah Marri forest	90
TL5	427900	6412972	Granite outcrop Assoc.	90
TL6	427604	6410609	Flooded Gum woodland	90
TL7	428302	6417251	Jarrah Marri forest	90
TL8	426279	6422853	Jarrah Marri forest	90
TL9	424253	6425012	Jarrah Marri forest	90
TL10	424816	6421905	Jarrah Marri forest	90
TL11	420735	6417238	Granite outcrop Assoc.	90
TL12	413197	6421772	Jarrah Marri forest	90
Phase 2 Total				**1,080**
Phase 1 and Phase 2 Combined Total				**2,340**

Camera traps

Thirty-three remote cameras (Reconyx-Hyperfire ® and Reconyx-Pro ®) were deployed during Phase 1 for a total of 2,375 trap nights, and 20 remote cameras were deployed for 547 trap nights during Phase 2. In total 2,922 nights were undertaken. The duration of trap nights for each camera ranged from 21 to 89 trap nights. Remote cameras were deployed to target the conservation significant Chuditch (VU), Quokka (*Setonix brachyurus*, VU), Quenda (P4), Rakali (*Hydromys chrysogaster*, P4), Western Brush Wallaby (*Macropus irma*, P4), Brush-tailed Phascogale (CD) and general fauna (birds, reptiles and mammals). This was done by positioning cameras within the core habitat of targeted species, i.e. for Quokka, creek lines and damplands were investigated and cameras placed low in dense vegetation (within runnels if present). Conversely in upland habitat, Chuditch were targeted by utilising logs and hollows to position cameras. To target Brush-tailed Phascogale, cameras were set up similar to that described in Scida and Gration (2017). Cameras were baited with universal animal bait (a combination of peanut butter, oats and sardines) to attract fauna species within the Survey Area. For each camera location the number of nights deployed, and the GPS coordinates were recorded (Table 7). Cameras were used in this instant to supplement other trapping techniques and sample for more cryptic species such as the Quokka. The use of cameras also reduces the invasive impacts of trapping on species (DEC 2011).

Camera setup included fast trigger speed (faster than 0.5 sec) and colour photographs during the day and monochrome at night. The highest mega pixel possible, frames per second (>1) with capture set to three pictures per trigger with a one second delay.

Data from the cameras were downloaded to a computer and manually analysed for the presence of fauna following the field survey.

Species targeted through this method include Chuditch, Quokka, Quenda, Rakali, Western Brush Wallaby and Brush-tailed Phascogale.

Table 7 Camera trap locations

Camera Number	Habitat Type	Location		Deployed		Trap Nights Deployed
		Easting	Northing	Set	Collected	
Phase 1						
CAM 1	Jarrah Marri Forest	418864	6418040	6/07/2020	9/09/2020	65
CAM 4	Melaleuca dampland	416403	6416995	7/07/2020	9/09/2020	64
CAM 5	Jarrah Marri Forest	414533	6418380	7/07/2020	8/09/2020	64
CAM 6	Blackbutt forest	421796	6420180	4/07/2020	11/09/2020	69
CAM 7	Jarrah Marri Forest	417930	6422313	24/06/2020	11/09/2020	79
CAM 8	Jarrah Marri Forest	422863	6419611	4/07/2020	11/09/2020	69
CAM 10	Blackbutt forest	421279	6420885	4/07/2020	11/09/2020	69
CAM 11	Jarrah Marri Forest	413643	6419215	7/07/2020	9/09/2020	64
CAM 12	Blackbutt forest	421719	6418205	24/06/2020	11/09/2020	79
CAM 13	Jarrah Marri Forest	425487	6419041	4/07/2020	11/09/2020	69
CAM 14	Jarrah Marri forest	412543	6421508	7/07/2020	9/09/2020	64
CAM 15	Jarrah Marri Forest	418879	6417211	6/07/2020	9/09/2020	65
CAM 15b	Bullich forest	417973	6420573	24/06/2020	11/09/2020	79
CAM 16	Jarrah Marri Forest	423744	6415834	24/06/2020	11/09/2020	79
CAM 27	Bullich forest	417762	6421235	24/06/2020	11/09/2020	79
CAM 18	Bullich forest	417972	6420590	24/06/2020	11/09/2020	79
CAM 19	Granite outcrop Assoc.	427821	6410903	24/06/2020	11/09/2020	79
CAM 20	Jarrah Marri Forest	423469	6421514	4/07/2020	11/09/2020	69
CAM 21	Jarrah Marri Forest	426592	6419221	4/07/2020	11/09/2020	69
CAM 23	Jarrah Marri Forest	423494	6420401	4/07/2020	11/09/2020	69
CAM 24	Jarrah Marri Forest	419237	6423010	24/06/2020	11/09/2020	79
CAM 25	Jarrah Marri Forest	423668	6418484	4/07/2020	11/09/2020	69
CAM 28	Jarrah Marri Forest	426306	6417290	24/06/2020	11/09/2020	79
CAM 29	Blackbutt forest	422981	6418491	4/07/2020	11/09/2020	69
CAM 31	Melaleuca dampland	424732	6423215	4/07/2020	11/09/2020	69
CAM 41	Jarrah Marri Forest	415169	6416938	7/07/2020	9/09/2020	64
CAM 43	Melaleuca dampland	415525	6419259	7/07/2020	9/09/2020	64
CAM 44	Jarrah Marri Forest	413126	6420315	7/07/2020	9/09/2020	64
CAM 1	Melaleuca dampland	424674	6423235	6/07/2020	9/09/2020	65
CAM 4	Bullich forest	417780	6421235	7/07/2020	9/09/2020	64
CAM 77	Blackbutt forest	420846	6407514	14/09/2020	11/12/2020	89
CAM 7	Jarrah Marri Forest (conveyor corridor)	419320	6404938	14/09/2020	11/12/2020	89
CAM 24	Jarrah Marri Forest (conveyor corridor)	423753	6411977	14/09/2020	11/12/2020	89
Phase 1 Total						**2,375**

Camera Number	Habitat Type	Location		Deployed		Trap Nights Deployed
		Easting	Northing	Set	Collected	
Phase 2						
CAM 19	Jarrah Marri Forest	422598	6417606	4/11/2020	2/12/2020	28
CAM 26	Melaleuca dampland	425849	6413871	4/11/2020	2/12/2020	28
CAM 31	Melaleuca dampland	429026	6413236	4/11/2020	2/12/2020	28
CAM 27	Jarrah Marri Forest	423076	6417283	4/11/2020	2/12/2020	28
CAM 13	Melaleuca dampland	424219	6416023	4/11/2020	2/12/2020	28
CAM 16	Jarrah Marri Forest	422187	6417758	4/11/2020	2/12/2020	28
CAM 25	Melaleuca dampland	413390	6421527	4/11/2020	2/12/2020	28
CAM 12	Melaleuca dampland	420665	6414911	4/11/2020	2/12/2020	28
CAM GHDa	Jarrah Marri Forest	421144	6415089	4/11/2020	2/12/2020	28
CAM 18	Jarrah Marri Forest	419843	6416674	4/11/2020	2/12/2020	28
CAM 1	Blackbutt forest	414557	6419520	4/11/2020	2/12/2020	28
CAM 11	Bullich forest	417382	6419424	3/11/2020	2/12/2020	29
CAM 44	Melaleuca dampland	415880	6417989	5/11/2020	2/12/2020	27
CAM 6	Jarrah Marri Forest	426620	6416720	5/11/2020	2/12/2020	27
CAM 28	Jarrah Marri Forest	426043	6415364	5/11/2020	2/12/2020	27
CAM 15B	Jarrah Marri Forest	427392	6415617	5/11/2020	2/12/2020	27
CAM 14	Jarrah Marri Forest	428306	6416019	5/11/2020	2/12/2020	27
CAM 115	Granite outcrop Assoc.	426358	6425914	5/11/2020	2/12/2020	27
CAM 166	Granite outcrop Assoc.	426466	6426032	5/11/2020	2/12/2020	27
CAM 10	Melaleuca dampland	422643	6422180	11/11/2020	2/12/2020	21
Phase 2 Total						**547**
Combined Phase 1 and 2 Total						**2,922**

Bat Surveys

Bat Detectors (SM2 and SM4 SongMeters ®) were deployed for a period of between two and six nights at each survey location during both survey phases. Bat detectors were positioned in areas where bats might be recorded, i.e., utilising water bodies, fly ways, hill tops or open areas associated with damplands or granite outcrops. Bat detectors were set to record from 30 minutes pre-dusk to 30 minutes post-dawn. Detectors were set to record full spectrum and assessed using Kaleidoscope Pro (Wildlife Acoustics) and Anabat Insight (Titley Electronics). For each detector, the time and date deployed and recovered, and the GPS coordinates were recorded (Table 8). Bat detector locations are presented in Figure 3, Appendix A.

Data from the bat detectors were downloaded to a computer and analysed by Craig Grabham, GHD Principal Ecologist, for the presence of bats following the field survey.

Species targeted through this method include the Western False Pipistrelle (*Falsistrellus mackenziei*) with guidance on survey design from DSEWHA (2010) and Burgar *et al* (2017).

Table 8 Bat detector locations

Bat detector	Habitat type	Location		Deployed		Nights deployed
		Easting	Northing	Set	Collected	
Phase 1						
SM4-1	Jarrah Marri Forest	426282	6417199	24/06/2020	30/06/2020	6
SM4-1	Granite outcrop Assoc.	427915	6412940	30/06/2020	2/07/2020	2
SM4-1	Jarrah Marri Forest	425818	6421856	2/07/2020	4/07/2020	2
SM4-4	Jarrah Marri Forest	417931	6422315	24/06/2020	30/06/2020	6
SM4-4	Jarrah Marri Forest	425197	6414173	30/06/2020	2/07/2020	2
SM4-4	Jarrah Marri Forest	421309	6416290	3/07/2020	6/07/2020	3
SM4-5	Jarrah Marri Forest	419249	6423008	24/06/2020	29/06/2020	5
SM4-5	Blackbutt forest	421589	6418754	29/06/2020	2/07/2020	3
SM4-5	Granite outcrop Assoc.	427860	6411147	2/07/2020	6/07/2020	4
SM2-3	Bullich forest	417973	6420593	24/06/2020	30/06/2020	6
SM2-3	Melaleuca dampland	424270	6416696	30/06/2020	2/07/2020	2
Total Phase 1						**41**
Phase 2						
SM4-4	Granite outcrop Assoc.	415676	6414950	3/11/2020	5/11/2020	2
SM4-1	Granite outcrop Assoc.	420798	6417251	3/11/2020	6/11/2020	3
SM4-4	Jarrah Marri Forest	420771	6417263	3/11/2020	6/11/2020	3
SM4-1	Jarrah Marri Forest	426302	6422178	6/11/2020	9/11/2020	3
SM4-2	Jarrah Marri Forest	425097	6426021	6/11/2020	9/11/2020	3
SM2-3	Jarrah Marri Forest	423254	6417433	6/11/2020	9/11/2020	3
SM4-4	Blackbutt forest	421492	6418891	6/11/2020	9/11/2020	3
SM4 -1	Melaleuca dampland	422176	6420640	9/11/2020	11/11/2020	2
Total Phase 2						**22**
Combined Phase 1 and 2 Total						**63**

Nocturnal Bird Acoustics and Bird Census

Song Meter SM4 (Wildlife Acoustics) acoustic recorders were deployed at 13 sites throughout the Survey Area and recorded a combined total of 47 nights during both survey phases. Acoustics were positioned in areas where birds might be recorded, i.e. utilising water bodies, flyways and specifically targeted the Masked Owl (*Tyto novaehollandiae*). For each acoustic recorder site, the number of nights deployed, and the GPS coordinates were recorded (see Table 9). Acoustic recorder's locations are depicted in Figure 3, Appendix A.

Data from the acoustic recorders were downloaded to a computer and analysed for the presence of birds following the field survey. Data from the acoustic recorders was assessed by Nigel Jackett (Bird Specialist) for the presence of bird species. The methods of his assessment and results are provided in detail in Appendix D.

Table 9 Bird acoustics recorder locations

Bird Acoustics recorder site name	Habitat type	Location		Deployed		Nights deployed
		Easting	Northing	Set	Collected	
Phase 1						
SM4-AC1	Blackbutt forest	417220	6419709	4/07/2020	9/07/2020	5
SM4-AC1	Blackbutt forest	424795	6421966	1/07/2020	4/07/2020	3
SM4-AC2	Granite outcrop Assoc.	420722	6417160	4/07/2020	6/07/2020	2
SM4-AC2	Jarrah Marri forest	415306	6415314	7/07/2020	9/07/2020	2
SM4-AC3	Jarrah Marri forest	414389	6420890	1/07/2020	9/07/2020	8
SM4-AC4	Jarrah Marri forest (adjacent clearing/farmland)	415635	6419757	1/07/2020	9/07/2020	8
Total Phase 1						**28**
Phase 2						
SM4-AC3	Jarrah Marri forest	421995	6417174	3/11/2020	6/11/2020	3
SM4-AC1	Bullich forest	417415	6419370	3/11/2020	5/11/2020	2
SM4-AC2	Jarrah Marri forest	415679	6414947	3/11/2020	5/11/2020	2
SM4-AC2	Jarrah Marri forest (adjacent clearing/farmland)	424811	6426489	6/11/2020	9/11/2020	3
SM4-AC3	Jarrah Marri forest	426584	6421732	6/11/2020	9/11/2020	3
SM4-AC4	Jarrah Marri forest	423237	6417434	6/11/2020	9/11/2020	3
SM4-AC1	Blackbutt forest	421492	6418887	6/11/2020	9/11/2020	3
Total Phase 2						**19**
Combined Phase 1 and 2 Total						**47**

Carter's Freshwater Mussel assessment

Carter's Freshwater Mussel (*Westralunio carteri*) assessments were conducted during the Phase 2 survey. The survey approach was based on a method used by Klunzinger *et al.* (2012) to study Carter's Freshwater Mussel populations in the lower Vasse River. This method is aimed at detecting individual presence. Due to the ephemeral nature of the water bodies within the Survey Area this method was based on the assumption of low density of individuals

Eleven locations were selected for assessment prior to the field survey based on potential direct impacts from clearing and crossing construction over stream zone areas. Potential survey locations focussed on streams likely to have water present in order to maximise detection to confirm presents/absence. For each survey location zoologists walked 100 m upstream and 200 m downstream assessing 10 (1 x 1 m) quadrats at regular 30 metre intervals. While traversing the stream zone opportunistic searching for mussels was also done between each quadrat. In situations where stream zones may have become inaccessible due to dense riparian vegetation, the maximum number of quadrats was surveyed along the accessible stream zone. The following was recorded:

– Any evidence of Carter's Freshwater Mussel including live mussels and dead shell remains within the water, as well as any shell evidence on banks
– Presence of water and if so, still or flowing, size of water body and depth if determinable
– Riparian vegetation, bank/bed condition including evidence of bank erosion, bed sediment deposition and disturbance (i.e. tramping by pigs, dumped material etc.)
– Riparian vegetation condition
– Evidence of riparian terrestrial fauna including Rakali middens, quokka tracks/runnels/scat etc.
– For standing water the following was recorded:

- Approximate depth, width and (for pools) length
- Substrate (rocky, sandy etc)
- Water quality (clear, turbid, sheen etc)
- Opportunistic observations for aquatic fauna (fish, crayfish, frogs etc).

In total eleven (11) Carters Freshwater Mussel transects were surveyed over the Survey Area. Locations of these transects are presented in Table 10. Greater details on the assessment can be found in Appendix D.

Table 10 Carter's Freshwater Mussel transect summary

Site Type	Location		Date completed	Number of quadrats
	Easting	Northing		
CFM 1	423948	6412155	11/11/2020	10
CFM 2	427574	6410425	4/11/2020	9
CFM 3	425341	6413891	11/11/2020	10
CFM 4	424312	6416058	5/11/2020	10
CFM 5	425273	6419128	5/11/2020	10
CFM 6	421589	6418319	5/11/2020	10
CFM 7	416100	6417674	5/11/2020	10
CFM 8	417932	6419996	3/11/202010	10
CFM 9	420847	6407516	11/11/2020	10
CFM 10	419321	6404937	11/11/2020	10
CFM 11	419791	6417772	4/11/2020	11

Rakali assessment

Due to similarity of habitat preference, Rakali habitat assessments were performed in conjunction with the Carter's Freshwater Mussel assessments. Each Carter's Freshwater Mussel transect (ten 1 x 1m quadrats over a 300 metre distance) was also searched for the presence of middens, tracks and scat as well as an overall assessment of habitat quality (permanent water, presence of food species, refuge habitat, fire history etc.). In addition to those mentioned above, an additional three locations were actively searched for the presence of Rakali. The locations of these active searches are presented in Table 11.

Remote cameras were also set to target Rakali in areas considered potentially suitable to support their presence such as alongside streams and creeks. Remote cameras are considered unreliable to capture Rakali (due to cool temperatures a wet Rakali maintains). However, cameras placed slightly away from water with sufficient bait to keep the species present longer also yield results (GHD *pers comm*. Cockatoo Island Fauna Surveys). Remote camera locations are presented in Table 7 and Figure 3,Appendix A. Greater details on the assessment can be found in Appendix D.

Table 11 Additional Rakali active search summary

Site name	Location		Date completed	Survey effort (minutes)
	Easting	Northing		
R1	423948	6412155	11/11/2020	30
R2	427574	6410425	4/11/2020	30
R3	425341	6413891	11/11/2020	30
R4	424312	6416058	5/11/2020	30
R5	425273	6419128	5/11/2020	30
R6	421589	6418319	5/11/2020	30
R7	416100	6417674	5/11/2020	30
R8	417932	6419996	3/11/2020	30
R9	420847	6407516	11/11/2020	30
R10	419321	6404937	11/11/2020	30
R11	419791	6417772	4/11/2020	30
Additional searches	424220	6416019	4/11/2020	20
	425346	6413895	4/11/2020	20
	424902	6413431	5/11/2020	20
Total				390

Quokka Assessments

Quokka assessments were performed during the Phase 1 and 2 surveys (Table 12). Assessments were conducted by targeting potential Quokka habitat (primarily medium-long unburnt riparian vegetation with dense undergrowth and melaleuca dampland). Areas of potential Quokka habitat were searched for presence of runnels, tracks and scat as well as the extent of habitat and connectivity to surrounding potentially suitable habitat. Each identified habitat was searched (meandered) by two ecologists for approximately 60 minutes. This methodology (Quokka habitat assessment) was extracted from Bain (DEC 2013) and where habitat is considered suitable or quokka detected (due to evidence found) remote cameras were placed. In total approximately 31 hours of Quokka assessments were undertaken spread over 31 sites.

Targeted remote cameras were set during both survey phases at locations deemed to be suitable to support Quokkas to confirm their presence (see Table 6 and associated habitat type of Melaleuca damplands). Suitability of camera location was based on habitat characteristics. Habitat with relatively high density of shrubs associated with creeklines and / or Melaleuca damplands. As these habitats provide shelter and movement corridors under cover for Quokkas. Camera location were also selected in proximity to secondary Quokka evidence detected during Quokka assessments such as scats, runnels and footprints. Remote camera locations are presented in Table 7 and Figure 3, Appendix A.

Table 12 Quokka assessment summary

Site Type	Location		Date completed	Habitat type	Survey effort (minutes)
	Easting	Northing			
Quokka assessment	417780	6421235	24/6/2020	Bullich forest at creek	60
	423934	6412206	14/09/2020	Melaleuca dampland	60
	419322	6404957	14/09/2020	Melaleuca dampland	60
	420847	6407512	14/09/2020	Melaleuca dampland	60
	420884	6407494	14/09/2020	Melaleuca dampland	60
	418020	6420561	9/7/2020	Bullich forest	60
	427636	6410541	9/7/2020	Flooded Gum Woodland	60
	417973	6420573	24/6/2020	Bullich forest	60
	423744	6415834	24/6/2020	Bullich forest	60
	417972	6420590	24/6/2020	Bullich forest	60
	429043	6413217	4/11/2020	Melaleuca dampland	60
	425848	6413873	4/11/2020	Melaleuca dampland	60
	424220	6416021	4/11/2020	Melaleuca dampland	60
	420662	6414911	4/11/2020	Melaleuca dampland	60
	419747	6417722	4/11/2020	Jarrah Marri forest	60
	417388	6419420	4/11/2020	Bullich forest at creek	60
	414559	6419466	4/11/2020	Blackbutt forest at creek	60
	421923	6415255	4/11/2020	Melaleuca dampland	60
	421967	6417010	4/11/2020	Melaleuca dampland	60
	413396	6421535	4/11/2020	Melaleuca dampland	60
	423637	6418272	5/11/2020	Melaleuca dampland	60
	425397	6419091	5/11/2020	Jarrah Marri forest at creek	60
	428728	6414402	5/11/2020	Melaleuca dampland	60
	427394	6415618	5/11/2020	Jarrah Marri forest	60
	417343	6419328	5/11/2020	Melaleuca dampland	60
	424374	6416090	5/11/2020	Melaleuca dampland	60
	422647	6422250	5/11/2020	Bullich forest at creek	60
	419434	6405119	11/11/2020	Jarrah Marri forest at creek	60
	420860	6407493	11/11/2020	Melaleuca dampland	60
	426048	6412319	11/11/2020	Blackbutt forest at creek	60
	423869	6412250	11/11/2020	Blackbutt forest at creek	60
Total					**1860**

Brush-tailed Phascogale assessment

Brush-tailed Phascogales were targeted using remote cameras, cages and Elliot box traps. Remote cameras were deployed in habitats deemed potentially suitable to support phascogales and were deployed within key habitat features important to the Brush-tailed Phascogale such as in trees and facing onto logs. Cameras were deployed during both phases of the survey to increase the capture potential.

Elliot box traps deployed at the traplines were adapted to target Brush-tailed Phascogale during the Phase 2 survey. Elliot traps were strapped into trees and on logs to target phascogale which are largely arboreal (tree dwelling). The Elliot traps were baited with universal bait (a combination of peanut butter, oats and sardines) and covered with bark, leaves or Sheoak needles.

2.3.7 Black Cockatoo habitat assessment

A Black Cockatoo habitat assessment (for Carnaby's Cockatoo, Forest Red-tailed Black Cockatoo and Baudin's Cockatoo) was undertaken over the Survey Area to assess the presence, quality and extent of habitat. The assessment involved visual and aural assessment of the Survey Area, identifying breeding habitat (presence/absence of actual and potential breeding trees), foraging habitat, roosting areas, current activity and any other signs of use by Black Cockatoos. For the purpose of this assessment, the DSEWPaC (2012) Black Cockatoo referral guidelines were used to define breeding, foraging and night roosting habitat.

The number and type of potential breeding trees within the Survey Area was estimated by surveying thirty one (31) plots (60 m by 500 m = 3 ha each) across the Survey Area (93 ha total). Each plot was traversed on foot and all potential Black Cockatoo breeding trees (based on Diameter Breast Height (DBH) recorded. Plots were selected to sample across all the vegetation complexes occurring locally based on vegetation mapping by Mattiske and Havel (1998). The number of plots within each vegetation complex was roughly proportional to the relative amount of each complex within the Survey Area. For example, the extensive Jarrah Marri forest habitat type had proportionately more plots than Bullich forest habitat type which comprised a small proportion of the Survey Area.

Breeding habitat was extrapolated using averaged results from these plot surveys per fauna habitat type throughout the Survey Area. This method was undertaken due to the large extent of the Survey Area and the commitment by Alcoa to undertaking detailed pre-clearing surveys of potential breeding trees in mining and haul road footprints once these are confirmed. For each potential breeding tree, details of the tree location, species, DBH, size and number of hollows observed, evidence of use and any other significant observations were recorded. Where trees were recorded to have a suitable large hollow that could be used or had signs of being used (potential or likely), trees were revisited by Tony Kirkby (Black Cockatoo Specialist) where the hollows were checked for Black Cockatoo use by using a drone, pole camera and telephoto lens.

Information collected during the field survey included:

– Foraging habitat - the location and extent of suitable Black Cockatoo species foraging habitat was identified and mapped for the Survey Area, based on the vegetation associations and presence/absence of known foraging species. During the field surveys any direct or indirect evidence of foraging by Black Cockatoos was recorded via GPS.
– Breeding habitat - suitable breeding habitat for Black Cockatoos is defined by DSEWPaC (2012) as trees of species known to support breeding within the range of the species which either have a suitable nest hollow or are of a suitable Diameter at Breast Height (DBH) to develop a nest hollow. For most tree species, suitable DBH is greater than 500 mm. For Salmon Gum (*Eucalyptus salmonophloia*) and Wandoo (*Eucalyptus wandoo*), suitable DBH is greater than 300 mm (DSEWPaC 2012), however in this Survey Area no wandoo were present. On average, Carnaby's Cockatoos are known to nest in hollows with an entrance diameter greater than 20 - 30 cm (Johnstone and Storr 1998; Groom 2011). While the Forest Red-tailed Black Cockatoo is known to nest in hollows with an entrance of greater than 12 cm (Johnstone and Storr 1998). Therefore, during the field survey hollows size, as well as position, chew evidence and tree species was a guide for potential and likely use.
– Night roosting habitat - suitable roosting habitat is defined by DSEWPaC (2012). Suitable roosting habitat was identified based on the presence of suitable tall trees, evidence of roosting (feathers, twig clips etc.) and proximity of known roosting sites in the Survey Area and extended Survey Area. There was one suspected location of roosting within the Survey Area. This can be seen in Appendix D.

– Opportunistic observations - both visual and aural observations of Black Cockatoos within the Survey Area and surrounding region were noted during the survey. This information was used to provide context to the use of the Survey Area by all three Black Cockatoo species.

This information was used to calculate the amount of foraging habitat, potential breeding habitat and night roosting habitat within the Survey Area and a guide to the habitats available within the extended Survey Area. A summary of this information is presented below in Table 26.

2.3.8 Other Searches

Rare and threatened species may have a patchy, disparate distribution through landscapes. To provide the best opportunity to determine the presence and relative prevalence of these species, this study employed a variety of sampling methods. Systematic sampling sites were also assessed using non-systematic methods to ensure thorough coverage of the sites, and non-systematic techniques were used to sample the broader Survey Area and increase survey effort.

Diurnal searching

Each trapping site was surveyed for amphibians, reptiles, and mammals. Surveys comprised of active searching of potential shelter sites (overturning logs, rocks and leaf litter) and low vegetation (under bark and in tree stumps) and recording all individuals observed with a focus on conservation significant species. Species presence was also detected and identified via secondary evidence, in the form of scats, tracks, feathers, burrows and skeletal remains. A minimum of one hour was spent at each trap line including the general area around it. Diurnal (active) searching is known to be highly productive during optimal weather in selected habitat types and can account for a significant proportion of reptile species recorded. This method targeted granite outcrops during Phase 1 to maximise effectiveness. A summary of the diurnal search effort completed is provided below in Table 13 with survey locations shown in Figure 3, Appendix A.

Table 13 Active diurnal search summary

Site name	Location		Habitat type	Survey effort (minutes)
	Easting	Northing		
Phase 1				
Active search	419166	6422868	Jarrah Marri forest	30
	427925	6412801	Melaleuca dampland	135
	426545	6422105	Jarrah Marri forest	30
	427854	6411179	Granite Outcrops Assoc.	30
	419111	6417875	Granite Outcrops Assoc.	30
	412511	6421533	Jarrah Marri forest	30
	415502	6415131	Jarrah Marri forest	120
	414359	6417984	Jarrah Marri forest	30
	427872	6410860	Granite Outcrops Assoc.	40
	418184	6422052	Granite Outcrops Assoc.	240
	420791	6417282	Granite Outcrops Assoc.	60
	428228	6418114	Granite Outcrops Assoc.	60
	427273	6417099	Jarrah Marri forest	60
	419542	6419115	Jarrah Marri forest	60
	427821	6418300	Granite Outcrops Assoc.	60
	420750	6417139	Granite Outcrops Assoc.	60
	418020	6422080	Granite Outcrops Assoc.	60
	426554	6425723	Granite Outcrops Assoc.	60
	430136	6410618	Jarrah Marri forest	30
	426378	6425909	Granite Outcrops Assoc.	120
	418557	6417351	Granite Outcrops Assoc.	140
	414085	6422412	Jarrah Marri forest	30
	420803	6417126	Granite Outcrops	60
Total Phase 1				**1,575**
Phase 2				
Active search	424329	6416182	Granite Outcrops	30
	428008	6410850	Jarrah Marri forest	120
	424219	6416025	Jarrah Marri forest	20
	424876	6414720	Jarrah Marri forest	60
	424609	6413211	Granite Outcrops	20
	419909	6424636	Jarrah Marri forest	60
	427714	6411184	Jarrah Marri forest	20
	428399	6413891	Jarrah Marri forest	20
	427103	6414267	Jarrah Marri forest	60
	426591	6421728	Jarrah Marri forest	60
	426543	6422105	Jarrah Marri forest	30
	426290	6422164	Jarrah Marri forest	20
	418184	6415922	Jarrah Marri forest	90

Site name	Location		Habitat type	Survey effort (minutes)
	Easting	Northing		
	418431	6415399	Granite Outcrops	180
	422622	6422820	Jarrah Marri forest	20
	426935	6413464	Jarrah Marri forest	20
	422059	6423729	Jarrah Marri forest	20
	419286	6419772	Jarrah Marri forest	60
	425697	6424851	Jarrah Marri forest	20
	416087	6422641	Jarrah Marri forest	60
	414743	6421898	Jarrah Marri forest	30
	426174	6423113	Jarrah Marri forest	30
	415025	6422056	Jarrah Marri forest	30
	414082	6422386	Jarrah Marri forest	20
Total Phase 2				**1,100**
Combined Phase 1 and 2 Total				**2,675**

Nocturnal searching

Spot lighting was undertaken to detect nocturnal species that may otherwise remain undetected using other survey techniques. Handheld or head mounted spotlights were used for a minimum of 15 minutes at each trap line for each survey phase and within the general area. Nocturnal searches involved spot lighting for a minimum of 200 m traversed at each location and recording all species observed during the exercise. A summary of the nocturnal searches completed is provided below in Table 14 with survey locations displayed in Figure 3, Appendix A.

Table 14 Nocturnal search summary

Site Type	Location		Habitat type	Survey effort (minutes)
	Easting	Northing		
Phase 1				
Frog / Nocturnal search	424263	6416733	Melaleuca dampland	15
Frog / Nocturnal search	427726	6410729	Blackbutt forest	30
Frog / Nocturnal search	425272	6413885	Jarrah Marri forest	15
Frog / Nocturnal search	424331	6416842	Melaleuca dampland	15
Frog / Nocturnal search	428035	6412958	Granite Outcrops Assoc	15
Frog census	424347	6415981	Melaleuca dampland	15
Nocturnal search	423543	6418321	Melaleuca dampland	30
Nocturnal search	417782	6421118	Bullich / Blackbutt forest	30
Nocturnal search	421610	6418810	Blackbutt forest	30
Nocturnal search	427636	6410541	Flooded Gum woodland	30
Nocturnal search	427615	6410458	Blackbutt forest	90
Nocturnal search	427616	6410462	Blackbutt forest	90
Nocturnal search	425445	6416692	Jarrah Marri forest	60
Nocturnal search	429006	6412852	Jarrah Marri forest	30
Total Phase 1				**495**
Phase 2				

Site Type	Location		Habitat type	Survey effort (minutes)
	Easting	Northing		
Nocturnal search	419178	6422955	Jarrah Marri forest	60
Nocturnal search	421550	6418600	Blackbutt forest	80
Nocturnal search	420745	6417248	Granite Outcrops Assoc	60
Nocturnal search	413297	6421782	Melaleuca dampland	60
Nocturnal search	417415	6419370	Bullich / Blackbutt forest	60
Nocturnal search	417781	6421118	Bullich / Blackbutt forest	60
Nocturnal search	421609	6418809	Blackbutt forest	60
Nocturnal search	427636	6410541	Flooded Gum woodland	60
Total Phase 2				**500**
Combined Phase 1 and 2 Total				**995**

Opportunistic observations

Opportunistic observations involve the recording of fauna taxa (physical presence and/or signs of presence) spatially throughout the Survey Area. These observations are gathered throughout the survey duration during all in-situ activities including travel, and generally account for a substantial proportion of the species assemblage recorded including conservation significant fauna. Opportunistic observations include physical observations (sighting or hearing fauna), and indirect evidence (scats, tracks, diggings, nests, feathers, slough, skeletal remains, pellets) which indicate the current or recent activity of a species present. Wherever possible, numbers of individuals, microhabitat use and other relevant information was recorded. Opportunistic observations were recorded outside of the diurnal, nocturnal or general trap site surveys (for example when driving, walking to a site, checking camera traps and bat detectors).

2.3.9 Summary of survey effort

Survey effort is described as the amount and type of survey that is undertaken during an assessment. Table 15 provides detail on the type and amount of survey time undertaken during both survey phases. Each of the trapping sites were sampled for a minimum of seven (7) trap-nights per survey phase including bucket, cages (both at general trap lines and cage trap transects), funnel and Elliott traps. The total trapping effort across both survey phases consisted of 6,412 trap nights. Additionally, over both survey phases remote cameras were deployed for a total of 2,922 nights, 2,340 minutes of bird census was undertaken (Table 5), 63 nights were sampled for bat acoustics (Table 7), 47 nights were sampled for bird acoustics (Table 8), 2,675 minutes of diurnal active searching was completed (Table 13), 995 minutes of nocturnal searching was completed (Table 14). Additionally, 390 minutes for Rakali (Table 11) and 1,860 minutes (Table 12) of Quokka assessments were undertaken.

Table 15 Summary of fauna survey effort

Fauna trapping sites Phase 1 2020				**Elliot traps**		**Pit traps**		**Cage traps**		**Funnel traps**	
Sites Phase 1	Easting	Northing	nights open	# of traps	trap nights	# of traps	trap nights	# of traps	trap nights	# of traps	trap nights
TL 1	426987	6413519	7	10	70	7	70	2	14	12	84
TL 2	424252	6425012	7	10	70	7	70	2	14	12	84
TL 3	427900	6412972	7	10	70	7	70	2	14	12	84
TL 4	426279	6422853	7	10	70	7	70	2	14	12	84
TL 5	419173	6422951	7	10	70	7	70	2	14	12	84
TL 6	420734	6417238	7	10	70	7	70	2	14	12	84
TL 7	421559	6418605	7	10	70	7	70	2	14	12	84
TL 8	428302	6417251	7	10	70	7	70	2	14	12	84
TL 9	427604	6410609	7	10	70	7	70	2	14	12	84
TL 10	413197	6421772	7	10	70	7	70	2	14	12	84
TL 11	424815	6421905	7	10	70	7	70	2	14	12	84
TL 12	418020	6420561	7	10	70	7	70	2	14	12	84
Total –Phase 1				**120**	**840**	**84**	**840**	**24**	**168**	**144**	**1,008**
Fauna trapping sites Phase 2 2020				**Elliot traps**		**Pit traps**		**Cage traps**		**Funnel traps**	
Sites Phase 2	Easting	Northing	nights open	# of traps	trap nights	# of traps	trap nights	# of traps	trap nights	# of traps	trap nights
TL 1	426987	6413519	7	10	70	7	70	2	14	12	84
TL 2	424252	6425012	7	10	70	7	70	2	14	12	84
TL 3	427900	6412972	7	10	70	7	70	2	14	12	84
TL 4	426279	6422853	7	10	70	7	70	2	14	12	84
TL 5	419173	6422951	7	10	70	7	70	2	14	12	84
TL 6	420734	6417238	7	10	70	7	70	2	14	12	84
TL 7	421559	6418605	7	10	70	7	70	2	14	12	84
TL 8	428302	6417251	7	10	70	7	70	2	14	12	84
TL 9	427604	6410609	7	10	70	7	70	2	14	12	84
TL 10	413197	6421772	7	10	70	7	70	2	14	12	84
TL 11	424815	6421905	7	10	70	7	70	2	14	12	84
TL 12	418020	6420561	7	10	70	7	70	2	14	12	84
Total Phase 2				**120**	**840**	**84**	**840**	**24**	**168**	**144**	**1,008**
Total Phase 1 and 2 combined				**240**	**1,680**	**168**	**1,680**	**48**	**336**	**288**	**2,016**

2.3.10 Species accumulation

The number and type of species trapped each day was recorded and a species accumulation curve was created for the Survey Area using PRIMER v6 (Clarke and Gorley 2006). The species accumulation curve represents the successfulness of the trapping program for its duration. Typically, the longer the trapping program the more complete the representation of species sampled per trapping location or habitat type. Accumulation curves should show “levelling” of the groups species counts prior to the completion of the survey. Many limitations can influence the results of a curve and should be observed as a guide to the project’s success. This curve is presented in Plate 10 in Section 4.3.1.

The data was run through Primer v6 against 8 existing models, these models are:

– Sobs - Curve of observed species counts
– Chao 1 - Chao's estimator based on number of rare species
– Chao 2 - Chao's estimator using just presence-absence data
– Jacknife 1 - Jacknife estimator based on species that only occur in one sample
– Jacknife 2 - Second order jacknife estimator
– Bootstrap - Bootstrap estimator based on proportion of quadrats containing each species
– MM (Michaelis-Menton) - Curve fitted to observed Sobs curve
– UGE - Calculated species accumulation curve based on Ugland, Gray and Ellingsen (2003)

2.3.11 Fauna survey limitations

EPA (2020) states that fauna and faunal assemblage survey reports for environmental impact assessment in Western Australia should contain a section describing the limitations of the survey methods used. The limitations and constraints associated with the fauna component of this field survey are discussed in Table 16.

Table 16 Fauna survey limitations

Limitations	Constraints	Impact on Survey outcomes
Scope (what fauna groups were sampled and were some sampling methods not able to be employed because of environmental constraints)	Nil	All fauna groups were able to be sampled. During the Phase 2 survey the traps had to be closed for three nights due to a car rally in the Survey Area. The traps were re-opened following the rally and were open for a minimum of 7 nights (combined) each.
Seasonal environmental conditions	Minor	The surveys were scoped and designed around EPA (2016a) guidelines; however they were modified and completed when EPA (2020) guidelines was released. This document provides recommended survey timing for the Southern Climatic Region for amphibians, birds and mammals. The recommended survey timing for reptiles in accordance with these guidelines include a primary survey being undertaken between October-December (completed) and a secondary survey to be completed between February-March (not completed). The first survey undertaken for the Myara North Survey Area was completed in June/July 2020 which is outside of the recommended survey timing for reptiles (EPA 2020). The survey was arranged prior to the release of the EPA (2020) guidelines; however, the survey incorporated extensive active searching in habitats deemed suitable for the Dell Skink and Southern Death Adder - conservation significant reptiles identified in the desktop assessment as potentially occurring within the Survey Area. Raking of leaf litter and active searching in granite is considered particularly useful during the winter months to detect reptiles lying dormant in the cooler weather. A high proportion of the reptile species recorded were detected via active searching. The survey timing discrepancy is not considered a major limitation to this survey due to the effort applied to active searching with particular focus on the conservation significant reptiles. The survey timing had no impact of recording mammals and birds.
Proportion of fauna identified, recorded and/or collected	Nil	All fauna were identified and released on site.
Proportion of the task achieved and further work which might be needed.	Nil	All scoped work was completed successfully.
Remoteness and/or access problems	Nil	No issues were encountered with the exception of the aforementioned car rally resulting in the traps being closed for three consecutive nights.
Accordance to EPA guidelines	Minor	Change of EPA guidelines from 2016 vertebrate guidance to 2020 during Phase 1 survey. Original scoping was to perform a detailed terrestrial fauna survey over the Survey Area in accordance with EPA (2016a). Following the release of the EPA (2020) guidelines the survey was adapted to take on more of a targeted approach. Chuditch and Black Cockatoo were targeted during both phases of the survey, while targeted Carters Freshwater Mussel and Quokka assessments were included into the Phase 2 survey.

2.4 Climate data for survey period

Weather conditions during the Phase 1 survey were generally cool and damp with rainfall occurring most days. The Phase 2 survey period also experienced rainfall at the beginning and end of the survey duration; however experienced dry and warm conditions for the majority of the survey. An overview of the weather experienced

during the survey is presented in Table 17. Weather data was obtained from the Bureau of Meteorology website closest weather station to the site, Karnet (Station ID: 009111) located approximately 5 km southwest of the Survey Area.

Table 17 Weather data for survey period (Phase 1 and 2)

Date	Minimum temp (°C)	Maximum temp (°C)	Rainfall (mm)
Phase 1			
29 June 2020	10.2	15.0	34.1
30 June 2020	11.2	15.0	2.0
1 July 2020	9.2	14	7.4
2 July 2020	6.5	15.4	0
3 July 2020	5.9	17.4	0.3
4 July 2020	8.3	20.5	0.5
5 July 2020	9.7	21.6	0
6 July 2020	11	15.9	4.8
7 July 2020	9.5	15	22.3
8 July 2020	6	14.6	9.6
9 July 2020	5.2	14.9	0.3
Phase 2			
2 November 2020	13.4	16.5	15.8
3 November 2020	11.1	-	7.3
4 November 2020	-	20.3	0
5 November 2020	10.4	22.5	0
6 November 2020	10	27.4	0
9 November 2020	12.4	25.6	0
10 November 2020	13.7	26.6	0
12 November 2020	12.1	22.8	0
13 November 2020	10.4	22.5	5.6

3. Desktop Assessment

3.1 Climate

The Survey Area is located within the Northern Jarrah Forest subregion of Western Australia. The climate of this region is classified as Warm Mediterranean, with two distinct seasons: a warm and dry summer (December to February) and a cool wet winter (June to August) (Williams & Mitchell 2001).

The region is characterised spatially by rainfall, with rainfall being greatest on the scarp and decreasing to the east and north (Williams & Mitchell 2001). The majority of all rainfall received occurs during winter months and is a result of low pressure systems associated with westerly winds. The closest operating weather station is Serpentine Karnet (Station ID: 009111) located approximately 5 km southwest of the Survey Area.

Climate data (Bureau of Meteorology 2020) from this station indicates:

– Mean maximum temperature ranges from 15.5 °C in July to 30.6 °C in January
– Mean minimum temperature ranges from 6.3 °C in July and August to 15.8 °C in February
– Mean annual rainfall is 1,153 mm with average of 98.5 rain days/year.

3.2 Geology and land systems

3.2.1 Geology

The Australian continent is made up of four continental blocks: the Yilgarn, Pilbara and Gawler Cratons and the Wilyama Block. The Survey Area is located within the South West Terane of the Yilgarn Craton. The Yilgarn Craton is comprised of geological formation from the Archaean (2.5 billion years ago) to Cainozoic ages (66 million years ago to present) and bounded by the Murgoo Gneiss Complex of the Western Gneiss Terrane in the west and the Southern Cross Province in the east. The South West Terrane is composed of granitic rocks classified into groups based on characteristics. The Study Area overlays two geological units:

– South West Terrane greenstones – granulite and migmatite
– Yilgarn Craton Granites - granitic rock, undivided; metamorphosed

3.2.2 Land systems

The Survey Area is located within two land systems:

– Darling Plateau System - Lateritic plateau. Duplex sandy gravels, loamy gravels and wet soils. Jarrah-Marri-wandoo forest and woodland.
– Murray Valleys System - Western Darling Range from the Avon Valley to Harvey. Deeply incised valleys with Red loamy earths, shallow duplexes and rock outcrop and Jarrah-Marri-wandoo forest and woodland with mixed shrubland.

3.3 Surface water and hydrology

The Survey Area lies predominantly within the Serpentine River catchment and lies adjacent to the Serpentine River and Serpentine Dam and Pipehead Dam Reservoirs. Tributaries of the Serpentine River and Serpentine Dam Reservoir include 39 Mile Brook, Banksia Gully and Gold Mine Gully, which flow in a roughly south-west direction through the Survey Area. The north west portion of the Survey Area drains to Honour Brook, which flows west through Jarrahdale and discharges into the Serpentine River downstream of the Pipehead Dam. The north-east portion of the Survey Area lies within the Wungong Brook catchment, which drains into Wungong Dam Reservoir approximately 4 km to the north-west.

The Serpentine Dam, Pipehead Dam and Wungong Dam are public drinking water reservoirs. The south-west extent of the Survey Area lies within the Reservoir Protection Zone of the Serpentine Dam and Pipehead Dam reservoirs.

The Serpentine Dam and Pipehead Dam are man-made perennial water bodies. The Serpentine River, Wungong Brook and tributaries within the Survey Area are ephemeral and flow for periods of several months during winter and spring. Drainage floors occur in areas of alluvial deposits along the Serpentine River and tributaries and form ephemeral waterlogged damplands during the winter and spring.

3.4 Land use

3.4.1 Crown reserves and estates

There are three reserves located within the Survey Area (see Table 18 and Figure 2, Appendix A).

Table 18 Reserves within the Survey Area

Reserve number	Name	Class	Use	Approximate location relative to Survey Area
R 16634	Jarrahdale State Forest	Class C	State Forest	Covering majority of the Survey Area with the exception of the north eastern-most portion
R 335	Un-named	Class C	Waterway, resting place	Lies within a small portion of the eastern Survey Area, adjacent to Albany Highway
R 5913	Jarrahdale State Forest	Class C	State Forest	Lies within the south-eastern boarder of the Survey Area

The following DBCA managed lands lie adjacent to the Survey Area:

– Serpentine National Park (Class A) to the west
– Monadnocks Conservation Reserve (Class A) to the east.

3.4.2 Environmentally Sensitive Areas

Three Environmentally Sensitive Areas (ESAs) lie within the western portion of the Survey Area (Figure 2, Appendix A). An additional 51 ESAs lie within 10 km of the Survey Area.

3.4.3 Regional Ecological linkages

Three ecological linkages lie within the Survey Area, as presented in Figure 2, Appendix A. The ecological linkages are interpreted to be in association with riparian corridors of the Serpentine River, Wungong Brook and Gold Mine Brook-39 Mile Brook. An additional 11 ecological linkages lie within the Study Area.

3.5 Vegetation

3.5.1 Broad vegetation mapping and extents

Vegetation associations

Broad scale (1:250,000) pre-European vegetation mapping of the Study Area has been completed by Beard (1979) at an association level. The mapping indicates the Survey Area intersects two vegetation associations:

– West Darling_3 (association 3): Mainly Jarrah and Marri *Eucalyptus marginata*, *Corymbia calophylla*
– West Darling_128 (association 128): Rock

Vegetation complexes

Regional vegetation complex mapping has been completed by Mattiske & Havel (1998) with updates from Webb *et al.* (2016) based on major landform boundaries within the South West Forest and forested region of south-west Western Australia. The mapping indicates eight vegetation complexes are present within the Survey Area:

– Dwellingup (D1): Open forest of *Eucalyptus marginata* subsp. *marginata-Corymbia calophylla* on lateritic uplands in mainly humid and subhumid zones.
– Dwellingup (D2): Open forest of *Eucalyptus marginata* subsp. *marginata-Corymbia* calophylla on lateritic uplands in subhumid and semiarid zones.
– Yarragil 1 (Yg1): Open forest of *Eucalyptus marginata* subsp. *marginata-Corymbia calophylla* on slopes with mixtures of *Eucalyptus patens* and *Eucalyptus megacarpa* on the valley floors in humid and subhumid zones.
– Yarragil 2 (Yg2): Open forest of *Eucalyptus marginata* subsp. *thalassica-Corymbia calophylla* on slopes, woodland of *Eucalyptus patens-Eucalyptus rudis* with *Hakea prostrata* and *Melaleuca viminea* on valley floors in subhumid and semiarid zones.
– Cooke (Ce): Mosaic of open forest of *Eucalyptus marginata* subsp. *marginata-Corymbia* calophylla (subhumid zone) and open forest of *Eucalyptus marginata* subsp. *thalassica-Corymbia calophylla* (semiarid and arid zones) and on deeper soils adjacent to outcrops, closed heath of Myrtaceae-Proteaceae species and lithic complex on granite rocks and associated soils in all climate zones, with some *Eucalyptus laeliae* (semiarid), and *Allocasuarina huegeliana* and Eucalyptus wandoo (mainly semiarid to prearid zones).
– Swamp (S): Mosaic of low open woodland of *Melaleuca preissiana-Banksia littoralis*, closed scrub of *Myrtaceae* spp., closed heath of *Myrtaceae* spp. and sedgelands of *Baumea* and *Leptocarpus* spp. on seasonally wet or moist sand, peat and clay soils on valley floors in all climatic zones.
– Murray 1 (My1): Open forest of *Eucalyptus marginata* subsp. *marginata-Corymbia* calophylla-*Eucalyptus patens* on valley slopes to woodland of *Eucalyptus rudis-Melaleuca rhaphiophylla* on the valley floors in humid and subhumid zones.
– Goonapping: Mosaic of open forest of *Eucalyptus marginata* subsp. *marginata* (humid zones) and *Eucalyptus marginata* subsp. *thalassica* (semiarid to perarid zones) on the sandy-gravels, low woodland of *Banksia attenuata* on the drier sandier sites (humid to perarid zones) with some *Banksia menziesii* (northern arid and perarid zones) and low open woodland of *Melaleuca preissiana-Banksia littoralis* on the moister sandy soils (humid to perarid zones).

3.6 Fauna

3.6.1 Fauna diversity

The *NatureMap* database identified 185 terrestrial vertebrate fauna species previously recorded within the Study Area. This total comprised of 113 birds, 32 reptiles, 28 mammals and 12 amphibians. Of the 185 fauna species previously recorded, 177 are native species and eight are naturalised (introduced) species. The EPBC Act PMST search detected an additional four threatened bird species as potentially occurring within the Study Area and the DBCA Threatened and Priority Fauna database returned one additional mammal within the Survey Area.

The *NatureMap* and PMST database search is provided in Appendix C. DBCA Threatened and Priority Fauna results are displayed in Figure 2, Appendix A.

3.6.2 Conservation Significant Fauna

Based on the above database searches, 13 conservation significant terrestrial vertebrate taxa were identified as likely to occur or known to be present within the Survey Area.

These species included:

– Two species listed as Endangered under the EPBC Act and BC Act including Baudin's Cockatoo (*Calyptorhynchus baudini*) and Carnaby's Cockatoo (*C. latirostris*)
– Three species listed as Vulnerable under the EPBC Act and BC Act including Forest Red-tailed Black Cockatoo (*C. banksii naso*), Chuditch (*Dasyurus geoffroii),* and Quokka (*Setonix brachyurus*)

– One species, Peregrine Falcon (*Falco peregrinus*) listed as 'Other specially protected' under the BC Act
– Six species listed as Priority 3 or 4 by DBCA
– *Phascogale tapoatafa wambenger* listed as 'Conservation Dependent' by the DBCA.

Desktop assessment for aquatic fauna (WRM 2021) identified the invertebrate species Carter's Freshwater Mussel (*Westralunio carteri*) as potentially present within the Survey Area. This species listed as Vulnerable under the EPBC Act and BC Act.

All conservation significant species identified as potentially occurring are presented in the Likelihood of Occurrence (LOO) assessment in Appendix D and further discussed regarding survey results in Section 4.3.

3.7 Previous Studies

A literature review was performed on previous terrestrial fauna studies considered relevant to the current Survey Area, to inform the basis of the fauna surveys. The review focuses on conservation significant species recorded during surveys on Alcoa mining lease and surrounding areas. A review of 26 existing reports that are considered relevant to the current study is provided in Table 19.

Table 19 Previous studies considered relevant to Myara North Survey Area

Project	Location and key findings	Location in relation to this Survey Area
Environmental Management and Research Consultants (EMRC) (1992) Long term fauna monitoring program 1992 (draft)	Location: 20 plots between Jarrahdale, Huntly and Karnet (control) Alcoa conducted numerous surveys as part of a monitoring program which included trapping (five successive trap nights in July, August and September), avifauna (quantitative and inventory surveys in summer and winter), reptile survey (trapping over five consecutive nights in Summer with toenail clippings to indicate recapture) opportunistic survey, nocturnal surveys and active searches. A total of 16 mammals, 61 birds, 21 reptiles, 6 frog and 80 ant species were recorded. Recorded threatened fauna comprise: • Quenda – trapped at Jarrahdale • Baudin's Cockatoo (recorded at all sites) • Red-eared Firetail (delisted) • Carpet Python (delisted)	8 survey plots established in Jarrahdale, 8 plots established in Huntly and four control plots at Karnet. Exact locations are not shown in report but Jarrahdale plots are expected to be adjacent or within the current Survey Area.
EMRC (1995) Long term fauna monitoring program 1995	Location: 20 plots between Jarrahdale, Huntly and Karnet (control) Alcoa conducted numerous surveys as part of a monitoring program which included trapping (five successive trap nights in July, August and September), avifauna (quantitative and inventory surveys in summer and winter), reptile survey (trapping over five consecutive nights in Summer with toenail clippings to indicate recapture) opportunistic survey, nocturnal surveys and active searches. A total of 19 mammals (six introduced), 57 birds, 20 reptiles, 5 frog and 52 ant species were recorded. Recorded threatened fauna comprise: • Quenda – four individuals were trapped • Chuditch – all opportunistic sightings (one near Phillips Road/Nettleton Road and seven ay Huntly Mine in 1995).	8 survey plots established in Jarrahdale, 8 plots established in Huntly and four control plots at Karnet. Exact locations are not shown in report but Jarrahdale plots are expected to be adjacent or within the current Survey Area.
EMRC (2003). McCoy Long Term Fauna Monitoring Program 2003	Location: six plots established, two in the Cameron catchment, two in the Gordon control catchment and two between these and the current Huntly Mine McCoy region crusher site. The monitoring program surveyed all terrestrial vertebrate species and ants. Mammal trapping occurred over four successive trap nights in both summer and winter using 10 pit traps, 16 medium Elliot traps, four large Elliot traps and four cage traps. Reptiles were targeted using five PVC pot traps with drift fence during summer. Traps were open on 29th Jan (summer) and 13 Aug (winter). Birds were surveyed using quantitative methods (two permanent bird transects surveyed on three consecutive days in summer and winter) and inventory methods (opportunistic recordings at each plot during the trapping program). A total of six mammals (one introduced), 39 birds, 7 reptiles, 9 frog and 37 ant species were recorded. Recorded threatened fauna comprise: • Chuditch – two trapped plus sightings or signs • Baudin's Cockatoo - sightings	Approximately 31 km south of the current Survey Area.
EMRC (2006) Long term fauna monitoring program 2006	Location: 20 plots between Jarrahdale, Huntly and Karnet (control) Alcoa conducted numerous surveys as part of a monitoring program which included trapping (five successive trap nights in July, August and September), avifauna (quantitative and inventory surveys in summer and winter), reptile survey (trapping over five consecutive nights in Summer with toenail clippings to indicate recapture) opportunistic survey, nocturnal surveys and active searches. A total of 18 mammals (six introduced), 49 birds, 21 reptiles, 5 frog and 70 ant species were recorded. Recorded threatened fauna comprise: • Chuditch – opportunistic sightings at Huntly • Quokka – opportunistic sighting at Huntly • Baudin's Cockatoo – sighted at Jarrahdale, Huntly and Karnet • Carpet Python (delisted) • Quenda - trapped at Jarrahdale and Karnet • Western Brush Wallaby - sighted at Jarrahdale and Huntly	8 survey plots established in Jarrahdale, 8 plots established in Huntly and four control plots at Karnet. Exact locations are not shown in report but Jarrahdale plots are expected to be adjacent or within the current Survey Area.
EMRC (2007a) McCoy Long Term Fauna Monitoring Program – results of the 2007 survey	Location: six plots established, two in the Cameron catchment, two in the Gordon control catchment and two between these and the current Huntly McCoy crusher site. Methods used were identical to those used in the 2003 survey (above). A total of seven mammal (two introduced), 41 bird, seven reptile, five frog and 54 ant species was recorded. Recorded threatened fauna comprise: • Baudin's Cockatoo –sightings • Western Brush Wallaby – multiple sightings	Approximately 31 km south of the current Survey Area.
ALCOA World Alumina Australia (2010) No 40. Threatened fauna species management plans for Alcoa's bauxite mining operations in the Jarrah forest	Location: Mining Lease ML1sa Management Plan for seven species of fauna known to occur within the mining lease: • Chuditch • Quokka • Noisy Scrub-bird • Baudin's Black Cockatoo • Forest Red-tailed Black Cockatoo • Peregrine Falcon • Carpet Python (delisted)	The current Survey Area is within the 1sa Mining Lease

Project	Location and key findings	Location in relation to this Survey Area
Stokes (2011) Orion Long Term Fauna Monitoring Program	Location: six monitoring sites within Alcoa's Orion mine region comprising two typical upland forest areas, two associated with stream zones and two within rehabilitated forest (8 years old). Mammals, birds, reptiles and frogs were surveyed during both summer (March) and winter (July), and ground dwelling invertebrates were sampled in summer only. Survey methods were similar to those used in EMRC (2006) with the addition of a single large trapping transect designed to specifically target Chuditch and species of goanna. This transect covered approx. 880 ha and comprised 40 wire cage traps spaced 300 m apart and was trapped over four successive nights at the same time as the generic mammal survey. A total of 10 mammals (three introduced), 38 birds, 9 reptiles, two frogs, 22 ground invertebrates, 49 ant species was recorded. • Recorded threatened fauna comprise: • Chuditch – five males trapped in summer • Quenda – one trapped • Western Brush Wallaby – multiple sightings • Baudin's Cockatoo – sightings • Forest Red-tailed Black Cockatoo - sightings	Within 20 km of the far western boundary of the Study Area
Stokes (2012) Vertebrate Fauna Survey of Planted Mining Areas at Alcoa's Keats Mining Region 2011/2012	Location: Keats mining region. Fauna were surveyed using a range of techniques, including trapping, remote sensitive cameras, tracking tunnels, observational surveys and spotlighting. Pitfall traps were not used. Five areas were trapped for mammals comprising two dieback free Jarrah forest areas and three stream zones. One landscape trapping transect was deployed to target Chuditch and goanna and this encompasses upland Jarrah forest, stream zones, low lying open forest, dieback graveyards and Sheoak forest. Black Cockatoo habitat survey was also undertaken. Surveys were only undertaken in summer due to time constraints. Recorded threatened fauna comprise: • Forest Red-tailed Black Cockatoo – flock sighted (up to 11 individuals) • Baudin's Cockatoo – 2 individuals sighted • Western Brush Wallaby – sightings and recorded on remote camera • Chuditch – one male trapped • Carpet Python (delisted)	Approximately 37 km southwest of the current Survey Area.
Way *et al*. (2013), McCoy Long Term Fauna Monitoring Program Report of the 2013 Field Survey	Location: six plots established, two in the Cameron catchment, two in the Gordon control catchment and two between these and the current Huntly McCoy crusher site and an additional three sites established in two year old rehabilitation within the McCoy Intermediate Rainfall Zone. In 2013 the McCoy Long Term Fauna Monitoring Program involved survey of terrestrial vertebrates (including mammals, birds and reptiles) and ground invertebrates, using the same methods used in previous LTFMP at McCoy (EMRC 2003, 2007a). Mammals, birds, reptiles, and frogs were surveyed in both winter (July-August 2013) and summer December 2013-January 2014). Additional survey methods were also implemented including a single large trapping transect to sample highly mobile species, remote sensor cameras and all invertebrates collected in pitfall traps were identified to taxonomic order. A total of 13 mammal species (four introduced), 46 birds, five frog, 31 invertebrates, and 64 ant species was recorded. Recorded threatened fauna comprise: • Western Quoll – one adult male trapped • Quenda – recorded on remote cameras • Western Brush Wallaby – multiple sightings and on remote cameras • Baudin's Cockatoo – multiple sightings • Forest Red-tailed Black Cockatoo – multiple sightings	Approximately 31 km south of the current Survey Area.
Chuditch survey raw data Myara 2013	This is an excel data file along with short summary document with the location description as 'Myara west' and 'Myara east'. Shows details of eight quoll captures at 'Myara west' and one quoll captured at 'Myara east' between 18-22 March 2013. Myara West excel data provides 8 GPS capture locations (in cage traps). Myara East excel data provides 40 locations with coordinates however according to the report only 1 capture location was recorded at Cage 26. The coordinates of this location were unable to be identified. Total number of captures comprised of five males and four females.	Location described as Myara west and east and general area surrounding Karnet Prison which is approximately within 10 km of the Survey Area. GPS coordinates provided: • 410458 E, 6409663 N • 410839 E, 6408964 N • 411357 E, 6408290 N • 411766 E, 6410671 N • 411138 E. 6407725 N • 412384 E, 6408752 N • 414231 E. 6408816 N • 414362 E, 6409006 N
McGregor *et al*. (2014). Does forest restoration in fragmented landscapes provide habitat for a wide-ranging carnivore?	Location: Huntly and Willowdale mines Fourteen Chuditch trapping sessions (13 at Huntly, one at Willowdale) across 9 trapping transects (8 at Huntly, one at Willowdale) were undertaken between June 2009 and Dec 2010. Radio collars with a two-stage transmitter and mortality mode were attached to 14 adult Chuditch (9 female, 5 males – all trapped at Huntly). Chuditch were tracked to their dens during the day. Spool and line tracking was also used. In total 29 individual Chuditch were captured on 60 occasions. Of the 14 individuals fitted with radio collars, three were found dead on the Huntly mine access road with evidence of road trauma. Another three Chuditch were also found dead from vehicle strikes along this road. The study identified 138 den sites from 11 tracked animals: 75 in unmined forest and 63 in restored forest ranging from 2-32 years old. In unmined forest, dens were mostly in hollow logs and ground burrows beneath tree stumps, but these substrates were never used in restored forest where dens were mostly ground burrows, usually associated with rock piles at the surface.	Huntly Mine and Willowdale Mine approx. 40 km and 55 km respectively southwest of the Survey Area.
Burgar *et al.* (2015) The importance of mature forest as bat roosting habitat within the production landscape	Location: forest surrounding Huntly mine site, for both restored and unmined forest. *Nyctophilus gouldii* and *Vespadelus regulus* were trapped and tracked during maternity and mating seasons using harp traps and position-sensitive radio transmitters. Few bats were captured in restored forest so traps were relocated to water sources. Study aimed at identifying roost habitat within restored forest vs unmined forest. Findings indicate that habitat restoration in production forest landscapes is unlikely to play a significant role in conserving species that rely on slow developing microhabitats such as tree hollows for decades or centuries and that retaining and managing forest remnants would be a more effective strategy to conserve populations of these species.	Huntly mine, approximately 40 km southwest of the current Survey Area.

Project	Location and key findings	Location in relation to this Survey Area
Burgar *et al.* (2017) Habitat features act as unidirectional and dynamic filters to bat use of production landscapes	Location: five forest types around the Huntly mine (four restored forest with different stages of vegetation succession, and one unmined forest) Ultrasonic detectors (Anabat Titley Electronics) were set at 64 sites four times per year between Oct and March 2010/2011 and 2011/2012 for a total of 512 survey nights. 31,347 bat call files were recorded over both years of which 22,520 were identified to species/species group. *Vespadelus regulus* was detected most frequently (15,833 call files) and *Falsistrellus mackenziei* least frequently (167 call files). Six species/groups were detected. Recorded threatened fauna comprise: • Western False Pipistrelle	Huntly Mine site, approximately 40 km southwest of the Survey Area
Craig *et al*. (2017) Can postmining revegetation create habitat for a threatened mammal?	Location: Jarrah Forest (Huntly mine site approximately 10 km north of Dwellingup) Most revegetation conducted for biodiversity conservation aims to mimic reference ecosystems present predisturbance. However, revegetation can overshoot or undershoot targets, particularly in the early stages of a recovery process, resulting in conditions different from the reference model. Revegetation that has, as yet, failed to fully meet revegetation targets may, nonetheless, provide habitat for threatened species not present in reference ecosystems. To investigate this possibility a survey of the Quokka (Setonix brachyurus), a threatened macropod, in a mining landscape in south-western Australia was conducted. Four sites in each of riparian forest (the preferred habitat of quokkas) but is not mined, mid-slope forest, which is the premining reference ecosystem but is not suitable habitat for quokkas, and revegetated forest on mine pits 16–21 years postmining. Quokkas were recorded in all riparian forest sites and two revegetated forest sites but not in any mid-slope forest sites. Occupied revegetated sites had greater cover between 0 and 2 m and were spatially closer to riparian forest than unoccupied revegetated sites, suggesting predation pressure was likely influencing which mine pits were occupied. The study demonstrated postmining revegetation can provide new habitat for a threatened species and suggested that revegetating a small proportion of sites to provide new habitat for threatened species could be considered as a management option in some scenarios. This could improve landscape connectivity and increase both the area of available habitat and between-site heterogeneity, which could all potentially increase the ability of revegetation to conserve biodiversity.	Huntly Mine site, approximately 40 km southwest of the Survey Area
EMRC (2015) Long Term Fauna Monitoring Program Summary of Results at Orion Mining Region.	Location: Numerous plots over the Willowdale Mine area Results of the 3rd survey of the LTFMP. Same methodology and plot locations as 2010 survey of the area. Additionally a large trapping transect targeting Chuditch and remote sensing cameras also deployed. Trapping conducted over 4 nights in both winter and summer seasons. The study results: • Twelve mammal species were trapped • Thirty five bird species recorded • Thirteen reptile species recorded • Three frog species recorded Results were indicative of some species being affected (not present afterwards or in lower numbers) by the January 2016 wildfire that burnt through the Willowdale Mine and surrounding areas including four of the six Orion sites.	Within 20 km of the far southern boundary of the Study Area.
Doherty *et al.* (2016). Successional changes in feeding activity by threatened cockatoos in revegetated mine sites.	Location: Numerous plots over the Huntly Mine, Boddington Bauxite Mine and Newmont Boddington Gold Mine. 232 plots were surveyed in revegetated forest and 480 plots were surveyed in unmined forest to determine whether there were successional patterns in cockatoo feeding activity in revegetation aged between 4 to 23 years. The study concludes that black cockatoos feed in vegetation at all three mine sites, despite variations in vegetation age, structure and floristics. Black cockatoos begun feeding on proteaceous and myrtaceous food plants within 4 and 7 years following revegetation, indicating that some food sources are restored quickly after mining disturbance of the Jarrah forest. The results highlight the importance of monitoring fauna recolonization over appropriate time scales to understand how successional processes in revegetation influence fauna persistence in production landscapes.	Huntly Mine approx. 40 km southwest of current Survey Area, Boddington Bauxite Mine approximately 60 km southeast of the current Survey Area, and Newmont Boddington Gold Mine 27 km southeast of current Survey Area.
Mastrantonis *et al.* (2019) Climate change indirectly reduces breeding frequency of a mobile species through changes in food availability	Location: the Northern Jarrah Forest of South West Western Australia over both the Swan and Murray River Catchments. Using a dataset of annual breeding frequency spanning 19 years, in combination with hydrological, climatological, and remotely sensed data, the effects of environmental variation on the annual breeding frequency of Forest Red-tailed Black Cockatoo's (FRTBC) were modelled. In total, 143 unique trees were surveyed over the 19 year period. A total of 173 breeding events were observed during this time with 104 and 71 events observed in the Swan and Murray River catchments respectively. On average there were 5.83 breeding events recorded per year with events ranging from 0 to 21 annually. Results found several significant relationships between annual breeding frequency of FRTBCs and environmental variation. While the model, which included a proxy for the availability of the cockatoo's primary food source and the previous season's rain, explained 49% of annual breeding frequency, there were also direct and indirect effects of heatwaves and forest productivity. FRTBC breeding was found to appear be linked to the spatiotemporal availability of its primary food sources, the fruit from the tree species, Marri *Corymbia calophylla* and Jarrah *Eucalyptus marginata*. However, due to climate change experienced and predicted to be experienced in the future in Western Australia it is expected that the food resources during the breeding season for cockatoos will become increasingly limited in time and space, thus threatening their persistence.	The Survey Area is within the bounds of the literature Study Area.
Burn (2000) A survey of the impact of burning on mammals and birds in Alcoa's rehabilitated Bauxite mines at Jarrahdale	Location: Jarrahdale forest (two unmined and four rehabilitated bauxite mine pits) To ascertain the impact of burning on birds and mammals at the above location pre burning monitoring took place 1997, and post burn monitoring commenced in 1998 in both burnt and unburnt, rehabilitated and unmined forest sites. Low numbers of mammals were caught making it difficult to conclude with certainty whether burning had an effect on most species. New epicormic growth may have attracted possums into one rehabilitated area, while mice invaded the dense rehabilitated site after the burn. There was a large decline in the numbers of birds and bird species following the burn in the dense rehabilitation. Burning sparse rehabilitation only resulted in a small decline while fire had little effect on bird populations of unmined forest. It was concluded that more time was needed to define the longer-term effects of burning on mammals and birds. The present survey was therefore undertaken in 2000 to assess the situation three years after burning.	Approximately 9 km north of the northern boundary of the Study Area.

Project	Location and key findings	Location in relation to this Survey Area
Huntly rehabilitation (2000)	As no long term monitoring of fauna has been conducted at Huntly since 1998, it was decided a repeat of the 1994 survey using identical methods would occur to gain a better understanding of the extent to which vertebrate fauna colonise older rehabilitation. The sites ranged from 14 to 22 years. Sixteen mammal species are known to inhabit rehabilitation at Huntly including 10 native and 6 feral species. Thirty four bird species were recorded in the rehabilitated areas surveyed (similar to the 36 recorded in the 1994 survey. Eight reptile species and one frog species were recorded in the rehabilitated areas surveyed. Fourteen recommendations came about which if implemented should encourage the return of fauna species in similar number to which they occur in surrounding unmined forest. Some recommendations are identical to the 1994 study; they have either not been implemented or they should continue. Key recommendations include; • Where it is not yet known about species recolonisation follow up monitoring in rehabilitated areas will reveal whether they have recolonised. • Surrounding forest if the source of all fauna recruitment. It is important that fauna habitat be protected so that species are available to recolonise.	Huntly Mine - approximately 35 km south .
EMRC (2007b) A Vertebrate Fauna Survey of Rehabilitated Areas at Alcoa's Huntly Minesite. (Final report)	Provides an overview of the 1994, 2000 and 2007 vertebrate fauna surveys of Alcoa's rehabilitated bauxite mines at Huntly. Mammals, birds and reptiles were surveyed in six rehabilitated pits ranging in age from 8 to 16 years. In total 16 mammal species (11 indigenous and 5 introduced), 34 birds and 8 reptiles were recorded. Rare or specially protected species either recorded in the present survey or recently sighted or trapped in rehabilitation at Huntly include the Brush-tailed Phascogale, Chuditch, Quokka, Baudin's Cockatoo, Forest Red-tailed Black Cockatoo and Carpet Python. Other species recorded in rehabilitation during the survey included the Echidna, Brush-tailed Phascogale and Common Brushtail Possum, while Western Brush Wallaby, Chuditch and Quenda have also recently been either trapped or sighted in rehabilitation at Huntly. Total bird species numbers recorded have remained similar to those in 2000 and in 1994, however in individual rehabilitated sites, the numbers of bird species and bird diversity have both decreased. Numbers of reptile species remained similar to those of previous years, with the Specially Protected Carpet Python seen in rehabilitation on a number of occasions. Thirteen recommendations were given as a result including; protection of adjacent fauna habitat, construction of fauna habitats and corridors, control of feral species, construction of suitable habitat specific to mammals and reptiles.	Huntly Mine - approximately 40 km south
EMRC (2001a) Alcoa World Alumina Australia Ltd. Long Term Fauna Monitoring Program. (V2)	The Alcoa Long Term Fauna Monitoring Program was designed in 1991. Monitoring events took place in 1992, 1995, 1998 and 2001 (Nichols 1992) using identical methods each time (except for the baseline). The program is designed to monitor fauna every three years at twenty plots located in rehabilitation and nearby forest at Jarrahdale, Huntly and Karnet (remote from mining). A total of 16 mammal (10 indigenous, six introduced), 50 bird, 17 reptile, 7 frog and 73 ant species was recorded. In 1998, the corresponding figures were 18 mammal, 53 bird, 21 reptile, 7 frog and 56 ant species. Mammals recorded included one officially gazetted rare species, the Chuditch. Two of the species recorded in 1998 were not detected in 2001. These were the Brush-tailed Phascogale and an unidentified bat species. Numbers of several species appear to have changed significantly with some mammal and bird species declining, possibly due to very dry summer followed by very low winter rainfall. .Common brushtail possum and frog species increased. Baudin's Cockatoo was recorded at both Jarrahdale and Huntly. The reptile fauna included one 'Specially Protected' species, viz. the Carpet Python. Quantitative data showed that the composition of all rehabilitated sites was becoming more similar to that of the unmined sites. However, they remain linked to each other, particularly JR1 and JR2, which have become even more similar to each other.	Jarrahdale plots are expected to be adjacent or within the current Survey Area, Huntly (approximately 40 km south) and Karnet (approximately 10km north)
EMRC (1998) Alcoa of Australis Ltd. Long Term Fauna Monitoring Program (1998)	Location: Plots located in rehabilitation and nearby forest at Jarrahdale, Huntly and Karnet. This report provides the results of the 1998 fauna monitoring program. Methods used were identical to the 1995 monitoring program. Results are then compared to previous monitoring programs (1992 and 1995) in detail and the influence of mining and successional processes on fauna can be assessed. A total of 18 mammal (12 indigenous, six introduced), 53 bird, 20 reptile, 5 frog and 56 ant species was recorded. Mammals recorded included two officially gazetted rare species, viz. the Chuditch and the Quokka. Two of the species recorded (Dunnart *Sminthopsis gilberti* and the Honey Possum) in 1995 were not detected in 1998. A number of species have increased since the previous monitoring event (Mardo and Quenda). There wasn't any evidence of any mammal species declining due to proximity of mining. All bird species recorded in 1992 and 1995 were recorded in 1998. Only one rare bird species, Baudin's Cockatoo was recorded and this was present at all sites. One new skink species was collected - *Glaphyromorphus gracilipes* was trapped at stream site HS1 (Banya Road) during the summer trapping program. Insufficient reptile numbers were collected to determine trends over time.	Jarrahdale plots are expected to be adjacent or within the current Survey Area Huntly (approximately 40 km south) and Karnet (approximately 10km north)
EMRC (2004) Orion LTFMP report 2004 Final	Location: Willowdale -north east portion of Orion region (two healthy forest and two dieback forest plots, two steam zone plots and two plots in rehabilitation) The LTMFP was reviewed in 2003 (Majer, 2003) which included a recommendation for a similar program to be established at Orion so that any differences in faunal successional processes taking place at Willowdale could be detected. Similar techniques to those used at Jarrahdale, Huntly and McCoy. Mammals recorded during the survey included the Chuditch, Quokka, Mardo, Dunnart, Common Brushtail Possum, Western Brush Wallaby. Only one mammal species was recorded in the young rehabilitation (Feral Mouse). Forty one bird species was recorded including the Baudin's Cockatoo. Bird numbers were highest at steam sites and lowest at rehabilitated sites. Six reptile species were recorded compared with 15 species recorded in the 1999 pre-mining survey. Three frog species were recorded. Fifty ant species were recorded. Further monitoring was recommended to determine successional patterns.	Willowdale (within 20 km of the far southern boundary of the Study Area)
EMRC (1999) A fauna survey of planned mining areas at Alcoa's Orion Mining region	Location: Orion mining region at Willowdale This report provides the results of the fauna survey conducted between February and November 1999. The habitats monitored were poorly surveyed in current mining areas, extensive dieback affected areas, small dieback free areas and on sites where mining operations are planned. A total of 46 bird species, nine mammals (6 native, 3 introduced), 13 reptiles and five frogs was recorded. These included three rare species (the Chuditch, Baudin's Cockatoo and possibly the Quokka) and one Specially Protected species (the Carpet Python). As well as these, the Noisy Scrub-bird has been reintroduced into the area and the uncommon Brush-tailed Phascogale is present albeit in low densities. The fauna of the Orion area was largely comparable to that of existing Willowdale mining areas. Results emphasise the need for ongoing fox control. Rehabilitation using Jarrah and other indigenous species offers the best prospects of successfully recreating suitable habitat for the species. Eleven recommendations were given for managing the area's faunal diversity including; protection of adjacent fauna habitat, construction of fauna habitats and corridors, control of feral species, construction of suitable habitat specific to mammals and reptiles.	Willowdale (within 20 km of the far southern boundary of the Study Area)

Project	Location and key findings	Location in relation to this Survey Area
EMRC (2007c) A Vertebrate Fauna Survey of Rehabilitated Areas at Alcoa's Willowdale Minesite	Location: Willowdale (rehabilitated bauxite mine sites) This report details the 2007 results of the long term fauna monitoring. Previous monitoring events occurred in 1994, 2000 (following fox control) and again in 2007. In the 2007 survey a total of 25 bird species, 10 mammals (seven indigenous, three introduced) and five reptiles was recorded in rehabilitation. They included three rare species, viz. the Chuditch, Brush-tailed Phascogale and Forest Red-tailed Black Cockatoo. Numbers of native mammals trapped in rehabilitation were higher than in previous years, with Yellow-footed Antechinus increasing from 0 in 1994 to 6 in 2007; Brush-tailed Phascogales increased from 0 to 1 and Chuditch increased from 0 to 3. Bird species had declined since the 2000 survey. Total numbers of both insectivores and honeyeaters both showed large declines between 1994 and 2000. There was a gradual decline in numbers of the skink *Acritoscincus trilineatum* as the rehabilitated sites become more like upland forest habitat and less suitable for this species. Fifteen recommendations were given for managing the area's faunal diversity including; protection of adjacent fauna habitat, construction of fauna habitats and corridors, control of feral species, construction of suitable habitat specific to mammals and reptiles	Willowdale (within 20 km of the far southern boundary of the Study Area)
EMRC (2001b) A Vertebrate Fauna Survey of rehabilitated areas at Alcoa's Willowdale Minesite	Location: Willowdale (rehabilitated bauxite mine sites) This report details the 2000 fauna monitoring event results after the introduction of fox control following the 1994 monitoring event. A total of 31 bird species, nine mammals (five introduced, four indigenous) and five reptiles was recorded. Although not trapped or recorded in the present survey, both the rare Chuditch and the specially protected Carpet Python have been recently recorded in rehabilitation at Willowdale. Numbers of native mammals trapped in rehabilitation were low, as in 1994. Some evidence suggests that Fox predation may still be a problem near farmland. The 31 bird species recorded in the 2000 survey is less than the 45 recorded in 1994. The five reptile species recorded indicate that the rehabilitation has not yet become more suitable for this fauna group. Fifteen recommendations were given for managing the area's faunal diversity including; protection of adjacent fauna habitat, construction of fauna habitats and corridors, control of feral species, construction of suitable habitat specific to mammals and reptiles.	Willowdale (within 20 km of the far southern boundary of the Study Area)

4. Survey Results

4.1 Fauna Habitats

There were eight broad fauna habitat types delineated in the Survey Area during the field survey. These habitat types are categorised based on flora species, hydrology, soil and topography. They align with the vegetation types identified by Mattiske (2021). The habitat types recorded in the Survey Area are described in Table 20 and mapped in Figure 5a and 5b, Appendix A. The broad fauna habitat types are:

– Jarrah-Marri forest
– Bullich forest
– Granite outcrop
– Blackbutt forest
– Flooded Gum woodland
– Melaleuca dampland
– Mine rehabilitation
– Pine plantation.

In addition to the fauna habitats listed above, a small proportion (0.7%) of the Survey Area comprised cleared rural land. These areas are included in Figure 5a and 5b, Appendix A. They have limited habitat values due to lack, paucity, or low quality of intact native vegetation.

4.1.1 Fauna habitat linkages

The Survey Area represents a large continuous tract of forest with good connectivity to all habitats directly adjacent.

4.1.2 Quality of habitat

Whilst the vegetation is mostly intact the impact by logging, frequent and extensive fire and dieback in some areas were evident. Despite this the habitat presents a large contiguous intact forest with multiple habitat types suitable for large ranging species such as the Chuditch, Brush-tailed Phascogale and Western Brush Wallaby.

The granite outcrop habitat provides quality resources (refuge, breeding, feeding and disbursal) for a diverse suite of fauna particularly reptiles. However some areas of granite outcrop are damaged in the form of broken/shattered rocks with tyre tracks observed over portions of outcrops. This may impede on species density as damaged habitat reduces the opportunity for species to hide or create refuge.

The forested areas covering the majority of the Survey Area were in very good to excellent condition (with respect to disturbance) with the exception of some areas of dieback infestation and some areas of recent timber harvesting. The forested habitats provided an array of micro-habitats such as logs, hollows, leaf litter, soft sand and dense foliage with a broad range of floristic species providing a range of foraging, roosting, denning and sheltering habitat. However prescribed burning in spring of 2020 destroyed several known Black Cockatoo breeding hollows in a patch of Bullich forest in the northern portion of the Survey Area (Tony Kirkby pers.comm). The same burn destroyed known Quokka habitat along the densely vegetated drainage line. This is based on Quokka detection during the current survey. Inappropriate fire frequency, intensity and extent can have adverse impacts on habitat quality for significant species and broader fauna assemblages.

Small streams were recorded throughout the Survey Area which provide accessible drinking water to fauna. Most of the streams appear to be seasonal however the Serpentine Dam lies adjacent south of the Survey Area which provides accessible drinking water year-round, particularly to birds. Floodplains were associated with some of the streams that provide suitable Quokka habitat as well as where frogs were recorded during both survey phases.

Table 20 Major habitat types within the Survey Area

Description	Corresponding Vegetation Type Code (Mattiske 2021)	Extent in the Mine Development Envelope Survey Area (ha)	Extent in the Conveyor/Haul Road Corridor Survey Area (ha)	Total Survey Extent (ha)	Percentage of Total Survey Area	Representative Images
Blackbutt Forest Blackbutt open forest with occasional Bullich, and Marri over sparse *Banksia littoralis* over *Trymalium, Macrozamia, Xanthorrhoea preissi*, over *Lepidospermum tetraquetrum*, *Astartea scoparia* and areas of dense Swamp peppermint (*Taxandria linearifolia*). This habitat is limited to localised patches often associated with creeks and drainage lines. Disturbance factors include frequent fire, feral pigs, dieback, damage caused rock removal, trail bike and 4WD on granite. **Fauna Species recorded during survey:** Provides habitat for a range of small forest and woodland birds such as Rufous Treecreeper, Golden Whistler, and Grey Shrike Thrush. Low dense understory provides shelter and suitable corridors for Quokka and Quenda. Forest reptiles recorded include Rosenburg Monitor and Southern Carpet Python. **Habitat for conservation significant species** Western Brush Wallaby, Quenda, Quokka, Chuditch and Western False Pipistrelle. Breeding and roosting habitat for all three Black Cockatoo species.	CW, AW, AW/AX, AX/CW, C	673	14	687	3.9%	
Bullich forest. Valleys and drainage areas dominated by Bullich (*Eucalyptus megacarpa*) and with some Black Butt (*E. patens*), occasional Marri (*Corymbia calophylla*), over Sheoak (*Allocasuarina fraseriana*), *Banksia littoralis* over Grass trees (*Xanthorrhoea preissii*), Bracken fern, patches of dense *Gahnia trifida* shrubland over *Lasiopetalum floribundum*, sedges and herbs. Substrate is dark clayloam soil. These areas are associated with seasonal creeks and drainage areas. This habitat is limited in extent to localised patches within the Survey Area. Disturbance factors include frequent fire, feral pigs, dieback. **Fauna species recorded during survey:** Provides habitat for a range of forest and woodland birds and frogs such as Ticking frog. Quokka and Quenda were recorded via camera within dense understory and shrub areas of this habitat. Potential breeding habitat for Black Cockatoo species, and nesting has been confirmed in areas of old growth Bullich (Tony Kirkby pers.comm). **Habitat for conservation significant species:** Black Cockatoos, Chuditch, Quokka, Quenda, Western Brush Wallaby, Masked Owl, Brush-tailed Phascogale, Western False Pipistrelle.	W, WA	239	28	267	1.5%	

Description	Corresponding Vegetation Type Code (Mattiske 2021)	Extent in the Mine Development Envelope Survey Area (ha)	Extent in the Conveyor/Haul Road Corridor Survey Area (ha)	Total Survey Extent (ha)	Percentage of Total Survey Area	Representative Images
Flooded Gum woodland Flooded Gum (*E. rudis*) open woodland with occasional Blackbutt, over open to open to sparse *Banksia littoralis* over Prickly Moses (*Acacia pulchella*), myrtaceous species such as Swamp peppermint (*Taxandria linearifolia*), *Astertea scoparia Trymalium odoratissimum*, low shrub/sedgeland. Substrate varies from dark grey to grey brown sandy clays. Associated with poorly drained broad valleys forming seasonal swamps and occasionally tall open forest along drainage lines. Disturbance factors include frequent fire, feral pigs. **Fauna Species recorded during survey:** Provides habitat for a range of woodland shrubland birds such as Scrubwrens, Fairy-wrens, and nectar feeding birds such as Honeyeaters, wattlebirds and parrots. **Habitat for conservation significant species** Chuditch and potential foraging habitat for Black Cockatoos. Favoured areas for Western Brush Wallaby. In areas of dense Myrtaceous thicket (low fire frequency) this provides refuge and movement corridors for Quokka and Quenda.	AC, AD, AX	674	13	688	2.9%	
Granite outcrop Granite outcrops with associated lithic vegetation complexes and adjacent associated fringing open Jarrah and Marri areas with scattered Sheoak, Melaleuca, *Banksia ilicifolia* over occasional Grass trees over mixed open heath communities of Myrtaceous and Proteaceous low shrubs. Soils are pale grey to yellowish fine sand or sandy clay. Granite outcrops often associated with seasonal watercourse and seasonally damp areas. This habitat found as localised patches throughout the Survey Area. Disturbance factors include frequent fire, feral pigs, dieback, damage caused by rock removal, trail bike and 4WD on granite. **Fauna Species recorded during survey:** Provides shelter and foraging for a range of reptile and frog fauna e.g. Ornate Crevice-dragon, Barking Gecko, Speckled stone gecko, Gould's hooded snake, Southern Carpet Python, and Black-headed Monitor. Associated water courses provide seasonal breeding for locally common frog species such as Quacking froglet and Moaning frog. Two Death Adders were also recorded on this habitat. **Habitat for conservation significant species:** Foraging and denning habitat for Chuditch. Habitat for Western Brush Wallaby, Southern Death Adder, and Dell's Ctenotus. Fringing open forest provides foraging and potential breeding habitat for Black Cockatoo species.	R, G, G1, G2, RG	366	7	373	2.1%	

Description	Corresponding Vegetation Type Code (Mattiske 2021)	Extent in the Mine Development Envelope Survey Area (ha)	Extent in the Conveyor/Haul Road Corridor Survey Area (ha)	Total Survey Extent (ha)	Percentage of Total Survey Area	Representative Images
Jarrah – Marri forest *E. marginata* and *C. calophylla* open forest over Grass trees (Xanthorrhoea preissi), *Lasiopetalum floribundum*, Macrozamia mid shrubland. Patches have dominance of understory *Allocasuarina fraseriana* and *Banksia grandis*. Often with complex mosaic of low shrubs such as Fabaceae , Hibbertia, Leucopogon, Adenanthos, and Pteridium. This is the most extensive habitat identified and comprises a number of vegetation types dominated by Jarrah on upper, mid and low slopes and broad valleys. Soils range from well drained gravely sand to sandy clay loam. Historical logging is a significant disturbance factor: extensive areas of forest are at varying ages of regeneration. Other disturbances include frequent fire (significant), feral pigs, dieback, trail bike, 4WD and dumped rubbish including weed plants. **Fauna species recorded during survey:** Provides habitat for a range forest and woodland birds such as Thornbills, Rufous Treecreeper, Pardalotes, Sitella, and Purple-crowned Lorikeet. All three Black cockatoo species observed feeding extensively throughout. Forest reptiles include Crevice Skink (*Egernia napoleonis*). Gould's Monitor (*Varanus gouldii*), *Lerista distinguenda*, and Southern Blind Snake (*Anilios australis*). Small mammals include forest micro-bats, and Mardo (*Antechinus flavipes*). Other species include Echidna, Western Brush Wallaby, Peregrine Falcon and Western Grey kangaroo. **Habitat for conservation significant species:** Chuditch, Brush-tailed Phascogale, Western Brush Wallaby, Peregrine Falcon, Masked Owl, Western False Pipistrelle, Dell's Skink, Southern Death Adder. Foraging and potential roosting habitat for all three locally occurring Black Cockatoo (*Calyptorhynchus*) species. Breeding habitat for all three Black Cockatoo species.	D, DA, DG, E, J, M, P, PG, PJ, PT, PS, PW, S, SP, ST, T, SW, TP, TS, Q	14,601	121	14722	83.2%	
Melaleuca dampland. Paperbark (*Melaleuca pressiana*) over sparse isolated *Banksia littoralis* over open Hakea, occasional Woody Pear (Xylomelum), Grass trees and over mixed shrublayer of Cyperaceae, Restionaceae, Babingtonia, Jacksonia and Acacia, over low shrubs, sedges and herbs. There are areas of sparse to occasional stunted Jarrah and Marri however these are limited to lowland transitional zones adjacent to slightly higher elevation and drainage open forest areas. Generally limited to areas of poor drainage and subject to winter inundation such as broad valleys and swamps. Substrate is grey gravely clay and clay loam. Disturbance factors include frequent fire and feral pigs. **Fauna species recorded:** Provides habitat for a range forest and woodland birds. Black cockatoo species forage on Banksia, Hakea and occasional Jarrah and Marri. Several frog species breed seasonally such as Glauert's Froglet (*Crinia glauerti*) and Moaning Frog (*Heleioporus eyrei*). Reptiles include Cool Skink (*Acritoscincus trilineatum*), and Earless Skink (*Hemiergis initialis*). Small mammals include forest micro-bats, and Mardo (*Antechinus flavipes*). Other species include Echidna, Western Brush Wallaby and Western Grey kangaroo. **Habitat for conservation significant species during survey:** Western Brush Wallaby, Western False Pipistrelle. Foraging habitat for all three locally occurring Black Cockatoo (*Calyptorhynchus*) species although Jarrah and Marri are generally stunted and sub-optimal for potential breeding habitat. Where creek lines or dense vegetation is present Quokka and Quenda reside.	A	130 ha	0	130	0.7%	

Description	Corresponding Vegetation Type Code (Mattiske 2021)	Extent in the Mine Development Envelope Survey Area (ha)	Extent in the Conveyor/Haul Road Corridor Survey Area (ha)	Total Survey Extent (ha)	Percentage of Total Survey Area	Representative Images
Mine rehabilitation Historic mine rehabilitation (> 20 years old) of the Jarrahdale Mine. This is historic rehabilitation under previous completion criteria and not representative of current or future rehabilitation programs. These areas are Jarrah dominated trees. These areas generally have high value foraging habitat for Black Cockatoo species but lack trees of suitable age (trunk diameter) to have developed hollows of sufficient diameter and depth to be considered potentially suitable breeding trees for Black Cockatoos. These areas do however provide continuity of forest or woodland connectivity allowing fauna movement and foraging habitat for a range of species ground such as terrestrial reptiles, birds, small mammals.	Rehab	387	14	402	2.4%	Image not available
Pine plantation These are monocultures of Pine timber tree species (Pinus). They represent very high quality foraging habit for Carnaby's and Baudin's Cockatoos. They tend to be devoid of understory and ground layer vegetation and lack habitat values for most other native vertebrates.	PL	162	0	162	0.9%	Image not available

4.2 Fauna Diversity

The combined fauna surveys (Phase 1 and Phase 2) recorded 132 vertebrate fauna species utilising the Survey Area, including 23 mammals, 76 birds, 26 reptiles and 7 amphibians. A breakdown of the fauna assemblage is provided below.

4.2.1 Mammals

The combined surveys recorded 23 mammal species from 12 families within the Survey Area including six species of introduced mammals and 17 native mammal species. The most specious family was the Dasyuridae and Vespertilionidae (both with four species) and Macropod (three species). Six micro-chiropteran bats were positively identified from call analysis and further two species were unconfirmed. Seven of the mammal species recorded are listed as conservation significant and are further discussed in section 4.3.

A breakdown of mammal families recorded during the surveys is provided in Table 21.

Table 21 Mammal families recorded during the field survey

Mammal Family	Number of species	
	Phase 1	Phase 2
Canidae (Fox)	1	1
Dasyuridae (Dasyurid mammals)	3	4
Felidae (Cat) (domestic)	1	1
Leporidae (Rabbit)	1	1
Macropodidae (Kangaroo)	3	3
Molossidae (Free-tail Bat)	2	2
Muridae (Rodent)	2	3
Peramelidae (Quenda)	1	1
Phalangeridae (Possum)	1	1
Suidae (Wild pig)	1	1
Tachyglossidae (Short-billed Echidna)	1	1
Vespertilionidae (Simple-nosed Bats)	4	4
Total	**21**	**23**

4.2.2 Birds

Bird surveys identified 76 bird species from 36 families over the combined Phase 1 and Phase 2 surveys. The most specious families were the Meliphagidae (8 species), Acanthizidae (6 species) and Psittaculidae (6 species). Five of the bird species recorded are listed as conservation significant and are further discussed in section 4.3.

No migratory shorebirds were recorded during the survey. The phase 2 survey coincided with the seasonal occurrence of shorebirds across the southwest region. The survey area lacks open water including shallow shorelines for foraging habitat. The creek lines and vegetated dampland areas within the survey area are not suitable. Therefore, they are unlikely to occur within the survey area, and any occurrence would be as vagrant visitation due to proximity of Serpentine Reservoir.

A breakdown of bird families recorded during the survey is provided in Table 22.

The Masked Owl (*Tyto novaehollandiae*) was specifically targeted for assessment utilising SM4 Acoustic Song Meters in suspected habitat areas as shown in Table 6 and Figure 3, Appendix A. Song Metres recorded 25 opportunistic bird species and detected the presence of Masked Owl during the Phase 1 survey with no detections during the Phase 2 survey. A comprehensive detailed summary of the results of the Acoustic Song meters is provided in Appendix D.

It should be noted that Song Meters were placed at targeted Masked Owl habitat during the Phase 1 survey and deployed to fill in ‘gaps’ in the Phase 2 survey to increase coverage over the Survey Area and indicate distribution of Masked Owl.

Table 22 Bird families recorded during the field surveys

Bird Family	Number of species	
	Phase 1	Phase 2
Acanthizidae (Weebill/Gerygone)	5	6
Accipitridae (Diurnal birds of prey)	1	2
Aegothelidae (Nightjar)	0	1
Alcedinidae (Kingfisher)	1	2
Anatidae (Duck)	2	1
Artamidae (Magpie group)	3	5
Cacatuidae (Cockatoo group)	3	4
Campephagidae (Cuckoo-shrikes)	1	1
Casuariidae (Emu)	1	1
Charadriidae (Lapwing)	1	0
Climacteridae (Tree Creeper)	1	2
Columbidae (Pigeon)	2	1
Corvidae (Crow, Raven)	2	1
Cuculidae (Cuckoos)	1	1
Dicaeidae (Flowerpeckers)	1	0
Estrildidae (Finches)	0	1
Falconidae (Falcons)	0	1
Hirundinidae (Swallows)	2	1
Locustellidae (Songlark)	1	0
Maluridae (Wrens)	3	2
Meliphagidae (Honeyeaters)	3	8
Meropidae (Bee-eater)	0	1
Monarchidae (Lark)	1	1
Neosittidae (Sitellas)	0	1
Pachycephalidae (Whistlers)	3	3
Pardalotidae (Pardalotes)	0	2
Petroicidae (Robin)	3	3
Podargidae (Frogmouths)	1	1
Psittaculidae (Parrots)	3	6
Rhipiduridae (Fantail)	1	1
Rallidae (Rails)	1	0
Strigidae (True Owls)	1	1
Threskiornithidae (large wading birds)	0	1
Turnicidae (Quail)	1	1
Tytonidae (Owl)	1	0
Zosteropidae (Silvereye)	1	1

Bird Family	Number of species	
	Phase 1	Phase 2
Total	**51**	**64**

4.2.3 Amphibians

A combined total of seven amphibians from three families were recorded during the Phase 1 and Phase 2 surveys. The most species family was Myobatrachidae (three species). No conservation significant amphibians were recorded during this time. A breakdown of amphibians recorded during the survey is provided in Table 23.

Table 23 Amphibian families recorded during the field surveys

Amphibian Family	Number of species	
	Phase 1	Phase 2
Myobatrachidae (Quacking/Bleating Frog)	3	2
Limnodynastidae (Moaning Frog)	1	1
Pelodryadidae (Slender tree Frog)	1	1
Total	**5**	**4**

4.2.4 Reptiles

A combined total of 26 reptile species from nine families were recorded during the Phase 1 and Phase 2 surveys. The most specious family was Scincidae (10 species) followed by Elapidae (four species). One conservation significant reptile was recorded during the survey which is further discussed in section 4.3.

A breakdown of reptile families recorded during the survey is provided in Table 24.

Table 24 Reptile families recorded during the field surveys

Reptile Family	Number of species	
	Phase 1	Phase 2
Agamidae (Dragons)	1	2
Boidae (Pythons)	1	1
Carphodactylidae (Terrestrial Geckoes)	1	0
Elapidae (Snakes)	2	4
Gekkonidae (Geckos)	1	2
Pygopodidae (Legless Lizards)	0	1
Scincidae (Skinks)	8	9
Typhlopidae (Blind Snakes)	0	1
Varanidae (Monitors)	3	2
Total	**17**	**22**

4.2.5 Introduced Species

Mammals comprised the main group in which introduced fauna were recorded. In total eight species were observed and included:

– Feral Pig (*Sus scrofa*)
– European Fox (*Vulpes vulpes*)
– European Rabbit (Oryctolagus cuniculus)
– Black Rat (Rattus rattus)

– House Mouse (*Mus musculus*)
– Feral cat (*Felis catus*)
– Rainbow Lorikeet (*Trichoglossus moluccanus*)
– Laughing Kookaburra (*Dacelo novaeguineae*).

These species are considered feral to the region.

4.3 Conservation Significant Fauna

Thirteen conservation significant fauna species were recorded within the Survey Area during the surveys. This includes:

– Baudin's Cockatoo (*Calyptorhynchus baudinii*) – listed as Endangered under the BC Act and Endangered under the EPBC Act.
– Carnaby's Cockatoo (*Calyptorhynchus latirostris*) – listed as Endangered under the BC Act and Endangered under the EPBC Act.
– Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) listed as Vulnerable under the BC Act and Vulnerable under the EPBC Act.
– Quokka (*Setonix brachyurus*) – listed as Vulnerable under the BC Act and the EPBC Act.
– Chuditch (*Dasyurus geoffroii*) listed as Vulnerable under the BC Act and Vulnerable under the EPBC Act.
– Peregrine Falcon (*Falco peregrinus*) listed as Special Protection (Schedule 7) under the BC Act.
– Brush-tailed Phascogale (*Phascogale tapoatafa wambenger*) listed as Conservation Dependent by DBCA.
– Masked Owl Southwest (*Tyto novaehollandiae novaehollandiae*) listed as Priority 3 by the DBCA.
– Rakali (*Hydromys chrysogaster*) listed as Priority 4 by the DBCA.
– Quenda (*Isoodon fusciventer*) – listed as Priority 4 by the DBCA.
– Western Bush Wallaby (*Notamacropus Irma*) – listed as Priority 4 by the DBCA.
– Southern Death Adder (*Acanthophis antarcticus*) listed as Priority 3 by the DBCA.
– Western False Pipistrelle (*Falsistrellus mackenziei*) listed as Priority 4 by the DBCA.

Likelihood of occurrence assessment

In addition to the field survey results, an assessment of the likelihood of conservation significant species occurring in the Survey Area was undertaken. This assessment is based on species' biology, habitat requirements, the quality and availability of suitable habitat as determined during the field survey and records of the species in the Survey Area and locality. The *NatureMap* database identified 185 terrestrial vertebrate fauna species previously recorded within the Study Area. This total comprised of 113 birds, 32 reptiles, 28 mammals and 12 amphibians. Of the 185 fauna species previously recorded, 177 are native species and eight are naturalised (introduced) species. The EPBC Act PMST search detected an additional four threatened bird species as potentially occurring within the Study Area and the DBCA Threatened and Priority Fauna database returned one additional mammal within the Survey Area. Based on the above database searches and GHD observations, fourteen conservation significant terrestrial vertebrate taxa were identified as likely to occur or present within the Survey Area.

With regard to migratory shorebirds, the survey area lacks open suitable foraging habitat, namely shorelines or extensive shallow open water. The creek lines and vegetated seasonal dampland areas within the survey area are not considered suitable foraging habitat and in most cases are dry during the period of migratory bird use in the south west of Western Australia. Therefore, they are unlikely to occur within the survey area, and any occurrence would be as rare vagrant.

Table 25 summarises the species of conservation significance that are either known or considered likely to occur in the Survey Area. A brief description of these species and their associated habitat types within the Survey Area are described below. The parameters of assessment for this likelihood of occurrence assessment and the full likelihood of occurrence assessment are provided in Appendix D.

Table 25 Summary of likelihood of occurrence assessment for conservation significant fauna

Species	EPBC Act	BC Act/ DBCA	Assessment outcome
Birds			
Baudin's Cockatoo (*Calyptorhynchus baudinii*)	EN	EN	Known. The species was recorded during the survey and shown in Figure 4d, Appendix A.
Carnaby's Cockatoo (*C. latirostris*)	EN	EN	Known. The species was recorded during the survey and shown in Figure 4d,Appendix A.
Forest Red-tailed Black Cockatoo (*C. banksii naso*)	VU	VU	Known. The species was recorded during the survey and shown in Figure 4b, Appendix A.
Peregrine Falcon (*Falco peregrinus*)	-	SP	Known. One individual was recorded during the survey and the Jarrah Marri forest within the Survey Area is suitable nesting habitat.
Masked Owl (southwest) (*Tyto novaehollandiae novaehollandiae*)	-	P3	Known. The species was recorded on acoustic recorders during the survey and shown in Figure 4c, Appendix A.
Mammals			
Western False Pipistrelle (*Falsistrellus mackenziei*)	-	P4	Known. This species was recorded on Song Meters in both the Phase 1 and Phase 2 surveys. Suitable habitat is available to support this species.
Chuditch (*Dasyurus geoffroii*)	VU	VU	Known. This species was recorded on two remote cameras during Phase 1 and Phase 2 of the survey. The Survey Area contains suitable breeding and foraging habitat to support this species.
Quenda (*Isoodon fusciventer*)	-	P4	Known. The species was recorded via cage trapping, remote cameras and diggings during the survey and shown in Figure 4c, Appendix A.
Quokka (*Setonix brachyurus*)	VU	VU	Known. The species was recorded on remote camera during the Phase 1 and Phase 2 of the survey shown in Figure 4a, Appendix A. The species appears to be wide spread and associated with riparian areas and damplands.
Brush tailed Phascogale (*Phascogale tapoatafa wambenger*)	-	CD	Known. At least three individuals were recorded on one remote camera within the Survey Area. Suitable habitat occurs within Survey Area.
Western Brush Wallaby (*Notamacropus irma*)	-	P4	Known. The species was recorded throughout the Survey Area as shown in Figure 4c, Appendix A.
Rakali (*Hydromys chrysogaster*)		P4	Known. The species was recorded on one remote camera along a flowing stream section of Big Brook that bisects the proposed conveyor location shown in Figure 4c, Appendix A.
Reptiles			
Southern Death Adder (*Acanthophis antarcticus*)	-	P3	Known. The species was recorded during the survey near granites near to Serpentine Dam and shown in Figure 4c, Appendix A. Suitable forest and rocky habitat occurs within Survey Area.
Dell's Skink (*Ctenotus Delli*)		P4	Likely. The species has previously been recorded in the region and habitat is present for the species.

Legend:
CD= Conservation dependent fauna
CR = Critically endangered under the EPBC Act or BC Act
EN = Endangered under the EPBC Act or BC Act
VU = Vulnerable under the EPBC Act or BC Act
SP (S7) = Schedule 7, Special Protection under BC Act
P3 = Priority 2 under DBCA, poorly known species.
P4 = Priority 4 under DBCA, rare, near threatened and other species in need of monitoring.

Fauna species recorded in the Survey Area

Forest Red-tailed Black Cockatoo (Calyptorhynchus banksii naso)

The Forest Red-tailed Black Cockatoo is listed as Vulnerable under the EPBC Act and BC Act.

The Forest Red-tailed Black Cockatoo is endemic to the south-west humid and sub-humid zones of Western Australia (Mawson and Johnstone 1997). It inhabits the dense Jarrah, Karri (*E. diversicolor*) and Marri forests receiving more than 600 mm of annual average rainfall. The current distribution is north of Perth and east to Mount Helena, Christmas Tree Well, North Banister, Mt Saddleback, Rocky Gully and the upper King River (Johnstone 1997). More recently the species has been utilising and persisting on the northern portions of the Swan Coastal Plain and is now considered a regular sighting (Johnstone *et al* 2017). Habitats in which Forest Red-tailed Black Cockatoos occur at Bungendore Park and Jarrahdale, have an understorey of Bull Banksia (*Banksia grandis)*, Snottygobble (*Persoonia longifolia)*, Sheoak (*Allocasuarina fraseriana)* and *Banksia* spp., with scattered Blackbutt (*E. patens)* and Wandoo (*E. wandoo)* (Johnstone & Kirkby 1999). Forest Red-tailed Black Cockatoos roost in Jarrah-Marri-Blackbutt habitat on road-sides, paddocks or forest blocks. While the Forest Red-tailed Black Cockatoo feeds on the seeds of other species, around 90 per cent of its diet is made up of the seeds from Marri and Jarrah fruits.

Forest Red-tailed Black Cockatoos have been recorded breeding in both Myara and Myara North, particularly at the Yamba area at the west of Myara and near the Tuart/Acacia Road area at the north-west of Myara North (T. Kirby, pers. comm.). Breeding is recorded in Jarrah, Marri (majority), Bullich and Blackbutt. Breeding has been recorded from adjacent areas including Serpentine National Park, Wungong Catchment, 39 Mile Brook area and Monadnocks Nature Reserve.

Significant Forest Red-tailed Black Cockatoos roost sites are known from the Myara North region at Jarrahdale Road/Albany Highway (350 birds but usually 50-60) and Jarrahdale Road near Jarrahdale (100 birds) (Johnstone and Kirkby unpublished data).

Forest Red-tailed Black Cockatoos were recorded at 149 locations throughout the Survey Area with approximately 280 physical observations recorded during Phase 1 and 91 physical observations during Phase 2. Individuals were recorded in flight, feeding or calling throughout the Survey Area. Foraging evidence, predominantly chewed Marri and Jarrah pods, was recorded throughout the Survey Area. All observations have been mapped and are presented in Figure 4b and 4d, Appendix A.



Plate 1: Forest Red-tailed Black Cockatoo image captured during winter survey

Baudins Cockatoo (Calyptorhynchus baudinii)

Baudin's Cockatoo is listed as Endangered under the EPBC Act and BC Act.

Baudin's Cockatoo is endemic to the south-west of Western Australia. The range of Baudin's Cockatoo varies considerably between the breeding and non-breeding seasons. During the breeding season (from October to January), the species nests in the far south-west of WA within Jarrah, Marri and karri forests which receive an average of 750 mm of rainfall annually. Breeding generally occurs in woodland or forest, but may also occur in former woodland or forest now present as isolated trees. Breeding has been recorded at Perth Hills, Lowden (Johnstone & Storr 1998), Serpentine (hills area), and to the east at Kojonup (Johnstone & Kirkby 2008). Nesting occurs in hollows of live or dead karri, Marri, wandoo and tuart (*Eucalyptus gomphocephala*) trees (DSEWPaC 2012). During the breeding season feeding primarily occurs in native vegetation, particularly Marri (DSEWPaC 2012). The range then expands during the non-breeding season (from February) as flocks forage more widely, congregating on the central and northern parts of the Darling plateau, as far as Mundaring and Gidgegannup (DSEWPaC 2012; Saunders 1974 & 1979). Some pockets of breeding have also been recorded around Augusta, Northcliffe, Walpole, Denmark and Albany (DSEWPaC 2012).

Baudin's Cockatoo has been recorded breeding in both the Myara and Myara North regions, though only in low numbers. Most breeding appears to be in the Solus Road area at the border of the Myara and Myara North regions (Alcoa, T. Kirkby unpublished data). Limited breeding also occurs in Bullich and Marri at the border of the Wungong Catchment and 39 Mile Brook Catchment areas approximately 5 km to the north of the Survey Area.

Within close proximity of the Survey Area Baudin's Cockatoo are known to roost in Bullich at Dirk Brook Road and Gobby Road (up to 350 birds) at the west of Myara (Johnstone and Kirkby unpublished data). The species is known to roost in Bullich at the Karnet area north of Kingsbury Drive (100 birds) and in smooth white barked exotic eucalypts at Turner Road (150 birds) south of Jarrahdale at Myara North (Alcoa, T. Kirkby unpublished data).

Flocks of between one and 40 Baudin's Cockatoo were observed during the surveys, including some mixed Baudin's - Carnaby's Cockatoo flocks noted based on bill length. All observations have been mapped and are presented in Figure 4a and 4d, Appendix A.

Carnaby's Cockatoo (Calyptorhynchus latirostris)

Carnaby's Cockatoo is listed as Endangered under the EPBC Act and BC Act.

Carnaby's Cockatoo (*C. latirostris*) is endemic to the south-west of Western Australia with a wide-spread distribution. Carnaby's Cockatoo nest in hollows of live or dead eucalypts, primarily smooth-barked Salmon Gum and Wandoo (Saunders 1979, 1982) though breeding has been reported in other Wheatbelt tree species and some tree species on the Swan Coastal Plain and Jarrah forest (Saunders 1979, 1982; Storr 1991; Johnstone and Storr 1998). Success in breeding is dependent on the quality and proximity of feeding habitat within 12 km of nesting sites (Saunders 1977, 1986; Saunders and Ingram 1987). Along with the trees that provide nest hollows, the protection, management and increase of this feeding habitat that supports the breeding of Carnaby's Cockatoo is a critical requirement for the conservation of the species.

Carnaby's Cockatoos have been recorded breeding in the Myara region and two nests are present in Marri at the west of the area near Scarp Road. Breeding is expected to occur at the south of Myara North in the vicinity of Solus Road and Mountain Road based on seasonal observations (Alcoa, T. Kirkby unpublished data). Breeding has been recorded in Marri at the Wungong Catchment and 39 Mile Brook Catchment approximately 5 km to the north (Johnstone and Kirkby unpublished data). More breeding may be recorded with greater survey effort as there are records of lone males in a few areas during the breeding season which may indicate that females are at the hollow either incubating an egg or brooding a chick (T. Kirby, pers. comm.). Carnaby's Cockatoos foraging evidence was recorded with foraging activity observed throughout all forest and woodlands habitats. A range of plants in utilised including Eucalyptus, Corymbia, Banksia, and records of foraging on *Hakea undulata* and Jarrah, along Frollett Road and Albany Highway at Myara North (Alcoa/T.Kirkby unpublished data). Pine plantation (Pinus) within the Study Area also represent a high value seasonal foraging resource. Foraging resources across the site are of high value particularly given the presents of potential and known breeding trees present within and in proximity to the foraging habitat.

Carnaby's Cockatoo were recorded at several locations throughout the Survey Area with a total of approximately 443 birds observed during the winter survey. Observations of flocks ranging from 5 and 200 Carnaby's Cockatoo were recorded. More individuals were recorded in the northern portion of the Survey Area; however evidence of them was observed throughout the entire Survey Area. Their locations were present in pine trees (feeding, calling and flying to and from). All observations have been mapped and are presented in Figure 4b and 4d, Appendix A.



Plate 2: Carnaby's Cockatoo image captured during winter survey

Masked Owl (southwest) (Tyto novaehollandiae novaehollandiae)

The Masked Owl is listed as Priority 3 by DBCA.

The Masked Owl occurs in open forest and woodland, and roosts among dense foliage in gullies, or in caves or tree hollows (Peake *et al* 1993, Kavanagh & Murray 1996, Liddelow, Wheeler and Kavanagh, 2002). Habitat is known to be woodland or open forest with cleared agricultural land nearby. The Masked Owl occurs mainly in the woodland region or where agricultural land intrudes into the heavier forest (Liddelow, Wheeler and Kavanagh, 2002).

During the winter field survey, a total of 132 calls attributable to Masked Owls were recorded at two locations within the middle portion of the Survey Area. Their locations were present in Jarrah Marri forest associated to properties along Kingsbury Drive near to Serpentine Dam. One of the locations where the Masked Owl was detected (SM4-AC2 – Object ID 119) was near Serpentine Dam on the northern side. Due to the distance apart, timing of calls and numbers of calls the data is likely at least one pair of Masked Owl is present (see Appendix D). No other locations were recorded for the species despite the entire Survey Area being suitable for the species. All observations have been mapped and are presented in Figure 4c, Appendix A.

A detailed summary of the acoustic recordings of the Masked Owl is provided in Appendix D.

Quenda (Isoodon fusciventer)

The Quenda is listed as Priority 4 by DBCA.

The Quenda has patchy distribution through the Jarrah and Karri forest and on the Swan Coastal Plain. Its habitat is generally dense scrubby, often swampy, vegetation with dense cover up to one metre high, often feeds in adjacent forest and woodland that is burnt on a regular basis and in areas of pasture and cropland lying close to dense cover. Populations inhabiting Jarrah and Wandoo forests are usually associated with watercourses (Braithwaite, 1995).

Over the course of the surveys Quenda was recorded at 21 locations within the Survey Area via trapping, remote cameras and opportunistically. Three of these locations are within cage traps, 13 are on cameras and five are opportunistic sightings. Quenda locations are spread widely across the Survey Area; however almost half (ten) records are from the northwest portion. Habitat preference tends to be associated with areas of low dense vegetation along drainage lines and damplands. These areas are providing adequate cover from predators.

All observations have been mapped and are presented in Figure 4c, Appendix A.



Plate 3: Quenda recorded on a remote camera during the Phase 1 survey

Quokka (Setonix brachyurus)

The Quokka is listed as Vulnerable under the BC Act and the EPBC Act.

The current distribution of the mainland quokka includes areas through the south-west forests from Jarrahdale to Walpole. The mainland quokka lives in the Darling Range and south-west regions of Western Australia, mostly inhabiting densely vegetated swamps and sometimes tea-tree thickets on sandy soils along creek systems and dense heath on slopes. Mainland quokkas tend to hide in runs among vegetation during the day and forage along the swamp margins at night (Kitchener, D.J, 1995).

In the southern forest, quokkas occupy a range of forest, woodland and wetland ecotypes. The most commonly occupied sites comprise Jarrah (*Eucalyptus marginata*), Marri (*Corymbia calophylla*), karri (*E. diversicolor*) or tingle (*E. jacksonii* or *E. guilfoylei)* forest and riparian habitats with a sedge dominated understorey (DEC 2013). Habitat supporting a low density of near-surface fuel, a complex vegetation structure and burn patchiness are the factors favouring quokka occupancy in the southern forest (DEC 2013). The habitat critical to survival for the south coast subpopulation includes a wider range of vegetation types (floristically and structurally) than in the northern Jarrah forest, including swamps, riparian areas, incised gullies and dense coastal heath (de Tores *et al.* 2007). Habitat occupied at the Swan Coastal Plain site at Muddy Lakes consists of fringing wetland vegetation of dense bulrush (*Typha orientalis*)/pale rush (*Juncus pallidus*) sedgeland with other sedges including jointed rush (*Baumea articulata*), *Typha domingensis* and coast sword-sedge (*Lepidosperma gladiatum*) (Keighery *et al*. 2002) (DEC 2013).

During the surveys Quokkas were recorded at a total of 16 locations across the Survey Area, each associated with riparian vegetation or damplands (Figure 4a, Appendix A). This comprises the presence of Quokka from signs (scat, prints or runnels) at three locations and the recordings of Quokka on 13 remote cameras. During phase 1, 16 individual Quokka (from 20 hits) were recorded and Phase 2 20 individuals (from 76 hits) on camera based on camera independence, animal size, pouch young size, hair loss and ear damage. Some individuals can be seen below in Plate 4 and Plate 5. Between 1 and 6 individuals were recorded per site based on independent characteristics, with the number of individuals likely higher due to animals being similar. During both phases a number of females either had pouch young or young at foot suggesting recruitment across the Survey Area.

Quokka detection locations were widespread across the Survey Area but limited to areas of dense vegetation associated with drainage lines and damplands. These areas are providing sufficient cover for shelter from predators, food and are movement corridors through the landscape. It is likely Quokka are present in the region wherever drainage lines and damplands are present with long unburnt vegetation. During this survey it was found animals were persisting in dense regrowth of approximately 5-6 years old after fire. This is probably occurring due to baiting in the region under western shield as few foxes were recorded on camera.



Plate 4: Quokka adult and juvenile captured on camera during Phase 1 survey



Plate 5: Quokka adult and juvenile captured on camera during Phase 2 survey

Western Brush Wallaby (Notamacropus irma)

The Western Brush Wallaby is listed as Priority 4 by DBCA.

Western Brush Wallaby are locally common in dry sclerophyll forest and woodlands in the southwest of Western Australia (Menkhorst & Knight 2010). They are predominantly diurnal, grazing on grasses and forbs.

Western Brush Wallaby were recorded throughout much of the Survey Area with a total of 62 observations of individuals (predominantly opportunistic) recorded during the surveys. Sightings occurred mainly amongst the Jarrah Marri forest, the dominant fauna habitat type, and were more prevalent in the southern and mid portions of the Survey Area. Remote cameras recorded approximately 21 records of Western Brush Wallaby over the deployment period.

Locations of Western Brush Wallaby observations recorded during the survey are presented in Figure 4c, Appendix A.



Plate 6: Western Brush Wallaby recorded during Phase 1 survey

Southern Death Adder (Acanthophis antarticus)

The Southern Death Adder is listed as Priority 3 by DBCA.

The Southern Death Adder lives in forests and woodlands, grasslands and heath. The species is a highly cryptic generally only visible if active or sunbaking. Generally the species requires thick litter to hide.

During the Phase 1 survey two Southern Death Adders were opportunistically recorded by Mattiske Consulting at one location (or generally in the same region) within close proximity to each other during the vegetation and flora survey being undertaking for this Project. This observation have been mapped and are presented in Figure 4c, Appendix A. This species was not detected by any other method throughout either of the surveys.



Plate 7: Southern Death Adder recorded by Mattiske in winter 2020 (Image by Zac Sims)

Chuditch (Dasyurus geoffroii)

The Western Quoll or Chuditch is listed as Vulnerable under the BC Act and EPBC Act.

The Chuditch is Western Australia's largest carnivorous marsupial and is endemic to south-west Western Australia. It has mostly brown fur with distinctive white spots (40-70 white spots on its body but not on its tail). The tail is 21-35 cm long. The Chuditch is a carnivore and feeds mostly on large invertebrates. It also easts small lizards, birds and mammals. They are also known to consume the red pulp on Zamia seeds, small fruits and part of flowers. They utilise hollow logs or burrows during the day and hunt at night. It is an excellent climber, which makes it easier to catch tree-dwelling animals. Historically, Chuditch inhabited a wide range of habitats, but today it survives mostly in Jarrah *Eucalyptus marginata* forests and woodlands, mallee shrublands and heathlands (DBCA 2017a).

During the field survey the Chuditch was recorded on two remote cameras in the central north-eastern and central north-western portion of the Survey Area (Figure 4a, Appendix A). Despite the extensive survey effort (cages and cameras) no other individuals were recorded. The Survey Area contains suitable breeding and foraging/hunting habitat to support this species and a population of the species in the Survey Area.



Plate 8: Chuditch recorded on remote cameras during Phase 1 survey

Rakali (Hydromys chrysogaster)

The Rakali is listed as Priority 4 by DBCA.

Rakali live in the vicinity of permanent bodies of fresh, brackish, or marine water, lakes and farm dams, and on sheltered coastal beaches, mangroves and offshore islands. In the south-west of WA they have been shown to prefer areas with riparian vegetation, better water quality and a degree of habitat complexity. Woody debris, rock ledges and wetland islands are likely to be important areas for feeding and refuge (DEC 2012). It is an occasional vagrant to temporary waters. Water Rat's dens are made at the end of tunnels in banks and occasionally in logs (Van Dyck & Strahan 2008).

One Rakali was recorded during Phase 1 of the survey via remote camera along a flowing stream section of Big Brook that bisects the proposed conveyor alignment (Figure 4c, Appendix A). A 300 m portion of the stream (Big Brook) was actively searched for Carters Freshwater Mussel and Rakali. No Rakali middens were recorded however a small amount of Yabbi remains were discovered on a bank which indicates recent use by Rakali. Big Brook is a seasonal Brook but a main tributary of Serpentine Dam, which is likely the source origin of Water Rat in the Survey Area. A further 13 locations were assessed for Rakali (See Appendix D for Rakali Assessment results) with an additional three creeks identified as potentially suitable for Rakali. Two of these areas had cameras deployed but no additional animals were detected. No other creeks in the Survey Area were assessed as suitable for the species due to the lack of permanent water within upper sections of creeks.



Plate 9: Rakali recorded on a remote camera during Phase 1 survey

Peregrine Falcon (Falco peregrinus)

The Peregrine Falcon is listed as Special Protection (Schedule 7) under the BC Act.

The Peregrine Falcon is a large falcon species which predominantly preys aerially on medium sized birds such as Pigeon, Galah and ducks. The species prefers areas with deep gorges or large cliff faces with riparian or plain habitat surrounding. Within the south-west this species utilised forest trees as suitable nest habitat, foraging in surrounding forests and clearings. The Peregrine Falcon nests primarily on ledges of cliffs, shallow tree hollows, and ledges of buildings in cities (Morcombe 2004). The Peregrine Falcon is wide ranging, mobile and aerial in nature, and therefore is likely to utilise forest and woodland habitats within the Survey Area.

During the Phase 2 survey one Peregrine Falcon was recorded roosting in a tree at Trapline 3 (Figure 4c, Appendix A) in the south of the Survey Area. The Survey Area contains suitable breeding and hunting habitat to support this species.

Western False Pipistrelle (Falsistrellus mackenziei)

The Western False Pipistrelles is listed as Priority 4 under DBCA managed species list.

The Western False Pipistrelles is a vespertilionid bat that occurs in Southwest Australia. It is an insectivore associated with old growth forest that provides the species with its preferred foraging opportunities. Namely, flying insects are hunted around tall forest canopy in the valley between trees tops or the open areas above the mid-storey (Kitchener, Caputi & Jones, 1986). Their range is dominated by wet sclerophyll eucalypt forest and semi woodland of the southwest. Roosting sites are usually associated with old growth eucalypts containing hollows as well as within branches or tree stumps. The Western False Pipistrelle has been recorded on the Swan Coastal Plain in Banksia woodland (Kitchener, Caputi & Jones 1986).

The Western False Pipistrelle was recorded at 13 sites during both phases of the Survey Area (Figure 4c, Appendix A), suggesting a large portion of the Survey Area, including eucalyptus forest and woodland habitats are utilised for foraging and roosting.

Brush tailed Phascogale (Phascogale tapoatafa)

The Brush tailed Phascogale is listed as Conservation Dependent (CD) under the BC Act.

It occurs at low densities in the northern Jarrah forest with highest densities occurring in the Perup/Kingston area, Collie River valley and near Margaret River and Busselton. This species has been observed in dry sclerophyll forests and open woodlands that contain hollow-bearing trees but a sparse ground cover. Records are less common from wetter forests. They are most active between dusk and dawn (though emerging later in mid-winter) and forage almost exclusively among the tree canopy. Nest sites include hollow tree limbs, rotten stumps and even bird's nests. Lactating females show a preference for large tree cavities with small entrances. They are opportunistic feeders including invertebrates, nectar, small birds and small mammals (DBCA, 2017b).

The Brush-tailed Phascogale was detected during phase 2 of the survey via remote camera from Jarrah – Marri forest with Sheoak understory within the central portion of the Survey Area (Plate 10 and Figure 4c, Appendix A.). Three individuals were identified on the same camera and all appear to be sub adult and likely from the same litter. This indicates a breeding population is present in the Survey Area.



Plate 10: Brush-tailed Phascogale recorded on remote camera

4.3.1 Accumulation curve

An accumulation curve was run for the data collected during the field survey within 8 models in Primer V6 (Plate 11). Jacknife1, Chao 1, Chao2 and Jacknife2 curves demonstrate poor fit to the data, while the remaining curves reach a curve asymptote (very few new species were recorded) after trap night 10-12. For, Bootstrap, MM, Sobs and UGE somewhat model levelling is demonstrated by the end of the survey indicating that of the species active at the time of the survey a majority of them were sampled prior to the end of the project. This is also comparable to the raw data of which the known species in the region (of native reptile, small mammal and frogs) approximately 51 could utilise the habitats present in the Survey Area (based on NatureMap records) where this study recorded 41.

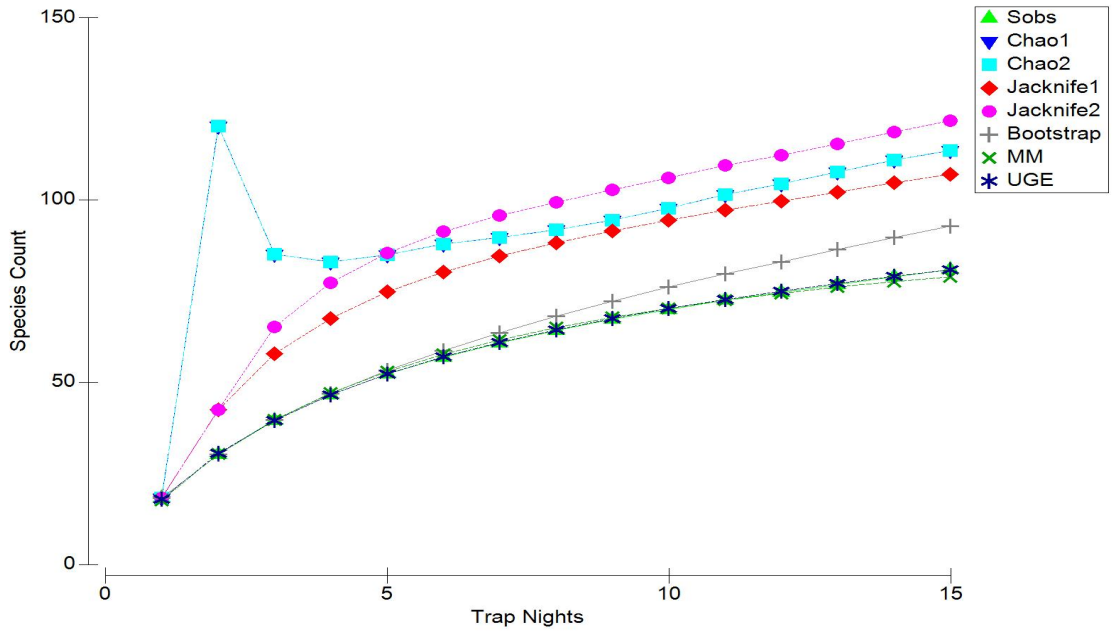


Plate 11: Species accumulation over time

4.3.2 Black cockatoo habitat assessment

The Black Cockatoo habitat assessment focussed on qualifying and quantifying the breeding habitat values for Black Cockatoo species occurring within the Survey Area. Due to the scale of the Survey Area, thirty one (31) three hectare habitat assessment plots were sampled to determine habitat usage and potential value for Baudin's, Carnaby's, and Forest Red-tailed Black Cockatoo as described in Section 2.3.7. Table 26 presents results on potential and actual usage of cockatoo breeding habitat within the Study Area. Table 27 provides a comparison of potential breeding habitat values for the fauna habitats across the Survey Area. Table 28 presents a quality assessment of the foraging habitat within the different habitat types.

4.3.2.1 Foraging habitat

In total 112 foraging sites were recorded consisting of 106 sites of Forest Red-tailed Black Cockatoo, nine sites of Carnaby's Cockatoo and one site from Baudin's Cockatoo. Throughout the six habitat types foraging quality is either low, medium or high depending on impacts of fire and dieback (Table 28). Melaleuca Damplands appears to be particularly impacted by recent fires in the region with few foraging species present at the time of the Survey. All six habitats are useable by either one or more Black Cockatoo species as a food source which is dominated by foraging species or has scattered foraging species present throughout the habitat type.

Table 28 presents a quality assessment of the foraging habitat within the different habitat types.

4.3.2.2 Breeding habitat

From this study and Alcoa's existing data from the Study Area it is known that two main areas appear to be where most of the current breeding activity has been recorded. These areas are within and around the Bullich habitat in the central northern western portion of the Study Area and central southern portion of the Study Area (see

Figure 4d). Several scattered other breeding trees are also known. The northern western portion appears to be more Forrest Red-tailed Black dominated breeding while the other region Baudin's Cockatoo. Breeding trees are mostly in Marri however Bullich and Blackbutt are also utilised in the Study Area.

Transect data undertaken within the Study Area identified that Flooded Gum Woodland and Jarrah/Marri Forest had the greatest number of trees per hectare with a DBH of >50cm at 12 and 9 respectively. Blackbutt Forest and Melaleuca Dampland had 7, while Granite Outcrop Association and Bullich Forest had 6 and 2 respectively (Table 27). The high density of trees in Melaleuca Damplands and Granite Outcrop Association is due to ecotone vegetation, that is Blackbutt fringing Melaleuca Dampland and Marri fringing granite outcrops. During the Survey at least four nests of Forest Red-tailed Black Cockatoo were lost to a prescribed burn in the northern western portion of the Study Area.

4.3.2.3 Roosting habitat

One roost site was recorded during the Survey Area in the vicinity of the Balmoral Anzac camp. The area had evidence of roosting.ie scat and leaf and twig clips and on nocturnal investigation identified at least 4 birds were roosting at the site. It is highly likely more roost locations are present in the Survey Area due to the large numbers of birds (854 consisting of 443 Carnaby's, 40 Baudin's and 371 Forrest Red-tailed Black Cockatoo) recorded in the Survey Area. It is likely that the location of roosting site is dependent on habitat quality in relation to fire history, timber harvesting, dieback or other anthropomorphic behaviour.

Table 26 Black Cockatoo habitat usage

Habitat usage	Presence within the Survey Area	Evidence
Foraging habitat	Yes, Marri, Jarrah and Banksia	Chewed Marri and/or Jarrah nuts, feeding evidence at Casuarina and Banksia trees at 112 locations however the entire Survey Area excluding granite outcrops (actual granite not supportive vegetation) is assessed as foraging habitat.
Actual Breeding Events	No	Historical breeding events were recorded at 8 locations (see Figure 4d). Two sites recorded with evidence of Baudin's Cockatoo breeding and six sites recorded with evidence of Forest Red-tailed Black Cockatoos breeding.
Potential breeding hollows	Yes, this data is based on transect surveys only	19 potential breeding trees > 500 mm DBH of either Jarrah, Marri, Flooded Gum, Blackbutt or Bullich in the Survey Area. Four large Jarrah with large hollows (>200 mm) suitable for breeding. Two of these had chews present however no actual breeding events were recorded.
Likely Breeding hollows	Yes, this data is based on transect surveys only	Ten trees in total were identified as being likely/suitable breeding hollows. Four large Marri trees, one large Jarrah tree with large hollows (>200 mm), two large blackbutt trees and three large Bullich trees with large hollows (>200mm). These trees identified had chews present at the entrance to the hollow however no actual breeding events were recorded.
Roosting habitat	Yes	One suspected roost location recorded in the Balmoral Anzac camp had evidence of roosting.
Potential breeding trees per hectare	Yes	Potential breeding trees identified derived from transect data (see Table 27 for further detail). Trees with hollows per habitat type per hectare: Jarrah-Marri forest: 3 Marri trees/ha, 6 Jarrah trees/ha Flooded Gum woodland: 12 Flooded Gum trees/ha Bullich forest: 2 Bullich trees/ha Blackbutt forest: 7 Blackbutt trees/ha:
Legend: Potential breeding hollow: breeding hollow of an adequate size for use. Likely breeding hollow: breeding hollow previously known/recorded to have been used, active chew marks present or other evidence hollow has been used.		

Table 27 Black Cockatoo potential breeding trees from transect data

	Area (ha) of habitat within Survey Area	Area (ha) of habitat within cockatoo assessment transects	Number of trees >50cm DBH within transects	Mean density trees >50cm DBH (trees/ha) within transects	Number of trees identified with potential hollows within transects	Number of trees identified with likely hollows within transects	Range of density potential breeding trees (DBH>50cm)/ha
Bullich Forest	267	0.66	1	2	0	0	0
Granite Outcrop Association	373	2.7	17	6	0	0	0
Blackbutt Forest	687	7.8	53	7	0	1	0-1
Flooded Gum Woodland	688	8.7	105	12	5	4	0-6
Melaleuca Dampland	130	2.5	17	7	0	0	0
Jarrah Marri Forest	14,722	81.7	723	9	5	14	0-2
Pine Plantation	162	0	0	<1	0	0	0
Cleared areas	259	0	0	<1	0	0	0
Rehabilitation areas	402	0.04	0	<1	0	0	0
Total	**17690**	**104.1**	**916**	**9**	**10**	**19**	**0**

Legend:
Potential breeding hollow: breeding hollow of an adequate size for use.
Likely breeding hollow: breeding hollow previously known/recorded to have been used, active chew marks present or other evidence hollow has been used.

Table 28 Black cockatoo foraging habitat assessment

Habitat type	Vegetation type	Baudin's Cockatoo			Carnaby's Cockatoo			Forest Red-tailed Black Cockatoo		
		Foraging species present	Evidence of foraging	Quality of foraging habitat	Foraging species present	Evidence of foraging	Quality of foraging habitat	Foraging species present	Evidence of foraging	Quality of foraging habitat
Bullich Forest	W, WA	Limited However scattered Marri proteaceous trees and shrubs	None	medium	Limited However scattered Marri proteaceous trees and shrubs	None	medium	Limited	None	medium
Granite Outcrop Association	R, G, RG, G1, G2	Limited However scattered Marri proteaceous trees and shrubs	None	low	High Associated proteaceous species	None	low	None	None	low
Blackbutt Forest	CW, AW, AW/AX, AX/CW, C	Limited	None	medium	Limited	Evidence of feeding in *Banksia littoralis*	medium	High Blackbutt	Numerous locations of the species feeding on Blackbutt seed	high
Flooded Gum Woodland	AC, AD, AX	Limited	None	medium	Limited	None	medium	None	None	medium
Melaleuca Dampland	A	Limited However scattered Marri proteaceous trees and shrubs	None	low	High Associated proteaceous species	None	low	None	None	none
Jarrah Marri Forest	D, DA, DG, E, J, M, P, PG, PJ, PT, PS, PW, S, SP, ST, T, SW, TP, TS, Q	High Dominant feeding habitat for this species, mainly Jarrah, Marri.	The species was recorded feeding in Marri nuts	high	High Jarrah, Marri, Banksia, and proteaceous species	The species was recorded feeding in Jarrah, Marri, Banksia, and records of foraging on *Hakea undulata*	high	High Dominant feeding habitat for this species, mainly Jarrah, Marri and Casuarina. Flowers of Banksia,	The species was recorded feeding in Marri, Jarrah, Casuarina nuts. A small flock was also observed feeding on nectar of Banksia grandis.	high
Mine rehabilitation	Rehab	Jarrah, Marri, exotic eucalyptus	none	high	Jarrah, Marri, exotic eucalyptus	none	high	Jarrah, Marri, exotic eucalyptus	none	high
Pine plantation	PL	Growing tips of mature pine trees (Pinus)	none	medium	Cones of mature pine trees (Pinus)	Chewed cones and cockatoos observed feeding	medium	none	none	none

Legend: Evidence of foraging- none (no feeding habitat present), limited (some species present but not dominant), high (habitat is dominated with feeding species).

4.3.3 Carter's Freshwater Mussel

Eleven locations (with between 9 and 11 transects per location) were searched for Carter's Freshwater Mussel within the Survey Area with no signs of mussels (alive or dead) recorded (see Appendix D for results). Of the surveyed transects, most were dry or reduced to small standing water puddles at the time of survey (November 2020) indicating that the waterways are dry for over four months of the year. The duration of dry streams is noted to be well outside of the five day exposure experiments undertaken in controlled conditions (Klunzinger 2012). However, under protected muddy conditions in a creek bed they are likely to survive longer.

Some transects also contained rocky substrate which may be sub-optimal for Carter's Freshwater Mussel as it requires sandy and clay substrate in which to bury. Three locations (of the 11) had water features suitable enough to maintain Carter's Freshwater Mussel; however none of the transects identified any live mussels or shell remains the species on banks. In these areas the species may be present albeit in very low numbers or below detectable numbers. When adequate stream water is present, the species may occasionally or sporadically be present following dispersal of young mussels up stream within host fish, however the dispersing mussels are unlikely to survive long term due to the dry nature of this portion of the forest. This is demonstrated by the lack of adult shells (dead animals) normally present when undertaking Carter Freshwater Mussel surveys, when they are present.

5. Conclusions

The Survey Area consists of eight broad fauna habitat types: Bullich forest, Granite outcrop, Blackbutt forest, Flooded Gum woodland, Jarrah -Marri forest, Melaleuca dampland. Mine rehabilitation and Pine plantation. Jarrah-Marri forest predominated at 83% of the Survey Area. A small portion of the Survey Area comprises rural cleared land.

The conservation value of each fauna habitat type is specific to the locally occurring conservation significant fauna species and the type of usage by those species. All three Black Cockatoos were recorded primarily throughout the Marri-Jarrah forest, however all habitat types will be utilised for foraging by either one or all of the species. Melaleuca Damplands and riparian areas comprising Bullich Forest, Blackbutt Forest and Marri-Jarrah Forest support a Quokka population with records scattered throughout the Survey Area. Chuditch are wide ranging and expected to use all habitat types at a relatively low density.

In total 13 conservation significant species were recorded in the Survey Area including the Quokka, Chuditch, Brush-tailed Phascogale, Western Brush Wallaby, Forrest Red-tailed Black Cockatoo, Baudin's Cockatoo, Carnaby's Cockatoo, Western False Pipistrelle, Southern Death Adder, Quenda, Rakali, Masked Owl and Peregrine Falcon. All species identified are likely to have significant populations and habitat present within the Survey Area.

The survey area was assessed in terms of habitat suitability for migratory shorebirds. No shorebirds were recorded during the survey. The survey area lacks open water bodies that feature shallow shorelines for foraging habitat. The creek lines and vegetated seasonal dampland areas within the survey area are not considered suitable foraging habitat due to the dense forest vegetation associated with these riparian areas, and the lack of extensive shallow shoreline. Therefore, they are unlikely to occur within the survey area, and any occurrence would be as rare vagrant.

Carter's Freshwater Mussel was targeted during the survey but no presence was recorded. This is expected given that the streams are seasonal and dry up for several months of the year. The species is known to reside in the Serpentine Dam on the southern edge of the Survey Area and while mussels may disperse upstream from the Dam during winter/spring flows, all streams are seasonal, and any dispersing mussels are unlikely to survive the extended dry summer period. Therefore, significant populations are unlikely in the Survey Area.

The DBCA NatureMap search identifies that 185 vertebrate fauna taxa previously recorded within 20 km radius of the Survey Area. This total included 28 mammals, 113 birds, 32 reptiles and 12 amphibians.

The detailed and targeted program recorded 132 vertebrate fauna species utilising the Survey Area, including 28 mammals, 76 birds, 26 reptiles and seven amphibians. Off these, eight introduced species (mammals and birds) were identified.

Fire was observed to cause substantial impact to fauna habitats of the Survey Areas. Large areas of the Survey Area had been burnt within the last 2 to 3 years impacting fauna habitat. During the survey the north west portion of the Survey Area was prescribed burned in October 2020.

6. References

ALCOA World Alumina Australia 2010, *'No 40. Threatened fauna species management plans for Alcoa's bauxite mining operations in the Jarrah forest'.*

Beard, JS 1976, *Vegetation Survey of Western Australia. Muchison 1: 1 000 000 Vegetation Series. Map Sheet 6 and Explanatory Notes to Sheet 6*. Published by UWA Press, Perth.

Bell, PJ & Mooney, N 2002, *Distribution, Habitat and Abundance of Masked Owls (Tyto novaehollandiae) in Tasmania, In; Ecology and Conservation of Owls, Eds*. Newton I, Kavanagh R, Olsen J, and Taylor I. CSIRO Publishing, Australia.

Braithwaite, RW 1995, *Southern Brown Bandicoot*. In R. Strahan (Ed.) The Mammals of Australia. Australian Museum and Reed Books. Chatswood, NSW.

Burbidge, AA 2004, '*Threatened Animals of Western Australia'*. Department of Conservation and Land Management, Perth.

Bureau of Meteorology 2020, *Climate statistics for Australian locations*, retrieved June 2020, from http://www.bom.gov.au/climate

Burgar, JM, Craig, MD & Stokes, VL 2015, '*The importance of mature forest as bat roosting habitat within a production landscape'*, Forest Ecology and Management, vol 356, pp 112-123.

Burgar, JM, Stokes, VL & Craig, MD 2017, *'Habitat features act as unidirectional and dynamic filers to bat use of production landscapes*', Biological conversations, vol 209, pp 280-288.

Burn 2000, *A Survey of the impact of burning on mammals and birds in Alcoa's rehabilitated Bauxite mines at Jarrahdale*.

Christidis, L & Boles, WE 2008, *Systematics and Taxonomy of Australian Birds*, Melbourne, Australia, CSIRO Publishing.

Churchill, S 2008, *Australian Bats*, second edition, Milton, Australia, Allen & Unwin.

Clarke, KR & Gorley, RN 2006, *PRIMER v6: User Manual/Tutorial (Plymouth Routines in Multivariate Ecological Research),* PRIMER-E, Plymouth.

Cogger, H 2014, *Reptiles and Amphibians of Australia*, Collingwood, Victoria, CSIRO Publishing.

Craig, MD, White, DA, Stokes, VL & Prince, J 2017, *'Can postmining revegetation create habitat for a threatened mammal?*' Ecological Management & Restoration, vol 18 no. 2. Ecological Society of Australia and John Willey & Sons Australia. Ltd.

de Tores, P, Hayward, MW, Dillon, MJ & Brazell, RI 2007, *'Review of the distribution, causes for decline and recommendations for management of the quokka, Setonix bracyurus (Macropodidae: Marsupialia), an endemic macropodid marsupial from south-west Western Australia'*, Conservation Science Western Australia, vol 6(1), pp 13-73.

Department of Agriculture Water and Energy (DAWE) 2020, *Environmental Protection and Biodiversity Conservation Act* 1999 Protected Matters Search Tool Results, retrieved May 2020, from http://www.environment.gov.au/epbc/pmst/index.html.

Department of Agriculture, Water and the Environment (DAWE) 2021a, '*Atrichornis clamosus in Species Profile and Threats Database'*, Department of the Environment, Canberra.

Department of Agriculture, Water and the Environment (DAWE) 2021b, '*Calidris acuminata in Species Profile and Threats Database'*, Department of the Environment, Canberra.

Department of Agriculture, Water and the Environment (DAWE) 2021c, *'Calyptorhynchus banksii naso in Species Profile and Threats Database'*, Department of the Environment, Canberra.

Department of Agriculture, Water and the Environment (DAWE) 2021d, '*Calyptorhynchus baudinii in Species Profile and Threats Database'*, Department of the Environment, Canberra.

Department of Agriculture, Water and the Environment (DAWE) 2021e, *'Species Profile and Threats Database'*, Department of the Environment, Canberra.

Department of Biodiversity, Conservation and Attractions (DBCA) 2007, *'NatureMap: Mapping Western Australia's Biodiversity'*, retrieved May 2020, from http://naturemap.dpaw.wa.gov.au/default.aspx/.

Department of Biodiversity, Conservation and Attractions (DBCA) 2017a, '*Fauna profiles – Chuditch Dasyurus geoffroii',* retrieved from http://www.dbca.wa.gov.au

Department of Biodiversity, Conservation and Attractions (DBCA) 2017b, '*Fauna profiles – Brush-tailed Phascogale',* retrieved http://www.dbca.wa.gov.au

Department of Environment and Conservation (DEC) 2011, *'Standard Operating Procedure Remote operation of cameras SOP No: 5.2'*, Prepared for: Department of Environment and Conservation's Animal Ethics Committee and Species and Communities Branch.

Department of Environment and Conservation (DEC) 2012, *'Fauna Profiles. Water Rat (Rakali) Hydromys chrysogaster (Geoffrey, 1804)'*, Department of Environment and Conservation, Perth, WA.

Department of Environment and Conservation (DEC) 2013, *'Quokka Setonix brachyurus Recovery Plan'*, Wildlife Management Program No. 56, Department of Environment and Conservation, Perth, WA.

Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) 2011a, *'Survey guidelines for Australia's threatened reptiles'*, Guidelines for detecting reptiles listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999.

Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) 2011b, *'Survey guidelines for Australia's threatened mammals'*, Guidelines for detecting mammals listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999.

Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) 2012, *'Referral guidelines for three species of Western Australian black cockatoos'*, retrieved from: http://www.environment.gov.au/epbc/publications/wa-black-cockatoos.html.

Doherty, TS, Wingfield, BN, Stokes, VL, Craig, MD, Lee, JGH, Finn, HC & Calver, MC 2016, '*Successional changes in feeding activity by threatened cockatoos in revegetated mine sites'*, Wildlife Research, vol 43, pp 93-104. CSIRO Publishing.

Environmental Management and Research Consultants (EMRC) 1992, *'Long Term Fauna Monitoring Program 1992'*, report prepared for Alcoa of Australia.

Environmental Management and Research Consultants (EMRC) 1995, *'Long term fauna monitoring program 1995'*, report prepared for Alcoa of Australia.

Environmental Management and Research Consultants (EMRC) 1999, *'A fauna survey of planned mining areas at Alcoa's Orion Mining Region'*, report prepared for Alcoa of Australia.

Environmental Management and Research Consultants (EMRC) 2000, *'A Vertebrate Survey of Rehabilitated Areas at Alcoa's Huntly Mine site – year 2000 results'*, report prepared for Alcoa of Australia.

Environmental Management and Research Consultants (EMRC) 2001a, '*Alcoa World Alumina Australia Ltd. Long Term Fauna Monitoring Program - 2001 results'*, report prepared for Alcoa of Australia.

Environmental Management and Research Consultants (EMRC) 2001b, *'A Vertebrate Fauna Survey of rehabilitated areas at Alcoa's Willowdale Mine site – Year 2000 results'*, report prepared for Alcoa of Australia.

Environmental Management and Research Consultants (EMRC) 2003, *'McCoy Long Term Fauna Monitoring Program 2003'*, report prepared for Alcoa of Australia.

Environmental Management and Research Consultants (EMRC) 2006, '*Long term fauna monitoring program 2006'*, report prepared for Alcoa of Australia.

Environmental Management and Research Consultants (EMRC) 2007a, '*McCoy Long Term Fauna Monitoring Program –results of the 2007 survey'*, report prepared for Alcoa of Australia.

Environmental Management and Research Consultants (EMRC) 2007b, '*A Vertebrate Fauna Survey of Rehabilitated Area's at Alcoa's Huntly Minesite -year 2007 results Final Report'*, report prepared for Alcoa of Australia.

Environmental Management and Research Consultants (EMRC) 2007c, *'A Vertebrate Survey of Rehabilitated areas at Alcoa's Willowdale Minesite – Year 2007 results'*, report prepared for Alcoa of Australia.

Environmental Management and Research Consultants (EMRC) 2015, '*Long Term Fauna Monitoring Program Summary of Results at Alcoa's Orion Mining Region'*, report prepared for Alcoa of Australia.

Environmental Protection Authority (EPA) 2016a, '*EPA Technical Guidance –Terrestrial Fauna Surveys'*, Perth.

Environmental Protection Authority (EPA) 2016b, *'EPA Technical Guidance – Sampling methods for terrestrial vertebrate fauna'*, Perth.

Environmental Protection Authority (EPA) 2020, *'EPA Technical Guidance – Sampling methods for terrestrial vertebrate fauna'*, Perth.

Garnett, ST & Crowley, GM 2000, *The Action Plan for Australian Birds,* Environment Australia, Canberra.

Groom, C 2011, *Artificial hollows for Carnaby's Black Cockatoo*, Department of Environment and Conservation, Kensington, Western Australia.

Higgins, PJ (ed.) 1999, *Handbook of Australian, New Zealand & Antarctic Birds, Volume 4: Parrots to Dollarbird*, South Melbourne, Australia, Oxford University Press.

Johnstone, RE & Kirkby, T 1999, *'Food of the Forest Red-tailed Black Cockatoo Calyptorhynchus banksii naso in south-west Western Australia'*, Western Australian Naturalist, vol 22, pp 167-177.

Johnstone, RE & Kirkby, T 2008, *'Distribution, status, social organisation, movements and conservation of Baudin's Cockatoo (Calyptorhynchus baudinii) in South-west Western Australia'*, Records of the Western Australian Museum, vol 25, pp 107-118.

Johnstone, RE & Storr, GM 1998, *Handbook of Western Australian Birds. Volume 1: Nonpasserines (Emu to Dollarbird),* Western Australian Museum, Perth.

Johnstone, RE 1997, *'Current studies on three endemic Western Australian cockatoos'*, Eclectus, vol 3, pp 34--35.

Johnstone, RE, Kirkby, T & Sarti, K 2017, *'The distribution, status movements and diet of the Forest Red-tailed Black Cockatoo in the south-west with emphasis on the greater Perth regions'*, Western Australia, Western Australian Naturalist, vol 30 (4), pp 1-193.

Jones, D & Goth, A (2008). Mound-builders. CSIRO Publishing. Victoria.

Kavanagh, RP & Murray, M 1996, *'Home Range, Habitat and Behaviour of the Masked Owl Tyto novaehollandiae Near Newcastle, New South Wales*', Emu Austral Ornithology, Journal of Birdlife Australia, vol 96, pp 250-257, CSIRO publishing.

Keighery, B, Keighery, G, Dell, J, & Santich, S 2002, *'A preliminary assessment of the natural values of the South Bunbury to Capel Coastal Corridor'*, Department of Environmental Protection, Perth.

Kitchener, DJ 1995, '*Quokka*', In R. Strahan (Ed.) The Mammals of Australia, Australian

Kitchener, DJ, Caputi, N, Jones, B 1986, *'Revision of Australo-Papuan Pipistrellus and Falsistrellus (Microchiroptera: Vespertilionidae)'*, Records of the Western Australian Museum, vol 12, pp 435–495, ISSN 0312-3162.

Klunzinger MW 2012, '*Ecology, life history and conservation status of Westralunio carteri Iredale 1934, an endemic freshwater mussel of south-western Australia'*, PHD Thesis, Murdoch University, Perth Western Australia.

Klunzinger, MK, Beatty, SJ, Morgan, DL, & Lymbery, AJ 2012*, 'Distribution of Westralunio carteri Iredale, 1934 (Bivalvia: Unionoida: Hyriidae) on the south coast of south-western Australia, including new records of the species'*, Journal of the Royal Society of Western Australia, vol 95, pp 77-81.

Liddelow, G, Wheeler, I & Kavanagh, R 2002, *Owls in the Southwest forests of Western Australia,* Ecology and Conservation of Owls, pp 233-241, Chapter 21, CSIRO Publishing.

Marchant, S & Higgins, PJ, (eds.) 1990, *Handbook of Australian, New Zealand and Antarctic Birds. Volume One - Ratites to Ducks,* Melbourne, Victoria: Oxford University Press.

Marchant, S & Higgins, PJ, (eds.) 1993, *Handbook of Australian, New Zealand and Antarctic Birds, Volume 2 - Raptors to Lapwings,* Melbourne, Victoria: Oxford University Press.

Mastrantonis, S, Craig, MD, Renton, M, Kirkby, T & Hobbs, RJ 2019, *'Climate change indirectly reduces breeding frequency of a mobile species through changes in food availability'*, Ecosphere, vol 10 (4), e02656. 10.1002/ecs2.2656.

Mattiske Consulting 2021, '*Myara North Flora and Vegetation Survey Report'*, in prep.

Mattiske, EM & Havel JJ 1998, Vegetation Mapping in the South West of Western Australia and Regional Forest Agreement vegetation complexes. Map sheets for Pemberton, Collie, Pinjarra, Busselton- Margaret River, Mt Barker, and Perth, Western Australia. Scale 1:250,000. Department of Conservation and Land Management, Perth.

Mawson, PR & Johnstone, RE 1997, *'Conservation status of parrots and cockatoos in Western Australia'*, Eclectus, vol 2, pp 4-9.

McGregor, RA, Stokes, VL & Craig, MD 2014, *'Does forest restoration in fragmented landscapes provide habitat for a wide-ranging carnivore?*', Animal Conservation, vol 17, pp 467–475.

Menkhorst, P & Knight, F 2010, *A Field Guide to Mammals of Australia*, third edition, South Melbourne, Australia, Oxford University Press.

Morcombe, M 2004, *Field Guide to Australian Birds,* Steve Parish Publishing, Archerfield, Queensland.

Nevill, SJ 2013, *Birds of Western Australia,* Simon Nevill Publications, Perth, Western Australia.

Orell, P 2004, '*Fauna monitoring and staff training: Western Shield review—February 2003',* Conservation Science Western Australia, vol 5 (2), pp. 51–95.

Peake, PC, Debus, L, McIntyre, S & Bramwell, M 1993, *'The Masked Owl Tyto novaehollandiae in Victoria'*, Australian Bird Watcher, vol 15, pp 124-136.

Phoenix Consulting 2021, *'Myara North Invertebrate Survey Report'*, in prep.

Pizzey, G & Knight, F 2012, *The Field Guide to the Birds of Australia,* Harper Collins Publishers, Sydney, Australia.

Saunders, DA 1974, '*Subspeciation in the White-tailed Black Cockatoo, Calyptorhynchus baudinii, in Western Australia'*, Australian Wildlife Research, vol 1, pp 55-69.

Saunders, DA 1979, *'Distribution and Taxonomy of the White-tailed and Yellow-tailed Black-Cockatoos Calyptorhynchus spp',* Emu, vol 79, pp 215--227.

Saunders, DA 1982, '*The breeding behaviour of the short-billed form of the White-tailed Black Cockatoo Calyptorhynchus funereus'*, Ibis, vol 124, pp 422--455.

Saunders, DA and Ingram, JA 1987, '*Factors affecting survival of breeding populations of Carnaby's Cockatoo, Calyptorhynchus latirostris in remnants of native vegetation'*, IN: Saunders, DA, Arnold, GW, Burbidge, AA and Hopkins, AJM, Nature Conservation: the Role of Remnants of Native Vegetation, Surrey Beatty and Sons, Chipping Norton, pp 249-58.

Scida, M and Gration, R 2017, *'Monitoring the threatened brush-tailed phascogale (Phascogale tapoatafa tapoatafa) at Sugarloaf Reservoir, Victoria'*, Australian Mammalogy, vol 40(2), pp 307-311.

Stokes, V 2011, '*Orion Long Term Fauna Monitoring Program 2010'*, Internal report for Alcoa of Australia.

Stokes, V 2012, *'Vertebrate Fauna Survey of Planned Mining Areas at Alcoa's Keats Mining Region 2011/12'*, Internal report for Alcoa of Australia.

Storr, GM 1991, *Birds of the South-west Division of Western Australia.* Records of the Western Australian Museum, Suppl. 35.

Storr, GM, Smith, LA & Johnstone, RE 1999, *Lizards of Western Australia, Volume 1: Skinks*, revised edition, Perth, Western Australian Museum.

Storr, GM, Smith, LA & Johnstone, RE 2002, *Snakes of Western Australia*, Western Australian Museum, Perth, W.A.

Threatened Species Scientific Committee (TSSC) 2016, *'Commonwealth Listing Advice on Cacatua pastinator pastinator (Muir's corella)'*, Department of the Environment, Canberra.

Tyler, MJ & Doughty, P 2009, *Field Guide to Frogs of Western Australia,* Fourth Edition, Western Australian Museum.

Ugland, KI, Gray JS, & Ellingsen, KE 2003, '*The species–accumulation curve and estimation of species richness'*, Journal of Animal Ecology. vol 72(5), pp 888-97.

Van Dyck, S & Strahan, R 2008, *The Mammals of Australia*, third edition, Sydney, Australia, New Holland Publishers.

Way, S, Stokes, V & Majer, J 2013, *'McCoy Long Term Fauna Monitoring Program Report of the 2013 Field Survey'*, report prepared for Alcoa of Australia by Environmental Research Department.

Webb, A, Kinloch, J, Keighery, G. & Pitt, G 2016, *The extension of vegetation complex mapping to landform boundaries within the Swan Coastal Plain landform and forested region of south west Western Australia*, Department of Parks and Wildlife, Bunbury, Western Australia.

Wetland Research & Management (WRM) 2021, *'Aquatic Fauna Desktop Assessment Myara North and Holyoake Regions'*, Prepared for GHD Pty Ltd.

Williams, K & Mitchell, D 2001, Jarrah Forest (JF1 – Northern Jarrah Forest subregion), A biodiversity audit of Western Australia's 53 biogeographical subregions in 2002.

Wilson, S & Swan, G 2017, *A Complete Guide to Reptiles of Australia*, Fifth edition, Sydney, Australia, New Holland Press.

Appendices

Appendix A

Map figures

Figure 1 Location of Survey Area

Figure 2 Environmental constraints

Figure 3 Fauna survey methods

Figure 4a Threatened fauna

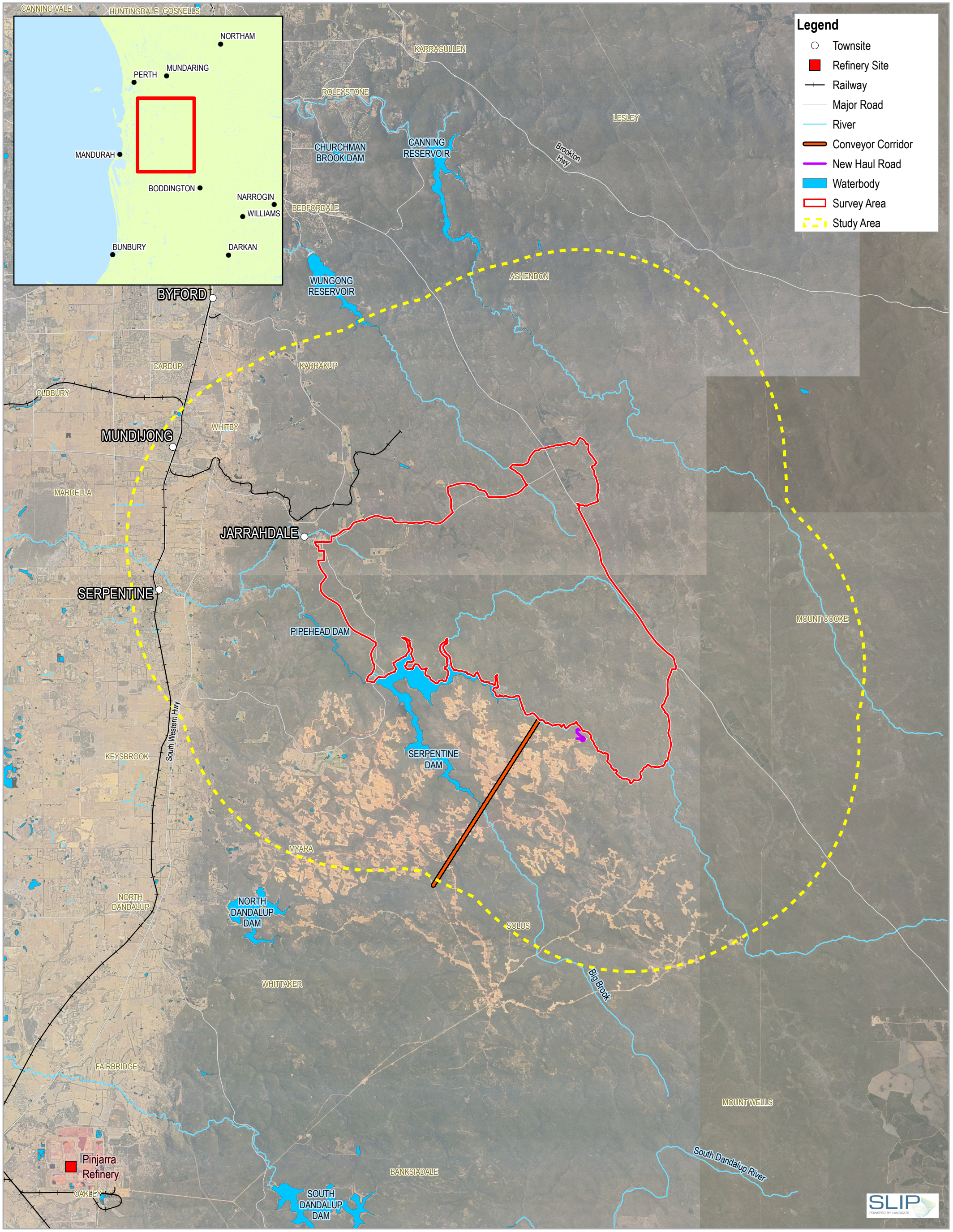
Figure 4b Forest Red tail black cockatoo recordings

Figure 4c Priority and other conservation dependent fauna

Figure 4d Black cockatoo results (*Calyptorhynchus spp.*)

Figure 5a Fauna habitats (Development Envelope)

Figure 5b Fauna habitats (Conveyor and Haul Road Corridor)



Paper Size ISO A3

0 1 2 3 4

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

Alcoa of Australia Limited
Pinjarra Alumina Refinery Revised Proposal

Location of Survey Area

Project No. **12520591**
Revision No. **0**
Date **8/26/2021**

FIGURE 1

\\ghdnet.internal\ghd\AU\Perth\Projects\61\12520591\GIS\Maps\Working\12520591-MyaraNorthReport\12520591_MyaraNorthReport_rev2.aprx\12520591_001_LocationofSurveyArea_Rev0
Print date: 26 Aug 2021 - 17:56

Data source: Alcoa: Refinery Site - 20200221, Myara North Boundary - 20200611; DoW: Rivers, Reservoir - 2200221; Landgate: Locality - 20180319, Railway - 20190304, Roads - 20190128, WANow: Landgate / SLIP. Created by: htaniza

CHURCHMAN BROOK DAM
CANNING RESERVOIR
WUNGONG RESERVOIR
Albany Hwy
Brookton Hwy
BYFORD
MUNDIJONG
SERPENTINE
PIPEHEAD DAM
SERPENTINE DAM
South Western Hwy

Legend

- Townsite

Fauna Conservation Categories

- Critically Endangered Species (CR)
- Endangered Species (EN)
- Vulnerable Species (VU)
- Species of Special Conservation Interest (CD)
- Other Specially Protected Species (OS)
- Priority 3 (P3)
- Priority 4 (P4)
- Railway
- River
- Conveyor Corridor
- New Haul Road
- Waterbody
- Survey Area
- Regional Ecological Linkage
- Environmentally Sensitive Area

DBCA Legislated Lands and Water

- Conservation Park
- National Park
- Nature Reserve
- State Forest
- Section 5(1)(g) Reserve
- Section 5(1)(h) Reserve

Vegetation Complex

- Cooke
- Darling Scarp
- Dwellingup
- Goonaping
- Helena 1
- Murray 1
- Pindalup
- Swamp
- Yalanbee
- Yarragil 1
- Yarragil 2

Vegetation Association

- 3
- 4
- 128
- 946
- 968
- 1000
- 1001

SLIP POWERED BY LANDGATE

Paper Size ISO A3

0 1 2 3 4

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

Alcoa of Australia Limited
Pinjarra Alumina Refinery Revised Proposal

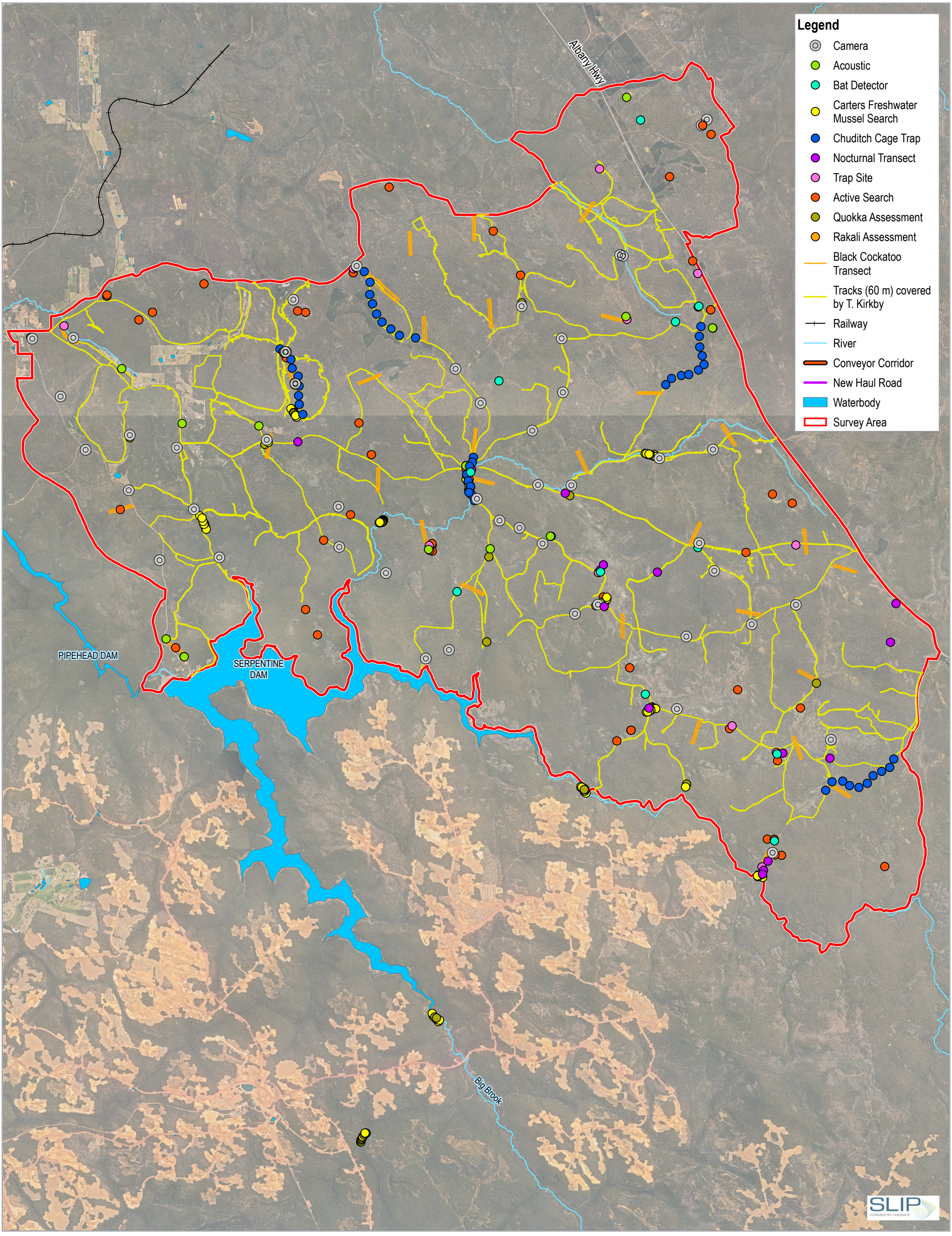
Environmental Constraints

Project No. **12520591**
Revision No. **0**
Date **8/26/2021**

FIGURE 2

\\ghdnet.internal\ghd\AU\Perth\Projects\61\12520591\GIS\Maps\Working\12520591-MyaraNorthReport\12520591_MyaraNorthReport_rev2.aprx\12520591_002_EnvironmentalConstraints_Rev0
Print date: 26 Aug 2021 - 17:58

Data source: Myara North Boundary - 20200611; DBCA: Ecological Linkages, Environmentally Sensitive Areas - 20200710, Legislated Lands and Water - 20180606, Threatened and Priority Fauna - 20200612; DoW: Rivers, Reservoir - 2200221; Landgate: Locality - 20180319, Railway - 20190304, Roads - 20190128, WANow: Landgate / SLIP. Created by: htaniza



Paper Size ISO A3

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

Alcoa of Australia Limited
Pinjarra Alumina Refinery Revised Proposal

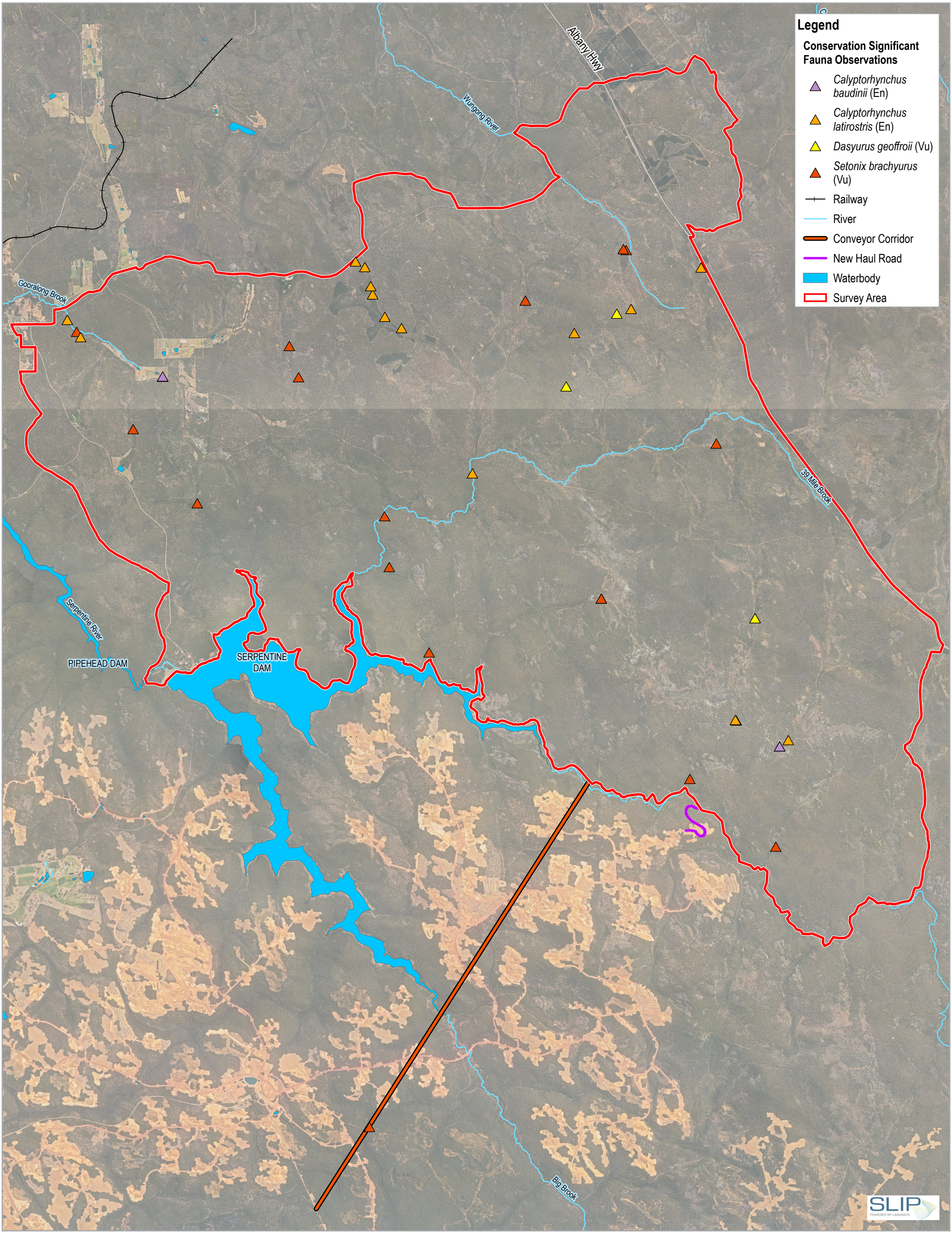
Fauna Survey Methods

Project No. **12520591**
Revision No. **0**
Date **8/26/2021**

FIGURE 3

\\ghdnet.internal\ghd\AU\Perth\Projects\61\12520591\GIS\Maps\Working\12520591-MyaraNorthReport\12520591_MyaraNorthReport_rev2.aprx\12520591_003_FaunaSurveyMethods_Rev0
Print date: 26 Aug 2021 - 17:59

Data source: Alcoa: Refinery Site - 20200221, Myara North Boundary - 20200611; DoW: Rivers, Reservoir - 2200221; Landgate: Locality - 20180319, Railway - 20190304, Roads - 20190128, WANow: Landgate / SLIP. Created by: htaniza



Paper Size ISO A3

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

Alcoa of Australia Limited
Pinjarra Alumina Refinery Revised Proposal

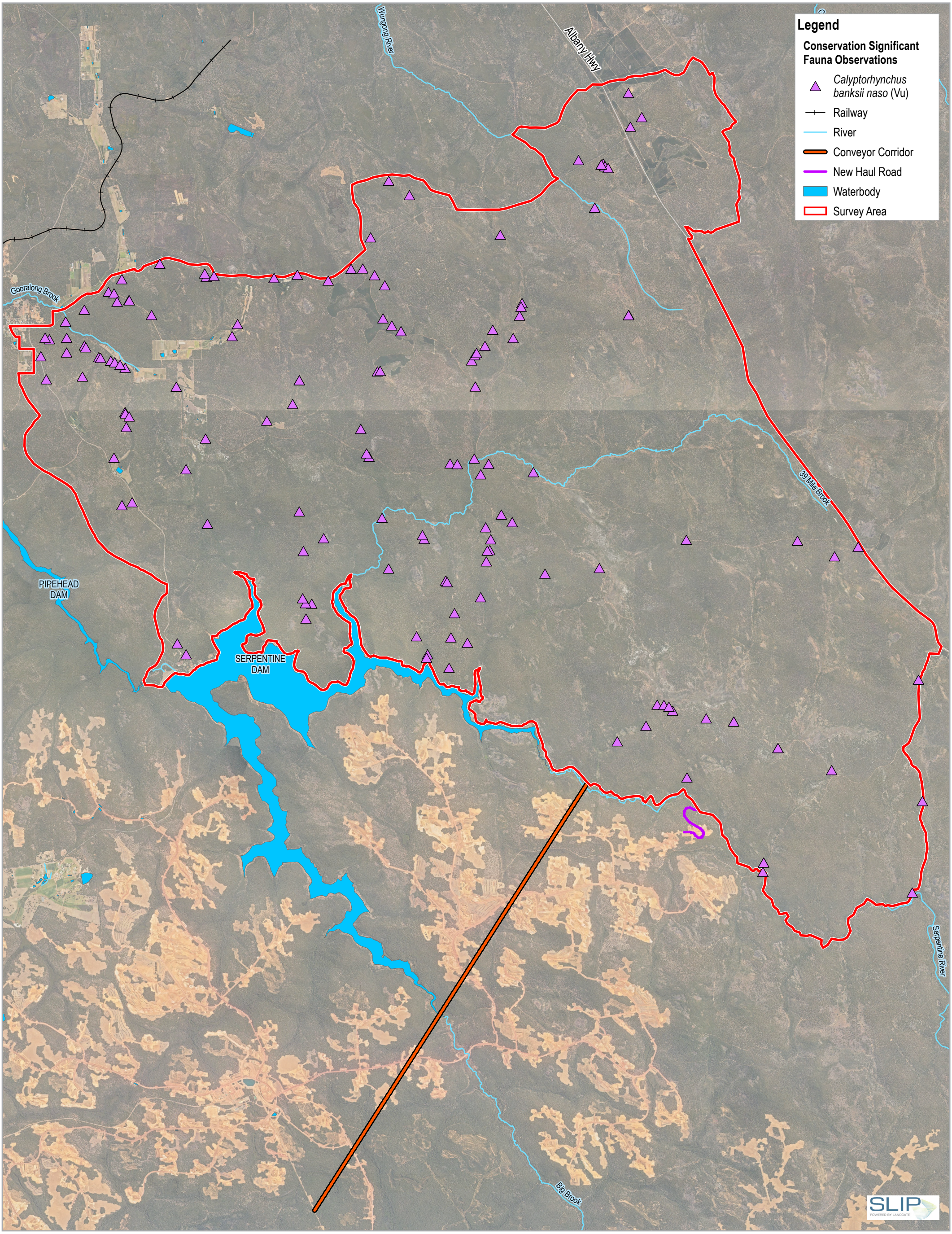
Threatened Fauna species

Project No. **12520591**
Revision No. **0**
Date **8/26/2021**

FIGURE 4A

\\ghdnet.internal\ghd\AU\Perth\Projects\61\12520591\GIS\Maps\Working\12520591-MyaraNorthReport\12520591_MyaraNorthReport_rev2.aprx\12520591_004A_Threatened_Rev0
Print date: 26 Aug 2021 - 18:01

Data source: Alcoa: Refinery Site - 20200221, Myara North Boundary - 20200611; DoW: Rivers, Reservoir - 2200221; Landgate: Locality - 20180319, Railway - 20190304, Roads - 20190128, WANow: Landgate / SLIP. Created by: htaniza



Paper Size ISO A3

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

Alcoa of Australia Limited
Pinjarra Alumina Refinery Revised Proposal

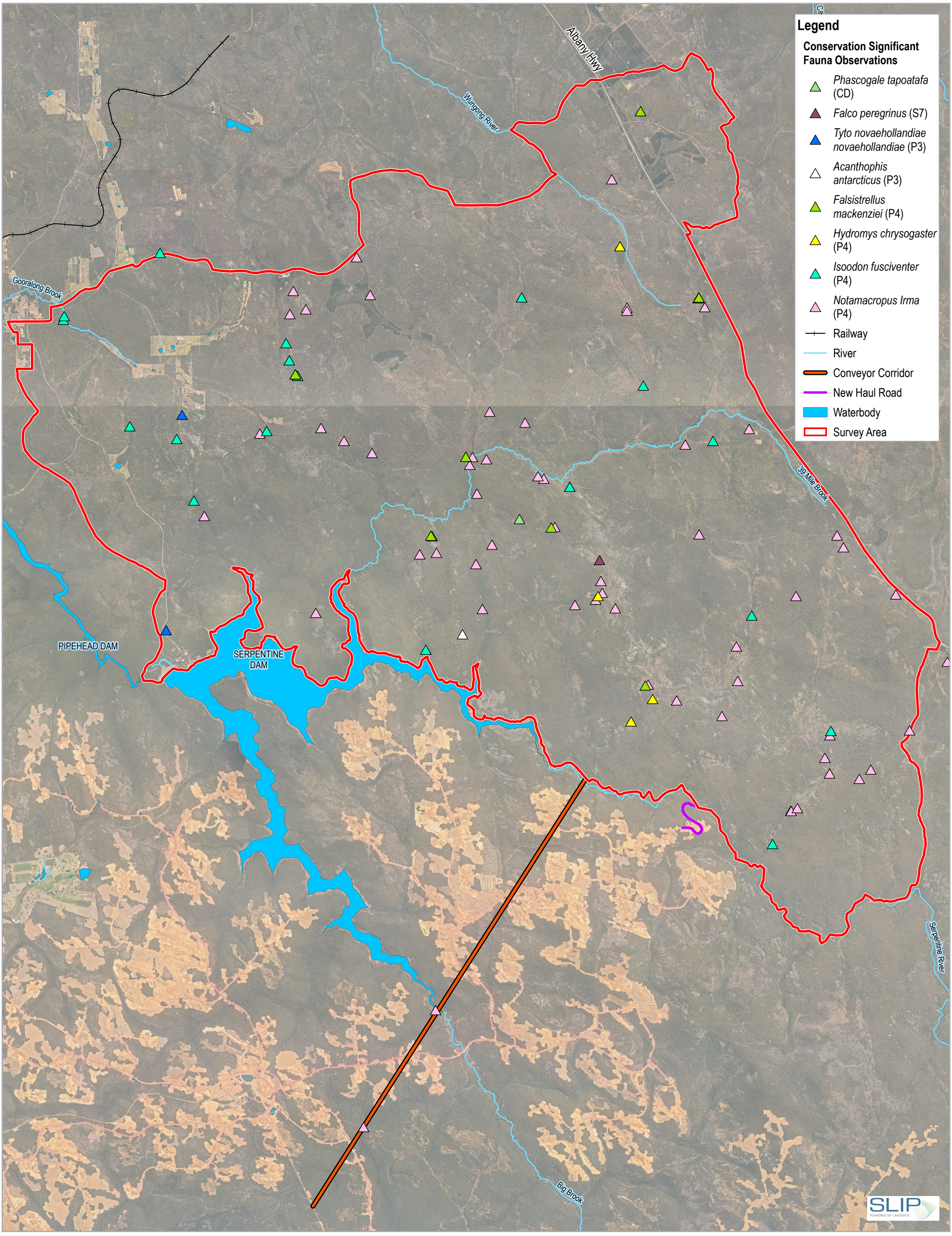
Forest Red-tailed Black Cockatoo recordings

Project No. **12520591**
Revision No. **0**
Date **8/26/2021**

FIGURE 4B

\\ghdnet.internal\ghd\AU\Perth\Projects\61\12520591\GIS\Maps\Working\12520591-MyaraNorthReport\12520591_MyaraNorthReport_rev2.aprx\12520591_004B_FRtBC_Rev0
Print date: 26 Aug 2021 - 18:03

Data source: Alcoa: Refinery Site - 20200221, Myara North Boundary - 20200611; DoW: Rivers, Reservoir - 2200221; Landgate: Locality - 20180319, Railway - 20190304, Roads - 20190128, WANow: Landgate / SLIP. Created by: htaniza



Paper Size ISO A3

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

Alcoa of Australia Limited
Pinjarra Alumina Refinery Revised Proposal

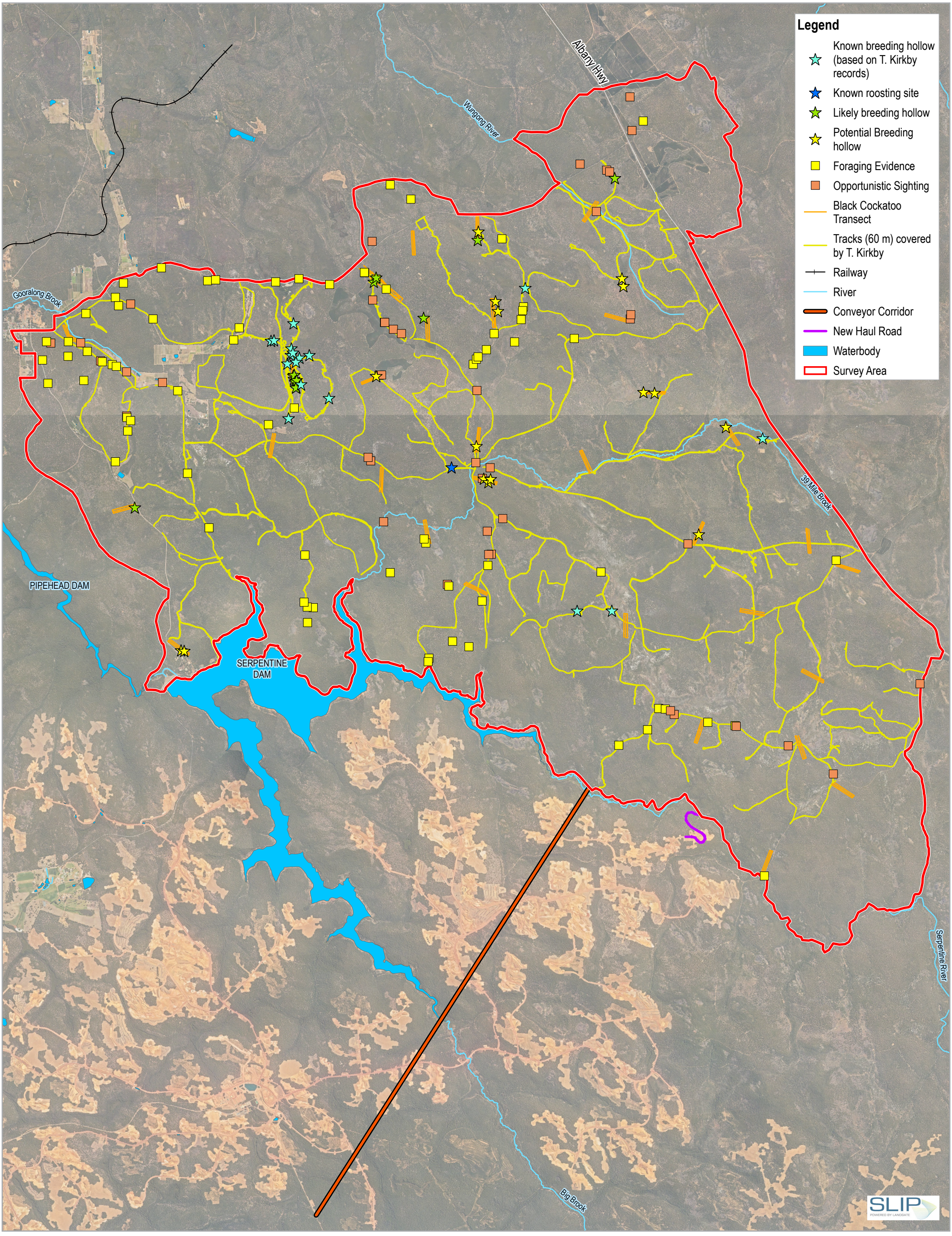
Priority and Other Conservation Dependent Fauna

Project No. **12520591**
Revision No. **0**
Date **8/26/2021**

FIGURE 4C

\\ghdnet.internal\ghd\AU\Perth\Projects\61\12520591\GIS\Maps\Working\12520591-MyaraNorthReport\12520591_MyaraNorthReport_rev2.aprx\12520591_004C_Priority_Rev0
Print date: 26 Aug 2021 - 18:05

Data source: Alcoa: Refinery Site - 20200221, Myara North Boundary - 20200611; DoW: Rivers, Reservoir - 2200221; Landgate: Locality - 20180319, Railway - 20190304, Roads - 20190128, WANow: Landgate / SLIP. Created by: htaniza



Paper Size ISO A3

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

Alcoa of Australia Limited
Pinjarra Alumina Refinery Revised Proposal

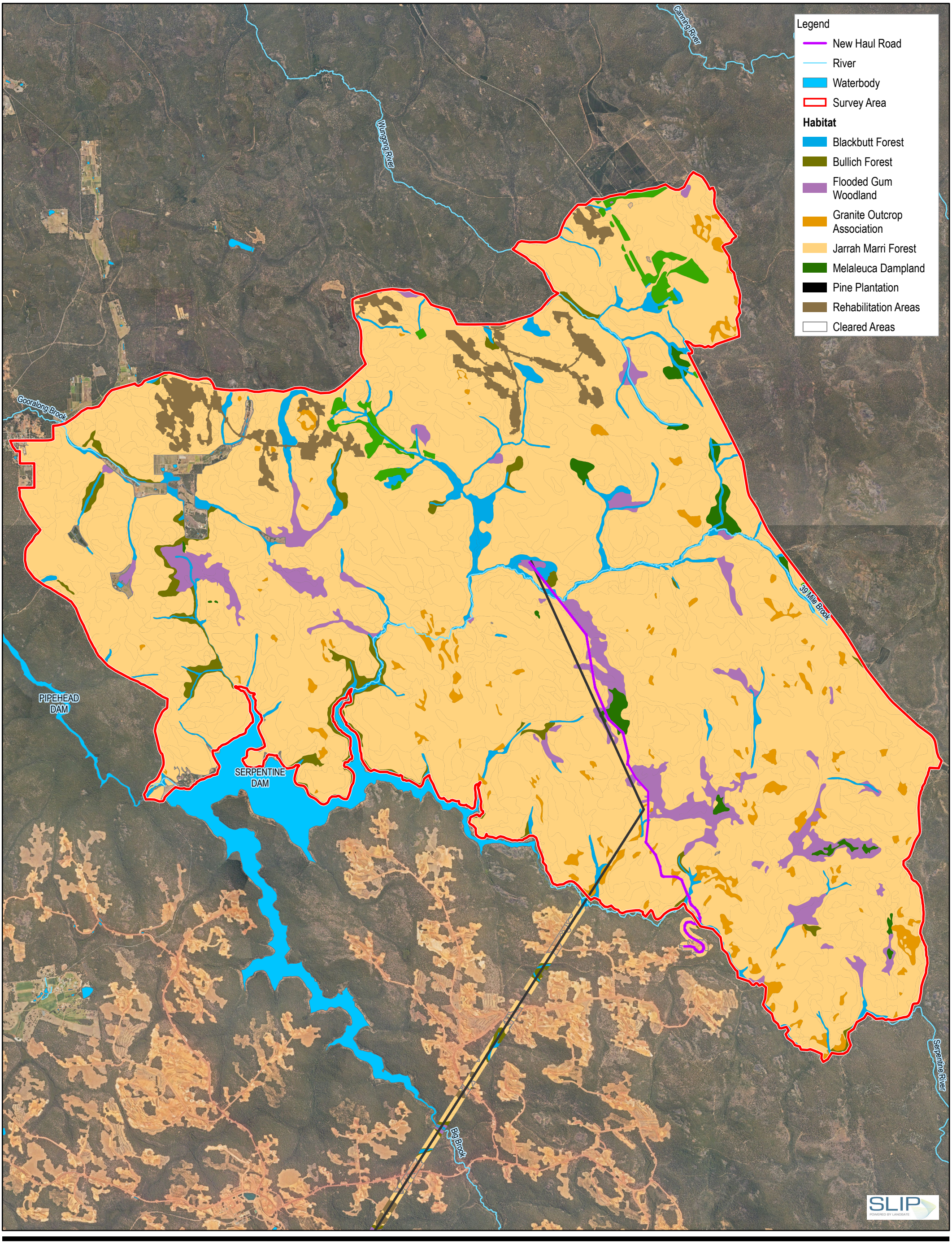
Black Cockatoo Results (Calyptorhynchus species)

Project No. **12520591**
Revision No. **0**
Date **8/26/2021**

FIGURE 4D

\\ghdnet.internal\ghd\AU\Perth\Projects\61\12520591\GIS\Maps\Working\12520591-MyaraNorthReport\12520591_MyaraNorthReport_rev2.aprx\12520591_004D_BlackCockatoo_Rev0
Print date: 26 Aug 2021 - 18:06

Data source: Alcoa: Refinery Site - 20200221, Myara North Boundary - 20200611; DoW: Rivers, Reservoir - 2200221; Landgate: Locality - 20180319, Railway - 20190304, Roads - 20190128, WANow: Landgate / SLIP. Created by: htaniza



Paper Size ISO A3

0 1 2 3 4

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

Alcoa of Australia Limited
Pinjarra Alumina Refinery Revised Proposal

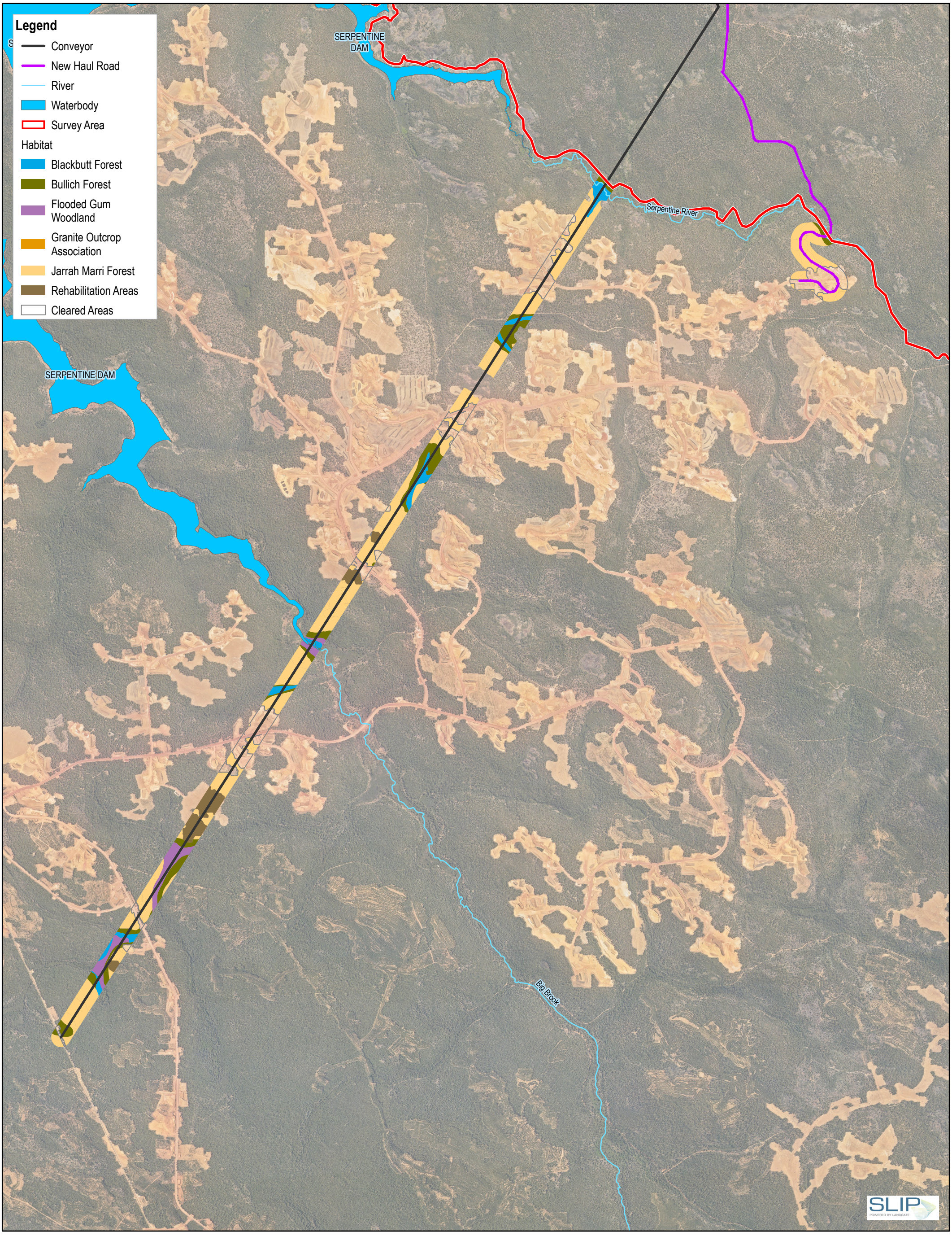
Fauna Habitats (Development Envelope)

Project No. **12520591**
Revision No. **0**
Date **8/26/2021**

FIGURE 5A

\\ghdnet.internal\ghd\AU\Perth\Projects\61\12520591\GIS\Maps\Working\12520591-MyaraNorthReport\12520591_MyaraNorthReport_rev2.aprx\12520591_005A_Habitat_Rev0
Print date: 26 Aug 2021 - 18:07

Data source: Alcoa: Refinery Site - 20200221, Myara North Boundary - 20200611; DoW: Rivers, Reservoir - 2200221; Landgate: Locality - 20180319, Railway - 20190304, Roads - 20190128, WANow: Landgate / SLIP. Created by: htaniza



Paper Size ISO A3

0 1 2 3 4

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

Alcoa of Australia Limited
Pinjarra Alumina Refinery Revised Proposal

Fauna Habitats
(Conveyor and Haul Road Corridor)

Project No. **12520591**
Revision No. **0**
Date **8/26/2021**

FIGURE 5B

\\ghdnet.internal\ghd\AU\Perth\Projects\61\12520591\GIS\Maps\Working\12520591-MyaraNorthReport\12520591_MyaraNorthReport_rev2.aprx\12520591_005B_Habitat_Rev0
Print date: 26 Aug 2021 - 18:09

Data source: Alcoa: Refinery Site - 20200221, Myara North Boundary - 20200611; DoW: Rivers, Reservoir - 2200221; Landgate: Locality - 20180319, Railway - 20190304, Roads - 20190128, WANow: Landgate / SLIP. Created by: htaniza

Appendix B

Relevant legislation, background information and conservation codes

Relevant legislation

Federal *Environment Protection and Biodiversity Conservation Act 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Federal Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places, which are defined in the EPBC Act as Matters of National Environmental Significance (MNES).

The biological aspects listed as MNES include:

– Nationally threatened flora and fauna species and ecological communities
– Migratory species

A person must not undertake an action that has, will have, or is likely to have a significant impact (direct or indirect) on MNES, without approval from the Federal Minister for the Environment.

The EPBC Act is administered by the Department of the Environment and Energy (DEE).

State *Environment Protection Act 1986*

The *Environmental Protection Act 1986* (EP Act) is the primary legislative Act dealing with the protection of the environment in Western Australia. The Act allows the Environmental Protection Authority (EPA), to prevent, control and abate pollution and environmental harm, for the conservation, preservation, protection, enhancement and management of the environment and for matters incidental to or connected with the foregoing. Part IV of the EP Act is administered by the EPA and makes provisions for the EPA to undertake environmental impact assessment of significant proposals, strategic proposals and land use planning schemes.

The Department of Water and Environment Regulation (DWER) is responsible for administering the clearing provisions of the EP Act (Part V). Clearing of native vegetation in Western Australia requires a permit from the DWER, unless exemptions apply. Applications for clearing permits are assessed by the Department and decisions are made to grant or refuse the application in accordance with the Act. When making a decision the assessment considers clearing against the ten clearing principles as specified in Schedule 5 of the EP Act:

a. Native vegetation should not be cleared if it comprises a high level of biodiversity.
b. Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a significance habitat for fauna indigenous to Western Australia.
c. Native vegetation should not be cleared if it includes, or is necessary, for the continued existence of rare flora.
d. Native vegetation should not be cleared if it comprises the whole or part of native vegetation in an area that has been extensively cleared.
e. Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.
f. Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.
g. Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.
h. Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.
i. Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

j. Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.

Exemptions for clearing include clearing that is a requirement of a written law or authorised under certain statutory processes (listed in Schedule 6 of the EP Act) and exemptions for prescribed low impact day-to-day activities (prescribed in the Environmental Protection (Clearing of Native Vegetation) Regulations 2004); these exemptions do not apply in environmentally sensitive areas (ESAs).

State *Biodiversity and Conservation Act 2016*

The *Biodiversity Conservation Act 2016* (BC Act) provides for the conservation and protection of biodiversity and biodiversity components, as well as the promotion of the ecologically sustainable use of biodiversity components in Western Australia. The BC Act replaces both the repealed *Wildlife Conservation Act 1950* (WC Act) and the *Sandalwood Act 1929* (Sandalwood Act), as well as their associated regulations. To attain the objectives of the BC Act, principles of ecological sustainable development have been established:

– Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations
– If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation
– The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations
– The conservation of biodiversity and ecological integrity should be a fundamental consideration indecision-making
– Improved valuation, pricing and incentive mechanisms should be promoted.

The BC Act is administered by the Department of Biodiversity Conservation and Attractions (DBCA).

State *Biosecurity and Agriculture Management Act 2007*

The *Biosecurity and Agriculture Management Act 2007* (BAM Act) and associated regulations are administered by the Department of Primary Industries and Regional Development (DPIRD) and replace the repealed *Agriculture and Related Resources Protection Act 1976*. The main purposes of the BAM Act and its regulations are to:

Prevent new animal and plant pests (vermin and weeds) and diseases from entering WA Manage the impact and spread of those pests already present in the state

Safely manage the use of agricultural and veterinary chemicals

Increased control over the sale of agricultural products that contain violative chemical residues.

The Western Australian Organism List (WAOL) provides the status of organisms which have been categorised under the BAM Act. A Declared Pest is a prohibited organism or an organism for which a declaration under Section 22(2) of the Act is in force. Declared Pests may be assigned a control category including: C1 (exclusion), C2 (eradication) and C3 (management). The category may apply to the whole of the State, LGAs, districts, individual properties or even paddocks, and all landholders are obliged to comply with the specific category of control. Categories of control are defined below.

DPIRD Categories for Declared Pests under the BAM Act

Control class code	Description
C1 (Exclusion)	Pests will be assigned to this category if they are not established in Western Australia and control measures are to be taken, including border checks, in order to prevent them entering and establishing in the State.
C2 (Eradication)	Pests will be assigned to this category if they are present in Western Australia in low enough numbers or in sufficiently limited areas that their eradication is still a possibility.
C3 (Management)	Pests will be assigned to this category if they are established in Western Australia but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size or density or moving from an area in which it is established into an area which is currently is free of that pest.

Fauna Conservation codes

Conservation significant fauna

The Federal conservation level of fauna species and their significance status is assessed under the EPBC Act. The significance levels for fauna used in the EPBC Act align with the International Union for Conservation of Nature (IUCN) Red List criteria, which are internationally recognised as providing best practice for assigning the conservation status of species. The EPBC Act also protects land and migratory species that are listed under International Agreements. The list of migratory species established under section 209 of the EPBC Act comprises:

– Migratory species which are native to Australia and are included in the appendices to the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals Appendices I and II)
– Migratory species included in annexes established under the Japan-Australia Migratory Bird Agreement (JAMBA) and the China–Australia Migratory Bird Agreement (CAMBA)
– Native, migratory species identified in a list established under, or an instrument made under, an international agreement approved by the Minister, such as the republic of Korea–Australia Migratory Bird Agreement (ROKAMBA)

The State conservation level of fauna species and their significance status also follows the IUCN Red List criteria. Under the BC Act fauna can be listed as Threatened, Extinct and as Specially Protected species.

Threatened species are those are species which have been adequately searched for and are deemed to be, in the wild, either rare, under identifiable threat of extinction, or otherwise in need of special protection, and have been gazetted as such. The assessment of the conservation status of Threatened species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria. Specially protected species meet one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection. Species that are listed as Threatened or Extinct species under the BC Act cannot also be listed as Specially Protected species.

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

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

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

For the purposes of this assessment, all species listed under the EPBC Act, BC Act and DBCA Priority species are considered conservation significant.

Conservation categories and definitions for EPBC Act and BC Act listed fauna species

Conservation category	Definition
Threatened 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". Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with criteria set out in section 20 and the ministerial guidelines.
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". Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines.
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". Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines.
Extinct species	
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).
Extinct in the Wild (EW)	Species that "is known only to survive in cultivation, in captivity or as a naturalized population well outside its past range, and it has not been recorded in its known habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its lifecycle and form", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).
Specially protected species	
Migratory (MI)	Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act). Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subsetof the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.
Species of special conservation interest (conservation dependent fauna) (CD)	Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened.
Other specially protected fauna (OS)	Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Conservation codes for DBCA listed Priority fauna

Priority category	Definition
Priority 1	Poorly-known taxa Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
Priority 2	Poorly-known taxa 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 andappear to be under threat from known threatening processes. Such species are in urgent need of further survey.
Priority 3	Poorly-known taxa Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
Priority 4	Rare, Near Threatened and other taxa in need of monitoring Rare: Taxa 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 beif present circumstances change. These taxa are usually represented on conservation lands. Near Threatened. Taxa that are considered to have been adequately surveyed and that do not qualifyfor Conservation Dependent, but that are close to qualifying for Vulnerable. Taxa that have been removed from the list of threatened taxa during the past five years for reasonsother than taxonomy.

Other significant fauna

Fauna species may be significant for a range of reasons other than those protected by international agreement or treaty, Specially Protected or Priority Fauna. Significant fauna may include short-range endemic species, species that have declining populations or declining distributions, species at the extremes of their range, or isolated outlying populations, or species which may be undescribed (EPA 2010).

References

ANZECC 2000, *Core Environmental Indicators for Reporting on the State of Environment*, ANZECC State of the Environment Reporting Task Force.

Commonwealth of Australia 2001, *National Targets and Objectives for Biodiversity Conservation 2001–2005*, Canberra, AGPS.

EPA 2010, *Technical Guide – Terrestrial Fauna Surveys*, EPA, Perth, WA

Appendix C

Desktop searches

NatureMap Species Report

EPBC Act Protected Matter Search Tool Report

NatureMap
Mapping Western Australia's biodiversity

NatureMap Species Report

Created By Guest user on 18/06/2020

Kingdom	Animalia
Current Names Only	Yes
Core Datasets Only	Yes
Method	'By Circle'
Centre	116° 11' 35" E,32° 22' 24" S
Buffer	20km
Group By	Species Group

Species Group	Species	Records
Amphibian	12	235
Bird	115	5344
Fish	9	15
Invertebrate	360	1981
Mammal	30	509
Reptile	35	412
TOTAL	**561**	**8496**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Amphibian					
1.	25398	*Crinia georgiana (Quacking Frog)*			
2.	25399	*Crinia glauerti (Clicking Frog)*			
3.	25400	*Crinia insignifera (Squelching Froglet)*			
4.	25401	*Crinia pseudinsignifera (Bleating Froglet)*			
5.	25404	*Geocrinia leai (Ticking Frog)*			
6.	25409	*Heleioporus barycragus (Hooting Frog)*			
7.	25410	*Heleioporus eyrei (Moaning Frog)*			
8.	25411	*Heleioporus inornatus (Whooping Frog)*			
9.	25415	*Limnodynastes dorsalis (Western Banjo Frog)*			
10.	25378	*Litoria adelaidensis (Slender Tree Frog)*			
11.	25426	*Neobatrachus pelobatoides (Humming Frog)*			
12.	25433	*Pseudophryne guentheri (Crawling Toadlet)*			
Bird					
13.	24260	*Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)*			
14.	24261	*Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*			
15.	24262	*Acanthiza inornata (Western Thornbill)*			
16.	24560	*Acanthorhynchus superciliosus (Western Spinebill)*			
17.	25535	*Accipiter cirrocephalus (Collared Sparrowhawk)*			
18.	25536	*Accipiter fasciatus (Brown Goshawk)*			
19.	25755	*Acrocephalus australis (Australian Reed Warbler)*			
20.	25544	*Aegotheles cristatus (Australian Owlet-nightjar)*			
21.	24312	*Anas gracilis (Grey Teal)*			
22.	24316	*Anas superciliosa (Pacific Black Duck)*			
23.	47414	*Anhinga novaehollandiae (Australasian Darter)*			
24.	24561	*Anthochaera carunculata (Red Wattlebird)*			
25.	24562	*Anthochaera lunulata (Western Little Wattlebird)*			
26.	25670	*Anthus australis (Australian Pipit)*			
27.	24285	*Aquila audax (Wedge-tailed Eagle)*			
28.	24340	*Ardea novaehollandiae (White-faced Heron)*			
29.	24341	*Ardea pacifica (White-necked Heron)*			
30.	25566	*Artamus cinereus (Black-faced Woodswallow)*			
31.	24353	*Artamus cyanopterus (Dusky Woodswallow)*			
32.		*Barnardius zonarius*			
33.	24319	*Biziura lobata (Musk Duck)*			
34.	25714	*Cacatua pastinator (Western Long-billed Corella)*			
35.	24724	*Cacatua pastinator subsp. pastinator (Muir's Corella, Muir's Corella (Western Corella SW WA))*		S	
36.	25715	*Cacatua roseicapilla (Galah)*			
37.	25716	*Cacatua sanguinea (Little Corella)*			
38.	25598	*Cacomantis flabelliformis (Fan-tailed Cuckoo)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
39.	42307	*Cacomantis pallidus (Pallid Cuckoo)*			
40.	25717	*Calyptorhynchus banksii (Red-tailed Black-Cockatoo)*			
41.	24731	*Calyptorhynchus banksii subsp. naso (Forest Red-tailed Black Cockatoo)*		T	
42.	24733	*Calyptorhynchus baudinii (Baudin's Cockatoo, White-tailed Long-billed Black Cockatoo)*		T	
43.	24734	*Calyptorhynchus latirostris (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)*		T	
44.	48400	*Calyptorhynchus sp. (white-tailed black cockatoo)*		T	
45.	24321	*Chenonetta jubata (Australian Wood Duck, Wood Duck)*			
46.	25601	*Chrysococcyx lucidus (Shining Bronze Cuckoo)*			
47.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
48.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
49.	25592	*Corvus coronoides (Australian Raven)*			
50.	25595	*Cracticus tibicen (Australian Magpie)*			
51.	25596	*Cracticus torquatus (Grey Butcherbird)*			
52.	30901	*Dacelo novaeguineae (Laughing Kookaburra)*	Y		
53.	25673	*Daphoenositta chrysoptera (Varied Sittella)*			
54.	25607	*Dicaeum hirundinaceum (Mistletoebird)*			
55.	24470	*Dromaius novaehollandiae (Emu)*			
56.		*Egretta novaehollandiae*			
57.		*Elanus axillaris*			
58.		*Eolophus roseicapillus*			
59.	25692	*Eopsaltria australis (Yellow Robin)*			
60.	24651	*Eopsaltria australis subsp. griseogularis (Western Yellow Robin)*			
61.	24652	*Eopsaltria georgiana (White-breasted Robin)*			
62.	25621	*Falco berigora (Brown Falcon)*			
63.	25622	*Falco cenchroides (Australian Kestrel, Nankeen Kestrel)*			
64.	25623	*Falco longipennis (Australian Hobby)*			
65.	25624	*Falco peregrinus (Peregrine Falcon)*		S	
66.	24616	*Falcunculus frontatus subsp. leucogaster (Western Shrike-tit, Crested Shrike-tit)*			
67.	25727	*Fulica atra (Eurasian Coot)*			
68.	42314	*Gavicalis virescens (Singing Honeyeater)*			
69.	25530	*Gerygone fusca (Western Gerygone)*			
70.	24443	*Grallina cyanoleuca (Magpie-lark)*			
71.	47965	*Hieraaetus morphnoides (Little Eagle)*			
72.	24491	*Hirundo neoxena (Welcome Swallow)*			
73.	24557	*Leipoa ocellata (Malleefowl)*		T	
74.	25661	*Lichmera indistincta (Brown Honeyeater)*			
75.		*Lophoictinia isura*			
76.	25650	*Malurus elegans (Red-winged Fairy-wren)*			
77.	24551	*Malurus pulcherrimus (Blue-breasted Fairy-wren)*			
78.	25654	*Malurus splendens (Splendid Fairy-wren)*			
79.	25758	*Megalurus gramineus (Little Grassbird)*			
80.	47997	*Melanodryas cucullata (Hooded Robin)*			
81.	25663	*Melithreptus brevirostris (Brown-headed Honeyeater)*			
82.	24587	*Melithreptus chloropsis (Western White-naped Honeyeater)*			
83.	24598	*Merops ornatus (Rainbow Bee-eater)*			
84.		*Microcarbo melanoleucos*			
85.	25693	*Microeca fascinans (Jacky Winter)*			
86.	24738	*Neophema elegans (Elegant Parrot)*			
87.	25564	*Nycticorax caledonicus (Rufous Night Heron)*			
88.	24407	*Ocyphaps lophotes (Crested Pigeon)*			
89.	25680	*Pachycephala rufiventris (Rufous Whistler)*			
90.	25681	*Pardalotus punctatus (Spotted Pardalote)*			
91.	24625	*Pardalotus punctatus subsp. punctatus (Spotted Pardalote)*			
92.	25682	*Pardalotus striatus (Striated Pardalote)*			
93.	24630	*Pardalotus striatus subsp. westraliensis (Striated Pardalote)*			
94.	48061	*Petrochelidon nigricans (Tree Martin)*			
95.	48066	*Petroica boodang (Scarlet Robin)*			
96.	24659	*Petroica goodenovii (Red-capped Robin)*			
97.	24409	*Phaps chalcoptera (Common Bronzewing)*			
98.	25587	*Phaps elegans (Brush Bronzewing)*			
99.	48071	*Phylidonyris niger (White-cheeked Honeyeater)*			
100.	24596	*Phylidonyris novaehollandiae (New Holland Honeyeater)*			
101.	25720	*Platycercus icterotis (Western Rosella)*			
102.	24745	*Platycercus icterotis subsp. icterotis (Western Rosella)*			
103.	24747	*Platycercus spurius (Red-capped Parrot)*			
104.	25721	*Platycercus zonarius (Australian Ringneck, Ring-necked Parrot)*			
105.	25703	*Podargus strigoides (Tawny Frogmouth)*			
106.	25722	*Polytelis anthopeplus (Regent Parrot)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
107.	25731	*Porphyrio porphyrio (Purple Swamphen)*			
108.	24771	*Porzana tabuensis (Spotless Crake)*			
109.	24702	*Pterodroma brevirostris (Kerguelen Petrel)*			
110.		*Purpureicephalus spurius*			
111.	48096	*Rhipidura albiscapa (Grey Fantail)*			
112.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
113.	25534	*Sericornis frontalis (White-browed Scrubwren)*			
114.	30948	*Smicrornis brevirostris (Weebill)*			
115.	24645	*Stagonopleura oculata (Red-eared Firetail)*			
116.	25597	*Strepera versicolor (Grey Currawong)*			
117.	25589	*Streptopelia chinensis (Spotted Turtle-Dove)*	Y		
118.	25590	*Streptopelia senegalensis (Laughing Turtle-Dove)*	Y		
119.	25705	*Tachybaptus novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
120.	24331	*Tadorna tadornoides (Australian Shelduck, Mountain Duck)*			
121.	24845	*Threskiornis spinicollis (Straw-necked Ibis)*			
122.	25549	*Todiramphus sanctus (Sacred Kingfisher)*			
123.	25723	*Trichoglossus haematodus (Rainbow Lorikeet)*			
124.	48147	*Turnix varius (Painted Button-quail)*			
125.	25764	*Tyto novaehollandiae (Masked Owl)*			
126.	24855	*Tyto novaehollandiae subsp. novaehollandiae (Masked Owl (southwest))*		P3	
127.	25765	*Zosterops lateralis (Grey-breasted White-eye, Silvereye)*			

Fish

128.		*? ?*			
129.		*Acentrogobius bifrenatus*			
130.		*Aldrichetta forsteri*			
131.		*Bostockia porosa*			
132.	34028	*Galaxias occidentalis (Western Minnow)*			
133.	34030	*Geotria australis (Pouched Lamprey)*		P3	
134.		*Nannoperca vittata*			
135.		*Neosilurus hyrtlii*			
136.		*Tandanus bostocki*			

Invertebrate

137.		*Acariformes sp.*			
138.		*Acritoptila margaretae*			
139.		*Acritoptila sp.*			
140.		*Adoxotoma chionopogon*			
141.		*Adoxotoma embolica*			Y
142.		*Adoxotoma nitida*			Y
143.		*Adversaeschna brevistyla*			
144.		*Aeshnidae sp.*			
145.		*Agraptocorixa sp.*			
146.		*Ainudrilus nharna*			
147.		*Allodessus bistrigatus*			
148.		*Allothereua maculata*			
149.		*Alotanypus dalyupensis*			
150.		*Ambicodamus marae*			
151.		*Amblyomma triguttatum*			
152.		*Aname mainae*			
153.		*Aname tepperi*			
154.		*Anax papuensis*			
155.		*Anisops hackeri*			
156.		*Anisops hyperion*			
157.		*Antiporus gilberti*			
158.		*Antiporus sp.*			
159.		*Arachnura higginsi*			
160.		*Araneus amblycyphus*			Y
161.		*Araneus cyphoxis*			
162.		*Araneus eburneiventris*			
163.		*Araneus eburnus*			
164.		*Araneus senicaudatus*			
165.		*Araneus stolidus*			
166.		*Archaeosynthemis occidentalis*			
167.		*Archaeosynthemis spiniger*			
168.		*Archiargiolestes pusillus*			
169.		*Archichauliodes sp.*			
170.		*Argiope trifasciata*			
171.		*Arkys alticephala*			
172.		*Arkys walckenaeri*			
173.		*Arrenuridae sp.*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
174.		*Artoria flavimana*			
175.		*Artoria flavimanus*			
176.		*Artoria schizocoides*			
177.		*Artoria taeniifera*			
178.		*Asadipus kunderang*			
179.		*Athericidae sp.*			
180.		*Aturidae sp.*			
181.		*Austracantha minax*			
182.		*Australomimetus aurioculatus*			
183.		*Australomimetus dunlopi*			
184.		*Australomimetus ovidi*			
185.		*Australopelopia prionoptera*			
186.		*Australotiphys barmutai*			
187.		*Austroagrion coeruleum*			
188.		*Austrochthonius muchmorei*			
189.		*Austrogomphus collaris*			
190.		*Austrolestes analis*			
191.		*Austrosynthemis cyanitincta*			
192.		*Backobourkia brounii*			
193.		*Backobourkia heroine*			
194.		*Baiami volucripes*			
195.		*Ballarra longipalpus*			
196.		*Berosus approximans*			
197.		*Berosus discolor*			
198.		*Bibulmena kadjina*			
199.		*Botryocladius bibulmun*			
200.		*Botryocladius freemani*			
201.		*Botryocladius petrophilus*			
202.		*Calanoida sp.*			
203.		*Carabidae sp.*			
204.		*Ceinidae sp.*			
205.		*Ceratopogonidae sp.*			
206.		*Cercophonius granulosus*			
207.		*Cercophonius sulcatus*			
208.		*Cethegus fugax*			
209.	33939	*Cherax cainii (Marron)*			
210.		*Cherax quinquecarinatus*			
211.		*Cheumatopsyche sp. AV2 (SAP)*			
212.		*Chironominae sp.*			
213.		*Chironomus aff. alternans (V24) (CB)*			
214.		*Chironomus tepperi*			
215.		*Chrysomelidae sp.*			
216.		*Cladocera (unident.)*			
217.		*Cladopelma curtivalva*			
218.		*Cladotanytarsus sp. A (SAP)*			
219.		*Cliotrombium antares*			Y
220.		*Cloeon sp.*			
221.		*Cloeon sp. 2 (SFM)*			
222.		*Clynotis albobarbatus*			
223.		*Clynotis severus*			
224.		*Coenagrionidae sp.*			
225.		*Condocerus aptus*			
226.		*Copepoda sp.*			
227.		*Corduliidae sp.*			
228.		*Corixidae sp.*			
229.		*Cormocephalus aurantiipes*			
230.		*Cormocephalus hartmeyeri*			
231.		*Cormocephalus michaelseni*			
232.		*Cormocephalus rubriceps*			
233.		*Cormocephalus turneri*			
234.		*Cricotopus 'brevicornis'*			
235.		*Cricotopus 'parbicinctus'*			
236.		*Crustulina bicruciata*			
237.		*Cryptochironomus aff griseidorsum*			
238.		*Cryptochironomus griseidorsum*			
239.		*Cryptoerithus melindae*			
240.		*Culicidae sp.*			
241.		*Curculionidae sp.*			
242.		*Cyclosa bacilliformis*			Y
243.		*Cyrtophora parnasia*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
244.		*Demadiana cerula*			
245.		*Diaprograpta striola*			
246.		*Dicrotendipes conjunctus*			
247.		*Dicrotendipes jobetus*			
248.		*Dicrotendipes pseudoconjunctus*			
249.		*Dicrotendipes sp.*			
250.		*Dicrotendipes sp. A (V47) (SAP)*			
251.		*Dinocambala ingens*			
252.		*Diplacodes bipunctata*			
253.		*Dolichopodidae sp.*			
254.		*Dytiscidae sp.*			
255.		*Ecnomina F group*			
256.		*Empididae sp.*			
257.		*Enchytraeidae sp.*			
258.		*Ephydridae sp.*			
259.		*Erigone prominens*			
260.		*Eriophora biapicata*			
261.		*Ero aphana*			
262.		*Eucyrtops latior*			
263.	48579	*Euoplos inornatus (inornate trapdoor spider (northern Jarrah Forest))*		P3	
264.		*Exocelina ater*			
265.		*Geogarypus taylori*			
266.	34114	*Glacidorbis occidentalis (Jarrah forest freshwater snail, freshwater snail)*		P3	
267.		*Gomphidae sp.*			
268.		*Gripopterygidae sp.*			
269.		*Gymnometriocnemus sp. 1 (=V44 = ortho sp. C & R)*			
270.		*Gyrinidae sp.*			
271.		*Halacaridae sp.*			
272.		*Haliplidae sp.*			
273.		*Haliplus fuscatus*			
274.		*Haliplus gibbus*			
275.		*Haliplus sp.*			
276.		*Harrisius sp. A (SAP)*			
277.		*Harrisius sp. B (SFM)*			
278.		*Hellyethira litua*			
279.		*Hellyethira sp.*			
280.		*Helochares tenuistriatus*			
281.		*Hemicordulia australiae*			
282.		*Hemicordulia tau*			
283.		*Henicops dentatus*			
284.		*Hirudinea sp.*			
285.		*Histiosoma feroniarum*			Y
286.		*Hogna crispipes*			
287.		*Holoplatys dejongi*			
288.		*Hyderodes sp.*			
289.		*Hydrobiosella michaelseni*			
290.		*Hydrobiosidae sp.*			
291.		*Hydrodromidae sp.*			
292.		*Hydrophilidae sp.*			
293.		*Hydroptila losida*			
294.		*Hydroptilidae sp.*			
295.		*Hydryphantidae sp.*			
296.		*Hygrobatidae sp.*			
297.		*Hyphydrus elegans*			
298.		*Hypomegalopsalis tanisphyros*			
299.		*Idiommata blackwalli*			
300.		*Isometroides vescus*			
301.		*Isopeda leishmanni*			
302.		*Karaops ellenae*			
303.		*Kiefferulus intertinctus*			
304.		*Kiefferulus martini*			
305.		*Lampona brevipes*			
306.		*Lampona yanchep*			
307.		*Lamponella ainslie*			
308.		*Lamponusa gleneagle*			
309.		*Lancetes lanceolatus*			
310.		*Laperousea blattifera*			
311.		*Larsia albiceps*			
312.		*Latrodectus hasseltii*			
313.		*Lectrides parilis*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
314.		*Lepidoptera (non-pyralid)*			
315.		*Leptoceridae sp.*			
316.		*Leptoperla australica*			
317.		*Leptophlebiidae sp.*			
318.		*Lestidae sp.*			
319.		*Limbodessus inornatus*			
320.		*Limbodessus shuckhardi*			
321.		*Limnesiidae sp.*			
322.		*Limnophyes vestitus (V41)*			
323.		*Limnoxenus zelandicus*			
324.		*Longepi woodman*			
325.		*Longrita insidiosa*			
326.		*Lopescladius? V35 (=SO3 sp. D)*			
327.		*Lycosa ariadnae*			
328.		*Macrogyrus angustatus*			
329.		*Macrogyrus sp.*			
330.		*Maratus pavonis*			
331.		*Maydenoptila baynesi*			
332.		*Maydenoptila sp.*			
333.		*Megaloptera sp.*			
334.		*Megapodagrionidae sp.*			
335.		*Megaporus sp.*			
336.		*Microctenonyx subitaneus*			
337.		*Micronecta gracilis*			
338.		*Micronecta robusta*			
339.		*Micronecta sp.*			
340.		*Missulena granulosa*			
341.		*Missulena hoggi*			
342.		*Missulena occatoria*			
343.		*Mituliodon tarantulinus*			
344.		*Miturga agelenina*			Y
345.		*Miturga catograpta*			
346.		*Molycria quadricauda*			
347.		*Muscidae sp.*			
348.		*Muziris carinatus*			
349.		*Myandra bicincta*			
350.		*Naididae sp.*			
351.		*Necterosoma darwini*			
352.		*Necterosoma penicillatus*			
353.		*Necterosoma regulare*			
354.		*Necterosoma sp.*			
355.		*Nematoda sp.*			
356.		*Nemertini sp.*			
357.		*Neostorena vituperata*			Y
358.		*Nephila edulis*			
359.		*Newmanoperla exigua*			
360.		*Nicodamus mainae*			
361.		*Notalina nr. sp. AV14*			
362.		*Notalina sp. AV15 (PSW)*			
363.		*Notalina sp. AV17 (RCM)*			Y
364.		*Notalina spira*			
365.		*Notoperata sp. AV1 (SFM)*			
366.		*Notoperata tenax*			
367.		*Nousia sp. AV16*			
368.		*Novakiella trituberculosa*			
369.		*Nunciella aspera*			
370.		*Nunciella karriensis*			Y
371.		*Nyungara bunni*			
372.		*Occiperipatoides gilesii*			
373.		*Oecetis sp.*			
374.		*Oecobius putus*			
375.		*Offadens soror (ex genus 1 WA sp. 1)*			
376.		*Oligochaeta sp.*			
377.		*Oniscidae sp.*			
378.		*Opisthopora sp.*			
379.		*Oribatida sp.*			
380.		*Orthetrum caledonicum*			
381.		*Orthocladiinae 'woodminer' (SAP)*			
382.		*Orthocladiinae SO3 sp. A (SAP)*			
383.		*Orthocladiinae SO3 sp. C (V31) (SAP)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
384.		*Orthocladiinae sp.*			
385.		*Ostearius melanopygius*			
386.		*Ostracoda (unident.)*			
387.		*Oxidae sp.*			
388.		*Oxyethira sp.*			
389.		*Oxyopes gracilipes*			
390.		*Ozarchaea harveyi*			
391.		*Ozarchaea westraliensis*			
392.		*Parachironomus sp. 1 (VSCL35) (SAP)*			
393.		*Paracladopelma M1 [SFM)*			
394.		*Paracymus pygmaeus*			
395.		*Parakiefferiella sp. S1*			
396.		*Parakiefferiella variegatus*			
397.		*Paralampona marangaroo*			
398.		*Paralimnophyes pullulus (V42)*			
399.		*Paramelitidae sp.*			
400.		*Paramerina levidensis*			
401.		*Paraplatoides nigrum*			
402.		*Parastacidae sp.*			
403.		*Penemideopsis pusilla*			Y
404.		*Pentaneurini genus V20*			
405.		*Pentasteron securifer*			
406.		*Perthiidae sp.*			
407.		*Phenasteron longiconductor*			
408.		*Phreodrilidae sp.*			
409.		*Phryganoporus nigrinus*			
410.		*Pinkfloydia harveii*			
411.		*Planorbidae sp.*			
412.		*Platorish gelorup*			
413.		*Platynectes sp.*			
414.		*Podonomopsis sp. 1*			
415.		*Poecilipta smaragdinea*			
416.		*Polypedilum nr. convexum (SAP)*			
417.		*Polypedilum nubifer*			
418.		*Polypedilum watsoni*			
419.		*Prionosternum nitidiceps*			
420.		*Prionosternum scutatum*			
421.		*Procladius DEC sp. P1 (formerly P.paludicola P1 no U-claws)*			
422.		*Procladius paludicola*			
423.		*Procladius sp.*			
424.		*Procordulia affinis*			
425.		*Pseudolampona jarrahdale*			
426.		*Pyralidae sp.*			
427.		*Raveniella cirrata*			
428.		*Raveniella peckorum*			
429.		*Rhantus suturalis*			
430.		*Rheotanytarsus juliae*			
431.		*Rheotanytarsus sp. (SFM)*			
432.		*Rheotanytarsus trivittatus*			
433.		*Rheotanytarsus underwoodi*			
434.		*Riekoperla occidentalis*			
435.		*Riethia v4*			
436.		*Riethia v5*			
437.		*Sandalodes scopifer*			
438.		*Scirtidae sp.*			
439.		*Scolopendra laeta*			
440.		*Sellnickiella biunguiculata*			
441.		*Simaetha thoracica*			Y
442.		*Simuliidae sp.*			
443.		*Siphonotus michaelseni*			Y
444.		*Skusella/"V12 ex-WA" (Cranston)*			
445.		*Sondra aurea*			
446.		*Sondra tristicula*			
447.		*Sternopriscus browni*			
448.		*Sternopriscus marginatus*			
449.		*Sternopriscus minimus*			
450.		*Sternopriscus sp.*			
451.		*Stictocladius occidentalis*			
452.		*Storena formosa*			
453.		*Storosa tetrica*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
454.		*Stratiomyidae sp.*			
455.		*Supunna funerea*			
456.		*Supunna picta*			
457.		*Symphytognatha picta*			
458.		*Synothele harveyi*			
459.		*Synothele longbottomi*			
460.		*Synothele michaelseni*			
461.		*Synsphyronus mimulus*			
462.		*Synthemistidae sp.*			
463.		*Tabanidae sp.*			
464.		*Tamopsis darlingtoniana*			
465.		*Tamopsis distinguenda*			
466.		*Tamopsis perthensis*			
467.		*Tanypodinae sp.*			
468.		*Tanytarsus aff manleyensis*			
469.		*Tanytarsus b1*			
470.		*Tanytarsus fuscithorax/semibarbitarsus*			
471.		*Tanytarsus nr K5*			
472.		*Tanytarsus palmatus*			
473.		*Tanytarsus sp. I (SAP)*			
474.		*Taschorema pallescens*			
475.		*Tasmanicosa leuckartii*			
476.		*Tasmanocoenis tillyardi*			
477.		*Temnocephalidea sp.*			
478.		*Tetragnatha maeandrata*			Y
479.		*Tetragnatha valida*			
480.		*Thienemanniella sp. (V19) (SAP)*			
481.		*Tinytrema yarra*			
482.		*Tipulidae sp.*			
483.		*Trachycosmus sculptilis*			
484.		*Trachytrema castaneum*			
485.		*Triplectides australis*			
486.		*Triplectides sp. AV1 (SFM)*			
487.		*Triplectides sp. AV21 (SFM)*			
488.		*Turbellaria sp.*			
489.		*Urodacus novaehollandiae*			
490.		*Urodacus planimanus*			
491.		*Venator immansueta*			
492.	34113	*Westralunio carteri (Carter's Freshwater Mussel)*		T	
493.		*Westrarchaea spinosa*			
494.		*Wheenyoides cooki*			
495.		*Xanthagrion erythroneurum*			
496.		*Zebraplatys fractivittata*			

Mammal

497.	25449	*Antechinus flavipes (Yellow-footed Antechinus)*			
498.	24088	*Antechinus flavipes subsp. leucogaster (Yellow-footed Antechinus, Mardo)*			
499.	47713	*Austronomus australis (White-striped Free-tailed Bat)*			
500.	24162	*Bettongia penicillata subsp. ogilbyi (Woylie, Brush-tailed Bettong)*		T	
501.	24086	*Cercartetus concinnus (Western Pygmy-possum, Mundarda)*			
502.	24186	*Chalinolobus gouldii (Gould's Wattled Bat)*			
503.	24187	*Chalinolobus morio (Chocolate Wattled Bat)*			
504.	24092	*Dasyurus geoffroii (Chuditch, Western Quoll)*		T	
505.	24189	*Falsistrellus mackenziei (Western False Pipistrelle, Western Falsistrelle)*		P4	
506.	24041	*Felis catus (Cat)*	Y		
507.	24215	*Hydromys chrysogaster (Water-rat, Rakali)*		P4	
508.	48588	*Isoodon fusciventer (Quenda, southwestern brown bandicoot)*		P4	
509.	24132	*Macropus fuliginosus (Western Grey Kangaroo)*			
510.	24223	*Mus musculus (House Mouse)*	Y		
511.	24146	*Myrmecobius fasciatus (Numbat, Walpurti)*		T	
512.	48022	*Notamacropus irma (Western Brush Wallaby)*		P4	
513.	24194	*Nyctophilus geoffroyi (Lesser Long-eared Bat)*			
514.	24195	*Nyctophilus gouldi (Gould's Long-eared Bat)*			
515.	24085	*Oryctolagus cuniculus (Rabbit)*	Y		
516.	24166	*Pseudocheirus occidentalis (Western Ringtail Possum, ngwayir)*		T	
517.	24245	*Rattus rattus (Black Rat)*	Y		
518.	24145	*Setonix brachyurus (Quokka)*		T	
519.	24108	*Sminthopsis crassicaudata (Fat-tailed Dunnart)*			
520.	24111	*Sminthopsis gilberti (Gilbert's Dunnart)*			
521.	24207	*Tachyglossus aculeatus (Short-beaked Echidna)*			
522.	24167	*Tarsipes rostratus (Honey Possum, Noolbenger)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
523.	25521	*Trichosurus vulpecula (Common Brushtail Possum)*			
524.	24158	*Trichosurus vulpecula subsp. vulpecula (Common Brushtail Possum)*			
525.	24206	*Vespadelus regulus (Southern Forest Bat)*			
526.	24040	*Vulpes vulpes (Red Fox)*	Y		
Reptile					
527.	25242	*Acanthophis antarcticus (Southern Death Adder)*		P3	
528.	42368	*Acritoscincus trilineatus (Western Three-lined Skink)*			
529.	24990	*Aprasia pulchella (Granite Worm-lizard)*			
530.	24980	*Christinus marmoratus (Marbled Gecko)*			
531.	30893	*Cryptoblepharus buchananii*			
532.	25020	*Cryptoblepharus plagiocephalus*			
533.	24883	*Ctenophorus ornatus (Ornate Crevice-Dragon)*			
534.	24884	*Ctenophorus pictus (Painted Dragon)*			
535.	25035	*Ctenotus delli (Dell's skink, Darling Range southwest Ctenotus)*		P4	
536.	25047	*Ctenotus impar*			
537.	25049	*Ctenotus labillardieri*			
538.	25766	*Delma fraseri (Fraser's Legless Lizard)*			
539.	24939	*Diplodactylus polyophthalmus*			
540.	25096	*Egernia kingii (King's Skink)*			
541.	25100	*Egernia napoleonis*			
542.	25474	*Hemiergis initialis*			
543.	25115	*Hemiergis initialis subsp. initialis*			
544.	25131	*Lerista distinguenda*			
545.	25005	*Lialis burtonis*			
546.	41416	*Liopholis pulchra subsp. pulchra (South-western Rock Skink, Spectacled Rock Skink)*			
547.	25184	*Menetia greyii*			
548.	25240	*Morelia spilota subsp. imbricata (Carpet Python)*			
549.	25191	*Morethia lineoocellata*			
550.	25192	*Morethia obscura*			
551.	25253	*Parasuta gouldii*			
552.	25255	*Parasuta nigriceps*			
553.	25510	*Pogona minor (Dwarf Bearded Dragon)*			
554.	24907	*Pogona minor subsp. minor (Dwarf Bearded Dragon)*			
555.	25511	*Pseudonaja affinis (Dugite)*			
556.	25259	*Pseudonaja affinis subsp. affinis (Dugite)*			
557.	25203	*Tiliqua occipitalis (Western Bluetongue)*			
558.	25519	*Tiliqua rugosa*			
559.	24983	*Underwoodisaurus milii (Barking Gecko)*			
560.	25218	*Varanus gouldii (Bungarra or Sand Monitor)*			
561.	25225	*Varanus rosenbergi (Heath Monitor)*			

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

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

Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

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

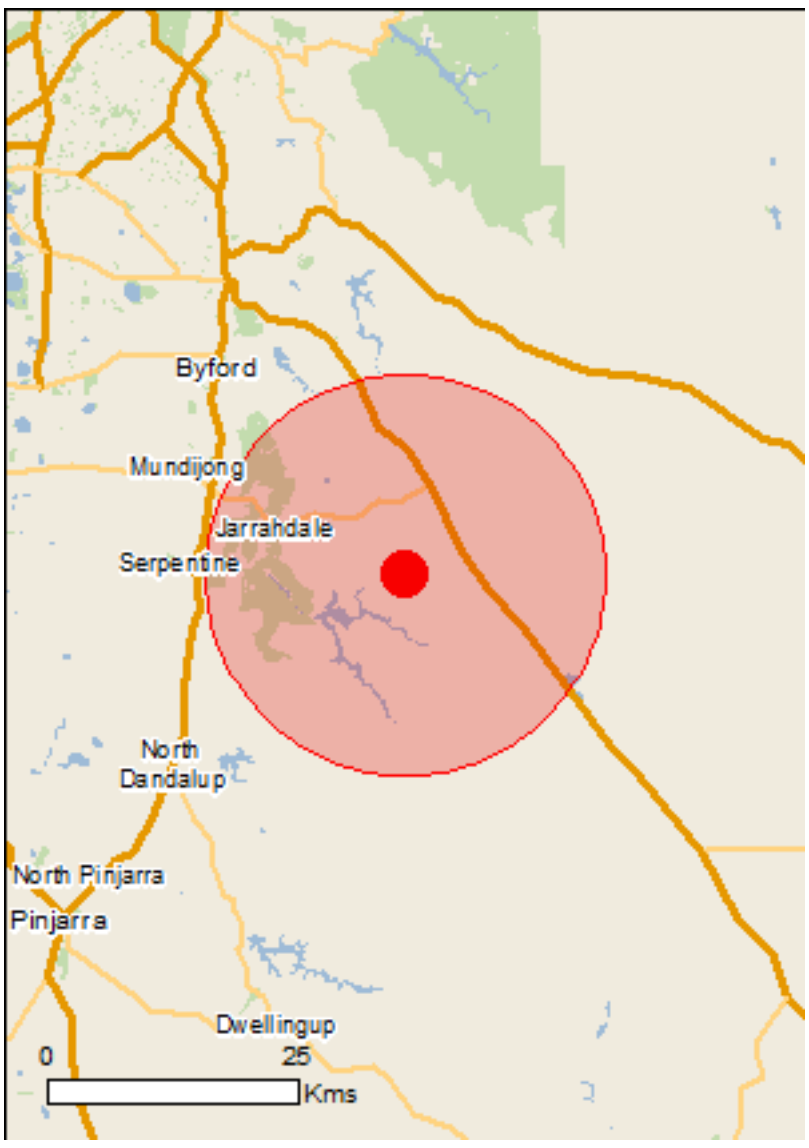
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

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

Report created: 18/06/20 15:49:43

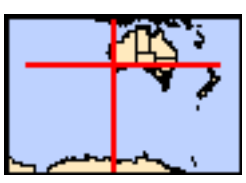
Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates
Buffer: 20.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	27
Listed Migratory Species:	8

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	14
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	7
Regional Forest Agreements:	1
Invasive Species:	38
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)	[Resource Information]
Name	Proximity
Peel-yalgorup system	20 - 30km upstream

Listed Threatened Ecological Communities		[Resource Information]

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

Name	Status	Type of Presence
	Critically Endangered	Community may occur within area
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community likely to occur within area

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area
Calyptorhynchus baudinii Baudin's Cockatoo, Long-billed Black-Cockatoo [769]	Endangered	Breeding known to occur within area
Calyptorhynchus latirostris Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Mammals		
Bettongia penicillata ogilbyi Woylie [66844]	Endangered	Species or species habitat known to occur within area

Name	Status	Type of Presence
[Dasyurus geoffroii](#) Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area
[Pseudocheirus occidentalis](#) Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat may occur within area
[Setonix brachyurus](#) Quokka [229]	Vulnerable	Species or species habitat known to occur within area
Other		
[Westralunio carteri](#) Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat known to occur within area
Plants		
[Anthocercis gracilis](#) Slender Tailflower [11103]	Vulnerable	Species or species habitat may occur within area
[Diuris micrantha](#) Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat known to occur within area
[Diuris purdiei](#) Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat likely to occur within area
[Drakaea elastica](#) Glossy-leafed Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat likely to occur within area
[Eleocharis keigheryi](#) Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat may occur within area
[Eucalyptus x balanites](#) Cadda Road Mallee, Cadda Mallee [87816]	Endangered	Species or species habitat may occur within area
[Grevillea flexuosa](#) Zig Zag Grevillea [2957]	Vulnerable	Species or species habitat likely to occur within area
[Lasiopetalum pterocarpum](#) Wing-fruited Lasiopetalum [64922]	Endangered	Species or species habitat known to occur within area
[Synaphea sp. Fairbridge Farm (D. Papenfus 696)](#) Selena's Synaphea [82881]	Critically Endangered	Species or species habitat likely to occur within area
[Synaphea sp. Serpentine (G.R. Brand 103)](#) [86879]	Critically Endangered	Species or species habitat may occur within area
[Tetraria australiensis](#) Southern Tetraria [10137]	Vulnerable	Species or species habitat likely to occur within area
[Thelymitra dedmaniarum](#) Cinnamon Sun Orchid [65105]	Endangered	Species or species habitat may occur within area
[Thelymitra stellata](#) Star Sun-orchid [7060]	Endangered	Species or species habitat may occur within area
[Verticordia fimbrilepis subsp. fimbrilepis](#) Shy Featherflower [24631]	Endangered	Species or species habitat known to occur

Name	Status	Type of Presence within area

Listed Migratory Species [Resource Information]

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

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

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

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

Name
Commonwealth Land -

Listed Marine Species [Resource Information]

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

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Gooralong	WA
Karnet	WA
Monadnocks	WA
NTWA Bushland covenant (0011)	WA
NTWA Bushland covenant (0076)	WA
Serpentine	WA
Unnamed WA50643	WA

Regional Forest Agreements	[Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
South West WA RFA	Western Australia

Invasive Species	[Resource Information]

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

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Funambulus pennantii Northern Palm Squirrel, Five-striped Palm Squirrel [129]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Brachiaria mutica Para Grass [5879]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Solanum elaeagnifolium Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple,		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Silverleaf-nettle, Trompillo [12323]		
Tamarix aphylla		
Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus		
Asian House Gecko [1708]		Species or species habitat likely to occur within area

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-32.37319 116.18017

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.

© Commonwealth of Australia
Department of the Environment
GPO Box 787
Canberra ACT 2601 Australia
+61 2 6274 1111

Appendix D

Fauna field data

Fauna likelihood of occurrence assessment guideline and definitions

Fauna likelihood of occurrence assessment

Combined phase species list

Phase 1 survey data

Phase 2 survey data

Trap Line habitat assessment

Results from bird acoustic analysis

Results from bat acoustic analysis

Carters Freshwater Mussel transect data

Rakali transect data

Species recorded from studies and database searches

The table presents all vertebrate fauna species recorded in previous studies within or in proximity to the Survey Area, and database searches within a 20 kilometre radius of the Survey Area.

Fauna likelihood of occurrence assessment guidelines

Assessment outcome	Description
Known	Species recorded during the field survey or from recent, reliable records from within or close proximity to the Survey Area.
Likely	Species are **likely** to occur in the Survey Area where there is suitable habitat within the Survey Area and there are recent records of occurrence of the species in close proximity to the Survey Area. OR Species known distribution overlaps with the Survey Area and there is suitable habitat within the Survey Area.
Unlikely	Species assessed as **unlikely** include those species previously recorded within 40 km of the Survey Area however: There is limited (i.e. the type, quality and quantity of the habitat is generally poor or restricted) habitat in the Survey Area. The suitable habitat within the Survey Area is isolated from other areas of suitable habitat and the species has no capacity to migrate into the Survey Area. OR Those species that have a known distribution overlapping with the Survey Area however: There is limited habitat in the Survey Area (i.e. the type, quality and quantity of the habitat is generally poor or restricted). The suitable habitat within the Survey Area is isolated from other areas of suitable habitat and the species has no capacity to migrate into the Survey Area.
Highly unlikely	Species that are considered **highly unlikely** to occur in the Survey Area include: Those species that have no suitable habitat within the Survey Area. Those species that have become locally extinct, or are not known to have ever been present in the region of the Survey Area.

Source information - desktop searches

NM – DBCA *NatureMap* (accessed May 2020)

PMST – DAWE Protected Matters Search Tool (PMST) to identify fauna listed under the EPBC Act potentially occurring within the Survey Area (accessed June 2020)

Definitions

Term	Description
Database search area	a 10 km buffer around the Survey Area
Survey Area	the area subject to the current survey
CR	Critically endangered under the EPBC Act or BC Act
EN	Endangered under the EPBC Act or BC Act
VU	Vulnerable under the EPBC Act or BC Act
IA	Migratory birds protected under an international agreement
MI, MA	Migratory, Marine
CD	Conservation dependent fauna
OS	Other specially protected fauna under the BC Act
P1	Priority 1: Poorly known fauna. Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
P2	Priority 2: Poorly known species. Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
P3	Priority 3: Poorly known species. Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
P4	Priority 4: Rare, Near Threatened and other species in need of monitoring. (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for Vulnerable, but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

Fauna likelihood of occurrence assessment of conservation significant species identified in the desktop assessment as potentially occurring within the Survey Area.

Species name	Common name	Status		Source			Habitat requirements	Likelihood of occurrence
		State	Federal	NatureMap	PMST	DBCA threatened fauna		
Birds								
Actitis hypoleucos	Common Sandpiper	MI	MI		X		Habitat for the Common Sandpiper is varied: coastal and interior wetlands – narrow muddy edges of billabongs, river pools, mangroves, among rocks and snags, reefs or rocky beaches. Avoids wide open mudflats. This species is widespread and scattered, common on the north and west coasts and uncommon in the south-east and interior (Morcombe 2004).	**Unlikely** Suitable habitat such as open shallow flood plain or tidal mud flat is not present to support this species. However, the species may occasionally occur along the shore of the nearby Serpentine Dam. Occurrence within the Survey Area would be as a vagrant at best.
Apus pacificus	Fork-tailed Swift	MI	MI		X		In Western Australia, there are sparsely scattered records of the Fork-tailed Swift along the south coast, ranging from near the Eyre Bird Observatory and west to Denmark. They are widespread in coastal and subcoastal areas between Augusta and Carnarvon, including some on nearshore and offshore islands. They are scattered along the coast from south-west Pilbara to the north and east Kimberley region, near Wyndham. There are sparsely scattered inland records, especially in the Wheatbelt, from Lake Annean and Wittenoom. They are found in the north and north-west Gascoyne Region, north through much of the Pilbara Region, and the south and east Kimberley. They are also recorded in the Timor Sea, both at sea and around islands such as the Ashmore Reef. Isolated records occur at Neale Junction in the Great Victoria Desert and on the Nullarbor Plain (Higgins 1999).	**Unlikely** Suitable habitat is not available to support this species however the species may occasionally occur in the Survey Area as a vagrant.

Species name	Common name	Status		Source			Habitat requirements	Likelihood of occurrence
		State	Federal	NatureMap	PMST	DBCA threatened fauna		
Atrichornis clamosus	Noisy Scrub-bird	EN	EN	X			The Noisy Scrub-bird inhabits areas with dense understorey or lower stratum of sedges and shrubs, dense leaf litter and abundant litter-dwelling invertebrates. It mainly occurs in low closed forests 5–15 m in height that are dominated by *Eucalyptus* or *Agonis* and *Banksia littoralis*, and occur in the steep and wetter gullies, and drainage lines of hills and granite mountains (Eucalyptus), and on the margins of freshwater lakes (*Agonis* and *B. littoralis*). It is also common in low closed forests up to 5 m in height that are dominated by *Hakea elliptica*, *Eucalyptus* or *Agonis* and *B. littoralis* and occur around granite outcrops, in shallower and drier gullies and on the margins of freshwater lakes. It mostly occurs at sites that have not been burnt for 10 or more years. It occurs at two locations in the south west; on the mainland in coastal areas from Two Peoples Bay Nature Reserve to Cheyne Beach, and on Bald Island (DAWE 2021a).	**Unlikely** Previously known from small populations in the Jarrah Forest however this population is now considered locally extinct.
Botaurus poiciloptilus	Australasian Bittern	EN	EN		X		The Australasian Bittern occurs mainly in densely vegetated freshwater wetlands and, rarely, in estuaries or tidal wetlands. The species favours foraging in tall, dense vegetation in shallow permanent or seasonal fresh water. In the southwest of Western Australia the Bittern is now largely confined to coastal areas especially along the south coast where it is found in beds of tall rush mixed with or near short fine sedge or open pools (Burbidge 2004). It also occurs around swamps, lakes, pools, rivers and channels fringed with lignum Muehlenbeckia, canegrass Eragrostis or other dense vegetation (Marchant & Higgins 1990). It occasionally ventures into areas of open water or onto banks.	**Unlikely** Suitable habitat such as expansive wetland with emergent native reeds is not available to support this species however the Survey Area boarders habitat which may be suitable (Serpentine Dam) and the species may occur in the Survey Area as a vagrant.
Cacatua pastinator pastinator	Muir's Corella	CD		X		X	Muir's Corella lives in woodland on the drier, eastern side of the main forest block in the south west, in woodlands that are dominated by Wandoo (E. wandoo), Marri, (*Corymbia calophylla*), or Jarrah, (*Eucalyptus marginata*). Most suitable habitat for this species now consists of remnant patches that occur in or adjacent to farmland, or along roadsides, paddock boundaries or watercourses, and sometimes as a few, isolated shade trees in otherwise cleared paddocks (Garnett & Crowley 2000). The bird nests in large hollows in trees at least 160 years old. Its now has a restricted distribution in the Tone Bridge, Rocky Gully, Frankland River and Lake Muir area (TSSC 2016).	**Highly unlikely** This species is not known from the region.

Species name	Common name	Status		Source			Habitat requirements	Likelihood of occurrence
		State	Federal	NatureMap	PMST	DBCA threatened fauna		
Calidris acuminata	Sharp-tailed Sandpiper	MI	MI		X		In Australasia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline saltlakes inland. They also occur in saltworks and sewage farms. They use flooded paddocks, sedgelands and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and creeks lined with mangroves. Sometimes they occur on rocky shores (DAWE 2021b). They are found throughout many wetlands on the Swan Coastal Plain, in Perth lakes with wet grassed margins and receding waters, Vasse and Harvey Estuaries, and the Busselton wetlands, but are less common on the south coast until the Esperance region (Nevill 2013).	**Unlikely** Suitable habitat such as open shallow flood plain or tidal mud flat is not present to support this species. However, the species may occasionally occur along the shore of the nearby Serpentine Dam. Occurrence within the Survey Area would be as a vagrant at best.
Calidris canutus	Red Knot	EN, MI	EN, MI		X		In Australasia the Red Knot mainly inhabits intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes, lagoons, pools and pans, and recorded on sewage ponds and saltworks, but rarely use freshwater swamps. They rarely use inland lakes or swamps (DAWE 2021b). They are found near mudflats and estuaries from Murchison to Bunbury but are then uncommon from Wilson Inlet to Esperance. In the Perth region they are mainly found in Alfred Cove and Peel Inlet (Nevill 2013).	**Unlikely**. Suitable habitat such as open shallow flood plain or tidal mud flat is not present to support this species. However, the species may occasionally occur along the shore of the nearby Serpentine Dam. Occurrence within the Survey Area would be as a vagrant at best.

Species name	Common name	Status		Source			Habitat requirements	Likelihood of occurrence
		State	Federal	NatureMap	PMST	DBCA threatened fauna		
Calidris ferruginea	Curlew Sandpiper	MI	MI		X		Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters (DAWE 2020).	**Unlikely** Suitable habitat such as open shallow flood plain or tidal mud flat is not present to support this species. However, the species may occasionally occur along the shore of the nearby Serpentine Dam. Occurrence within the Survey Area would be as a vagrant at best.
Calidris melanotos	Pectoral Sandpiper	MI	MI		X		In Australia, the Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. The species is usually found in coastal or near coastal habitat but occasionally found further inland. It prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation, such as grass or samphire. The species has also been recorded in swamp overgrown with lignum (DAWE 2021e). The bird can be seen on the Swan Coastal Plain but is rare to scarce on Lake Thompson, and as well on any freshwater wetland in the southwest with shallow, well-grassed margins. They are seen at Lake Warden, Esperance, and at Lake McLarty (Nevill 2013).	**Unlikely** Suitable habitat such as open shallow flood plain or tidal mud flat is not present to support this species. However, the species may occasionally occur along the shore of the nearby Serpentine Dam. Occurrence within the Survey Area would be as a vagrant at best.

Species name	Common name	Status		Source			Habitat requirements	Likelihood of occurrence
		State	Federal	NatureMap	PMST	DBCA threatened fauna		
Calyptorhynchus banksii naso	Forest Red-tailed Black Cockatoo	VU	VU	X	X	X	The Forest Red-tailed Black Cockatoo inhabits the dense Jarrah, karri, and Marri forests receiving more than 600 mm annual average rainfall but also occurs in a range of other forest and woodland types, including Blackbutt (*E. patens*), Wandoo (*E. wandoo*), Tuart (*E. gomphocephala*), Albany Blackbutt (*E. staeri*), Yate (*E. cornuta*), and Flooded Gum (*E. rudis*) (DAWE 2021c). Habitats tend to have an understorey of balga (Xanthorrhoea spp.), kingia (*Kingia australis*), snottygobble (*Persoonia* spp.), parrot bush (*Banksia sessillis*), holly-leaved mirbelia (*Mirbelia dilatata*), bull banksia (*B. grandis*), bullich (*Taxandria* spp.) and sheoak (*Allocasuraina fraseriana*). They are most common in the Jarrah forest region of the northern Darling Range from Collie north to Mundaring and are very local throughout the lower south-west. They can be found on the Swan Coastal Plain, mainly in search of food the exotic white cedar (*Melia azedarach*). There are also several small isolated populations in the eastern parts of its range (DAWE 2021c).	**Known** This species was recorded during both phases of the survey. The Survey Area contains suitable breeding and foraging habitat to support this species.
Calyptorhynchus baudinii	Baudin's Black Cockatoo	EN	EN	X	X	X	Baudin's Black Cockatoo mainly occurs in eucalypt forests, especially Jarrah, Marri and karri forest that receives 750 mm of annual rainfall. The species is less frequently in woodlands of wandoo (*Eucalyptus wandoo*), blackbutt (*E. patens*), flooded gum (*E. rudis*), yate (*E. cornuta*), partly cleared farmlands and urban areas. The range of the species extends from Albany northward to Gidgegannup and Mundaring (east of Perth), and inland to the Stirling Ranges and near Kojonup. Preferred roosts are in areas with a dense canopy close to permanent sources of water (DAWE 2021d).	**Known** This species was recorded during both phases of the survey. The Survey Area contains suitable breeding and foraging habitat to support this species.
Calyptorhynchus latirostris	Carnaby's Black Cockatoo	EN	EN	X	X	X	Carnaby's Cockatoo occurs in uncleared or remnant native eucalypt woodlands, especially those that contain salmon gum, wandoo, Marri, Jarrah and karri, and in shrubland or kwongan heathland dominated by Hakea, Dryandra, Banksia and Grevillea species. Breeding activity is restricted to eucalypt woodlands mainly in the semiarid and subhumid interior, from Kalbarri in the north, Three Springs District south to the Stirling Range, west to Cockleshell Gully and east to Manmanning. The species has expanded its breeding range westward and south into the Jarrah-Marri forests of the Darling Scarp and into the tuart forests of the Swan Coastal Plain, including the Yanchep area, Lake Clifton and near Bunbury. It ness in trees older than 120-150 years (DAWE 2021e).	**Known** This species was recorded during both phases of the survey. The Survey Area contains suitable breeding and foraging habitat to support this species.

Species name	Common name	Status		Source			Habitat requirements	Likelihood of occurrence
		State	Federal	NatureMap	PMST	DBCA threatened fauna		
Falco peregrinus	Peregrine Falcon	OS		X		X	The Peregrine Falcon is found on and near cliffs, gorges, timbered watercourses, riverine environments, wetlands, plains, open woodlands, and pylons and spires of buildings, though less frequently in desert regions (Morcombe 2004; Pizzey & Knight 2012). They are not common but can be found almost anywhere throughout WA and in the southwest, including particularly at Fitzgerald River, Stirling Range, Porongurup National Parks, Kondinin, and Peak Charles, with many more locations north of Perth (Nevill 2013).	**Known** One individual of this species was recorded during the Phase 2 survey and suitable habitat is available within the Survey Area.
Leipoa ocellata	Malleefowl	VU	VU & MI	X	X	X	The Malleefowl generally occurs in semi-arid areas of Western Australia, in shrublands and low woodlands that are dominated by mallee vegetation, as well as native pine Callitris woodlands, Acacia shrublands, paperbark, sheoak, Broombush *Melaleuca uncinata* vegetation, eucalypt woodlands, or coastal heathlands. Mostly they are found where there are sandy or gravel soils. The nest is a large mound of sand or soil and organic matter (Jones & Goth 2008; Morcombe 2004; Nevill 2013). In WA they are found from the southwest Nullarbor to Albany, north, and then west from Moore River up to Shark Bay, past Cue, across to Wiluna and east to the northern Victoria Desert south of the Blackstone Ranges (Nevill 2013; Pizzey & Knight 2012).	**Highly unlikely** The Survey Area does not contain suitable habitat to support this species.
Motacilla cinerea	Grey Wagtail	MI	MI		X		The Grey Wagtail is strongly associated with water, particularly rocky substrates along water courses but also lakes and marshes. It breeds from Western Europe to Asia, migrates to Africa, Malaysia, Indonesia and New Guinea. In the nonbreeding season the species may visit northern Australia and Christmas Island (Pizzey & Knight 2012)	**Highly Unlikely** This species des not frequent southern Australia and is not considered likely to be vagrant within the Survey Area.
Numenius madagascariensis	Eastern Curlew	CR	CR & MI	X	X		The Eastern Curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, sometimes within the mangroves, and in coastal saltworks and sewage farms. In the south west, Eastern Curlews are recorded from Eyre, and there are scattered records from Stokes Inlet to Peel Inlet (Marchant & Higgins 1993). They are uncommon further south of	**Unlikely** Suitable habitat such as open shallow flood plain or tidal mud flat is not present to support this species. However, the species may occasionally occur along the shore of the nearby Serpentine Dam. Occurrence within the

Species name	Common name	Status		Source			Habitat requirements	Likelihood of occurrence
		State	Federal	NatureMap	PMST	DBCA threatened fauna		
							Geraldton, but can be spotted in Alfred Cove, Peel Inlet and the Albany region (Nevill 2013).	Survey Area would be as a vagrant at best.
Pandion haliaetus	Osprey	MI	MI		X		Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia. They require extensive areas of open fresh, brackish or saline water for foraging. They frequent a variety of wetland habitats including inshore waters, reefs, bays, coastal cliffs, beaches, estuaries, mangrove swamps, broad rivers, reservoirs and large lakes and waterholes. They exhibit a preference for coastal cliffs and elevated islands in some parts of their range but may also occur on low sandy, muddy or rocky shores and over coral cays. They may occur over atypical habitats such as heath, woodland or forest when travelling to and from foraging (DSEWPaC 2016)	**Unlikely** Suitable habitat such as open estuarine inlets or lakes is not available to support this species however the Survey Area boarders habitat which may be suitable (Serpentine Dam) and the species may occur in the Survey Area as a vagrant.
Rostratula australis	Australian Painted Snipe	EN	EN		X		The Australian Painted Snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. Australian Painted Snipe breeding habitat requirements may be quite specific: shallow wetlands with areas of bare wet mud and both upper and canopy cover nearby. The species rarely occurs in south-western Australia, where it was once more common (Marchant & Higgins 1993; Garnett & Crowley 2000).	**Unlikely** Suitable habitat is not available to support this species however the Survey Area boarders habitat which may be suitable (Serpentine Dam) and the species may occur in the Survey Area as a vagrant.
Tyto novaehollandiae subsp. novaehollandiae	Masked Owl (southern subsp)	P3		X		X	The Masked Owl is found in forests (wet and dry sclerophyll, non-eucalypt dominated), open woodlands, farmlands or scrub with large trees (12-20 m) and adjacent cleared country, timbered watercourses, paperbark woodlands, and caves (Pizzey & Knight 2012). It requires large hollows in old growth eucalypts or bare sand or the earth of a cave for nesting, and often favours areas with dense understorey or ecotones comprising dense and sparse ground cover. It is often recorded foraging within 100-300 m of the boundary of two vegetation types (Bell & Mooney 2002). The bird is restricted to the thicker humid forests of the south west region, particularly in the Pemberton and Manjimup area and along the Murray River in the Lane Poole area. It nests in hollows in large Karri (*Eucalyptus diversicolor*), Marri (*Corymbia calophylla*) and Jarrah (*E. marginata*) trees (Nevill 2013).	**Known** This species was detected at two locations within the Survey Area during the Phase 1 survey.

Species name	Common name	Status		Source			Habitat requirements	Likelihood of occurrence
		State	Federal	NatureMap	PMST	DBCA threatened fauna		
Mammals								
Falsistrellus mackenziei	Western False Pipistrelle	P4		X		X	The Western False Pipistrelle occurs in wet sclerophyll forest dominated by Karri (*Eucalyptus diversicolor*), and in the high rainfall zones of the Jarrah (*E. marginata*) and Tuart (*E. gomphocephala*) dry sclerophyll forests. The species is restricted to areas in or adjacent to stands of old growth forest. It has also been recorded in mixed Tuart-Jarrah tall woodlands on the adjacent coastal plain. Marri (*Corymbia calophylla*), Sheoak (*Casuarina heugeliana*) and Peppermint (*Agonis flexuosa*) trees are often co-dominant at its collection localities (Churchill 2008; McKenzie & Start 1999).	**Known** This species was recorded on bat detectors during both Phase 1 and Phase 2 surveys and suitable habitat is available to support this species.
Bettongia penicillata ogilbyi	Woylie	CR	EN	X	X	X	Preferred habitat for the Woylie includes dense undergrowth, logs and rock-cavities and occasionally in burrows (Burbidge 2004). Scattered Woylie populations may be found throughout the Jarrah forest in the south-west corner of WA. Extant naturally occurring populations of the species are restricted to three small wheatbelt reserves – Dryandra Woodland, Tutanning Nature Reserve and Perup Forest. All are characterised by the presence of thickets of the plant *Gastrolobium* (Van Dyck and Strahan 2008). The species is now restricted to forests and areas where predation has been controlled (or excluded). It rests during the day in a well-concealed nest, built over a shallow depression. The nest is most commonly built using long strands, of grasses, but other material such as strips of bark are also used (in the forest) or dried seagrass and/or triodia (in arid coastal areas) (Freegard 2007).	**Unlikely** Suitable habitat is present within the Survey Area however the species is not expected to occur within, or vagrant to, the Survey Area due to the presence of predators such as foxes and cats.
Dasyurus geoffroii	Chuditch	VU	VU	X	X	X	The Chuditch inhabits eucalypt forest (especially Jarrah, *Eucalyptus marginata*), dry woodland, mallee shrublands, heaths, and desert, particularly in the south coast of WA. They also occur at lower densities in drier woodland and mallee shrubland in the goldfields and wheatbelt, as well as in Kalbarri National Park (translocated). Chuditch require adequate numbers of suitable den and refuge sites (horizontal hollow logs or earth burrows) to survive (DEC 2011b). In Jarrah forest, Chuditch populations occur in both moist, densely vegetated, steeply sloping forest and drier, open, gently sloping forest (Van Dyck & Strahan 2008). The species can travel large distances, and for this reason requires habitats that are of a suitable size and not excessively fragmented.	**Known** This species was recorded during the survey on two remote cameras. The Survey Area provides suitable denning and foraging/hunting habitat to support this species.

Species name	Common name	Status		Source			Habitat requirements	Likelihood of occurrence
		State	Federal	NatureMap	PMST	DBCA threatened fauna		
Hydromys chrysogaster	Rakali, Water-rat	P4		X		X	The Water Rat lives in the vicinity of permanent bodies of fresh, brackish, or marine water, lakes and farm dams, and on sheltered coastal beaches, mangroves and offshore islands. In the south-west of WA they have been shown to prefer areas with riparian vegetation, better water quality and a degree of habitat complexity. Woody debris, rock ledges and wetland islands are likely to be important areas for feeding and refuge (DEC 2012). It is an occasional vagrant to temporary waters. Water Rat's dens are made at the end of tunnels in banks and occasionally in logs (Van Dyck & Strahan 2008).	**Known** This species was recorded on one remote camera deployed on a flowing stream section of Big Brook that bisects the proposed conveyor location.
Phascogale calura	Red-tailed Phascogale	CD	VU		X		The Red-tailed Phascogale inhabits Wandoo (Eucalyptus wandoo) and dense Sheoak (Allocasuarina huegeliana) woodland associations, with populations being most dense in the latter vegetation type. The species prefers vegetation that is unburnt for a long time, which provides continuous canopy cover to assist their arboreal habits. Trees need to be of a sufficient age to provide hollows for nesting in limbs or logs, and grass trees need to have ample skirts to provide cover. Small, scattered populations still occur in remnant vegetation in the Wheatbelt (DEC 2007).	**Unlikely**. Not recorded during the survey. The Survey Area is beyond the known range of this species.
Phascogale tapoatafa	Brush Tailed Phascogale	CD				X	The Brush-tailed Phascogale is sparsely distributed outside the semi-arid zone in dry sclerophyll forest and monsoonal forest and woodland. The species is generally rare and threatened by habitat fragmentation in the south west of Western Australia.	**Known** This species was detected at one remote camera within the south-eastern portion of the Survey Area and suitable habitat is available to support this species.
Pseudocheirus occidentalis	Western Ringtail Possum	CR	CR	X	X		The Western Ringtail Possum occurs in coastal and near coastal and Peppermint Tree (*Agonis flexuosa*) forest and Tuart (*Eucalyptus gomphocephala*) dominated forest with a Peppermint Tree understorey from Bunbury to Albany. Also occurs in Jarrah (*E. marginata*) forest and Jarrah-Marri *(Corymbia calophylla*) forest associated with Peppermint Tree (Van Dyck & Strahan 2008).	**Unlikely** Suitable habitat Tuart over peppermint understory is not present to support this species and the Study Area is beyond the current natural range of the species.

Species name	Common name	Status		Source			Habitat requirements	Likelihood of occurrence
		State	Federal	NatureMap	PMST	DBCA threatened fauna		
Isoodon fusciventer	Quenda (Southern Brown Bandicoot)	P4		X		X	The Quenda prefers dense scrubby, often swampy, vegetation with dense cover up to one metre high. However, it also occurs in woodlands, and may use less ideal habitat where this habitat occurs adjacent to the thicker, more desirable vegetation. The species often feeds in adjacent forest and woodland that is burnt on a regular basis and in areas of pasture and cropland lying close to dense cover (Van Dyck & Strahan 2008).	**Known** This species was recorded during the survey via both remote cameras, diggings and trapping. The Survey Area provides suitable breeding and foraging habitat to support this species.
Myrmecobius fasciatus	Numbat	EN	EN	X		X	Current Numbat populations occupy several different habitat types: upland Jarrah forest, open eucalypt woodland, banksia woodland and tall closed shrubland. The only remaining original subpopulations are at Dryandra Woodland and the Upper Warren area (including Tone Perup Nature Reserve, Greater Kingston National Park and adjoining State Forest). In WA there are nine translocation sites, including Boyagin Nature Reserve, Tutanning Nature Reserve, Batalling block and Karroun Hill Nature Reserve (see DPaW 2015 for complete list and details). At Dryandra, numbats inhabit brown mallet (*Eucalyptus astringens*) plantations. Habitats usually have an abundance of termites in the soil, and hollow logs, tree hollows, burrows and branches for shelter (DAWE 2021e; Van Dyck & Strahan 2008).	**Highly unlikely** Suitable habitat is not available to support this species. The Survey Area is outside the current known range of the Numbat however it has previously been recorded at Jarrahdale.
Notamacropus irma	Western Brush Wallaby	P4		X		X	The Western Brush Wallaby is found primarily in open forest or woodland, particularly favouring open, seasonally- wet flats with low grasses and open scrubby thickets. It is also found in some areas of mallee and heathland and is uncommon in karri forest (DEC 2011b; Van Dyck & Strahan 2008).	**Known** This species was recorded numerously during the survey. The Survey Area provides suitable breeding and foraging habitat to support this species.

Species name	Common name	Status		Source			Habitat requirements	Likelihood of occurrence
		State	Federal	NatureMap	PMST	DBCA threatened fauna		
Setonix brachyurus	Quokka	Vu	Vu	X	X	X	The current distribution of the Quokka includes Rottnest and Bald Islands, and at least 25 sites on the mainland, including Two Peoples Bay Nature Reserve and Torndirrup, Mt Manypeaks and Walpole-Nornalup National Parks, and swamp areas through the south-west forests from Jarrahdale to Walpole. The last known population on the Swan Coastal Plain occurs in Muddy Lakes near Bunbury. Quokkas have also been reintroduced to Karakamia Sanctuary (DEC 2013). They occupy dense forests and thickets, streamside vegetation, heaths, shrublands, *Agonis linearifolia*-dominated swamps in the Jarrah (*Eucalyptus marginata*) forest, and sometimes tea-tree thickets on sandy soils along creek systems. The northern extent on the mainland is in the Jarrah forest immediately south-east of the Perth metropolitan area, from where it extends southward through the southern Jarrah, Marri and Karri forests to the south coast, but largely confined throughout to areas receiving an annual rainfall of 1,000 mm or more (DEC 2013; Van Dyck & Strahan 2008).	**Known** This species was recorded during the survey on remote cameras. The Survey Area provided suitable breeding and foraging habitat to support this species.
Reptiles								
Acanthophis antarcticus	Southern Death Adder	P3		X		X	The Southern Death Adder habitat ranges from rainforest to shrublands and heaths. This species is declining in many areas, probably due to habitat destruction and altered fire regimes (Wilson & Swan 2013).	**Known** Two individuals were recorded during the Mattiske vegetation and flora survey (2020).
Ctenotus delli	Dell's Skink	P4		X		X	Dell's Skink is associated with Jarrah-Marri woodland that has a shrub-dominated understorey, on laterite, sandy or clay soils. It is found in the north Darling Range and inhabits dry sclerophyll forest on granite outcrops, stony hills and ranges. It is absent from the Swan Coastal Plain (Cogger 2014; Wilson & Swan 2013).	**Likely** The Survey Area contains suitable breeding and foraging habitat to support this species however it was not detected during the surveys.
Geotria australis	Pouched Lamprey	P3		X			This species utilises freshwater streams in the south west (Perth to Albany) to breed and grow before migrating to the ocean to mature (Allen *et al*. 2002). Dams and weirs are the main obstacles for the species. Sporadic records exist throughout the South West Coast Drainage Division between Perth and Albany including the Swan, Canning, Serpentine, Margaret, Donnelly, Warren and Goodga rivers.	**Highly Unlikely** Permanent suitable habitat was not recorded during the survey and no creeks are linked to coastal water due to Serpentine Dam.

Species name	Common name	Status		Source			Habitat requirements	Likelihood of occurrence
		State	Federal	NatureMap	PMST	DBCA threatened fauna		
Westralunio carteri	Carter's Freshwater Mussel	Vu	Vu		X		Carter's Freshwater Mussel is usually found in freshwater river pools. They are most common in areas with muddy, silty and sandy bottoms and flowing permanent water. Environmental tolerances of W. carteri are not precisely known but they can be found where water temperatures range from 4° C to over 30° C. Formerly this species occurred widely through the southwest including interior rivers of southwest such as Avon, Murray and Blackwood, however Salination of many waterways has severely reduced this species distribution.	**Known.** Occurs in the adjacent Serpentine Reservoir however the Survey Area lacks adequate permanent streams to provide suitable aquatic habitat.

Combined Phase Species List

Family	Scientific Name	Species	EPBC listing	DBCA listing	Phase 1	Phase 2
Mammals						
Canidae	*Vulpes vulpes*	Fox	Int	Int	X	X
Dasyuridae	*Sminthopsis gilberti*	Gilberts Dunnart			X	X
Dasyuridae	*Phascogale tapoatafa*	Brush-tailed Phascogale		CD		X
Dasyuridae	*Antechinus flavipes*	Mardo			X	X
Dasyuridae	*Dasyurus geoffroii*	Chuditch	Vu	Vu	X	X
Felidae	*Felis catus*	Feral Cat	Int	Int	X	X
Leporidae	*Oryctolagus cuniculus*	European Rabbit	Int	Int	X	X
Macropodidae	*Notamacropus irma*	Western Brush Wallaby		P4	X	X
Macropodidae	*Macropus fuliginosus*	Western Grey Kangaroo			X	X
Macropodidae	*Setonix brachyurus*	Quokka	Vu	Vu	X	X
Molossidae	*Austronomus australis*	White-striped Free-tailed Bat				X
Molossidae	*Ozimops kitcheneri*	South-western Free-tailed Bat			X	X
Muridae	*Hydromys chrysogaster*	Rakali		P4	X	
Muridae	*Mus musculus*	House Mouse	Int	Int	X	X
Muridae	*Rattus rattus*	Black Rat	Int	Int	X	X
Peramelidae	*Isoodon fusciventer*	Quenda		P4	X	X
Phalangeridae	*Trichosurus vulpecula*	Common Brushtail Possum			X	X
Suidae	*Sus scrofa*	Feral Pig	Int	Int	X	X
Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna			X	X
Vespertilionidae	*Chalinolobus gouldii*	Gould’s Wattled Bat			X	X
Vespertilionidae	*Chalinolobus morio*	Chocolate Wattled Bat			X	X
Vespertilionidae	*Falsistrellus mackenziei*	Western False Pipistrelle		P4	X	X
Vespertilionidae	*Vespadelus regulus*	Southern Forest Bat			X	X
Birds						
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill			X	X

Family	Scientific Name	Species	EPBC listing	DBCA listing	Phase 1	Phase 2
Acanthizidae	*Smicrornis brevirostris*	Weebill			X	X
Acanthizidae	*Gergoyne fusca*	Western Gerygone			X	X
Acanthizidae	*Acanthiza inornata*	Western Thornbill			X	X
Acanthizidae	*Sericornis frontalis*	White-browed Scrubwren			X	X
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill				X
Accipitridae	*Aquila audax*	Wedge-tailed Eagle			X	X
Accipitridae	*Accipiter fasciatus*	Brown Goshawk				X
Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar				X
Alcedinidae	*Dacelo novaeguineae*	Laughing Kookaburra		Int	X	X
Alcedinidae	*Todiramphus sanctus*	Sacred Kingfisher				X
Anatidae	*Chenonetta jubata*	Australian Wood Duck			X	X
Anatidae	*Anas superciliosa*	Pacific Black Duck			X	
Artamidae	*Cracticus torquatus*	Grey Butcherbird			X	X
Artamidae	*Strepera versicolor*	Grey Currawong			X	X
Artamidae	*Cracticus tibicen*	Australian Magpie			X	X
Artamidae	*Artamus cinereus*	Black-faced Wood Swallow				X
Artamidae	*Artamus cyanopterus*	Dusky Woodswallow				X
Cacatuidae	*Calyptorhynchus baudinii*	Baudin’s Cockatoo	En	En	X	X
Cacatuidae	*Calyptorhynchus latirostris*	Carnaby's Cockatoo	En	En	X	X
Cacatuidae	*Calyptorhynchus banksii*	Forest Red-tailed Black Cockatoo	Vu	Vu	X	X
Cacatuidae	*Eolophus roseicapilla*	Galah				X
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike			X	X
Casuariidae	*Dromaius novaehollandiae*	Emu			X	X
Charadriidae	*Vanellus tricolor*	Banded Lapwing			X	
Climacteridae	*Climacteris rufus*	Rufous Tree Creeper			X	X
Climacteridae	*Climacteris affinis*	White-browed Treecreeper				X
Columbidae	*Phaps elegans*	Brush Bronzewing			X	

Family	Scientific Name	Species	EPBC listing	DBCA listing	Phase 1	Phase 2
Columbidae	*Phaps chalcoptera*	Common Bronzewing			X	X
Corvidae	*Corvus coronoides*	Australian Raven			X	X
Corvidae	*Corvus bennetti*	Little Crow			X	
Cuculidae	*Cacomantis flabelliformis*	Fan-tailed Cuckoo			X	
Cuculidae	*Chrysococcyx lucidus*	Shining Bronze-cuckoo				X
Dicaeidae	*Dicaeum hirundinaceum*	Mistletoebird			X	
Estrildidae	*Stagonopleura oculata*	Red-eared Firetail Finch				X
Falconidae	*Falco peregrinus*	Peregrine Falcon		OS		X
Hirundinidae	*Petrochelidon ariel*	Fairy Martin			X	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin			X	X
Locustellidae	*Megalurus cruralis*	Brown Songlark			X	
Maluridae	*Malurus elegans*	Red-winged Fairywren			X	X
Maluridae	*Malurus splendens*	Splendid Fairywren			X	X
Maluridae	*Stipiturus malachurus*	Southern Emu-wren			X	
Meliphagidae	*Phylidonyris novaehollandiae*	New Holland Honeyeater			X	X
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird			X	X
Meliphagidae	*Acanthorhynchus superciliosus*	Western Spinebill			X	X
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater				X
Meliphagidae	*Melithreptus brevirostris*	Brown-headed Honeyeater				X
Meliphagidae	*Lichenostomus virescens*	Singing Honeyeater				X
Meliphagidae	*Anthochaera lunulata*	Western Wattlebird				X
Meliphagidae	*Melithreptus lunatus*	White-napped Honeyeater				X
Meropidae	*Merops ornatus*	Rainbow Bee-eater				X
Monarchidae	*Myiagra inquieta*	Restless Flycatcher			X	
Monarchidae	*Grallina cyanoleuca*	Magpie-lark				X
Neosittidae	*Daphoenositta chrysoptera*	Varied Sitella				X
Pachycephalidae	*Pachycephala occidentalis*	Western Whistler			X	X

Family	Scientific Name	Species	EPBC listing	DBCA listing	Phase 1	Phase 2
Pachycephalidae	*Colluricincla harmonica*	Grey Strike Thrush			X	X
Pachycephalidae	*Pachycephala rufiventris*	Rufous Whistler			X	X
Pardalotidae	*Pardalotus punctatus*	Spotted Pardalote				X
Pardalotidae	*Pardalotus striatus*	Striated Pardalote				X
Petroicidae	*Petroica boodang*	Scarlet Robin			X	X
Petroicidae	*Eopsaltria griseogularis*	Western Yellow Robin			X	X
Petroicidae	*Eopsaltria georgiana*	White-breasted Robin			X	X
Podargidae	*Podargus strigoides*	Tawny Frogmouth			X	X
Psittaculidae	*Platycercus zonarius*	Australian Ringneck Parrot			X	X
Psittaculidae	*Purpureicephalus spurius*	Red-capped Parrot			X	X
Psittaculidae	*Platycercus icterotis*	Western Rosella			X	X
Psittaculidae	*Neophema elegans*	Elegant Parrot				X
Psittaculidae	*Parvipsitta porphyrocephala*	Purple-crowned Lorikeet				X
Psittaculidae	*Trichoglossus moluccanus*	Rainbow Lorikeet		Int		X
Rallidae	*Fulica atra*	Eurasian coot			X	
Rhipiduridae	*Rhipidura albiscapa*	Grey Fantail			X	X
Strigidae	*Ninox boobook*	Southern Boobook			X	X
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis				X
Turnicidae	*Turnix varius*	Painted Button Quail			X	X
Tytonidae	*Tyto novaehollandiae*	Masked Owl		P3	X	
Zosteropidae.	*Zosterops lateralis*	Silvereye			X	X
Reptiles						
Agamidae	*Ctenophorus ornatus*	Ornate Crevice-dragon			X	X
Agamidae	*Pogona minor*	Western Bearded Dragon				X
Boidae	*Morelia spilota*	Carpet Python			X	X
Carphodactylidae	*Underwoodisaurus milii*	Barking Gecko			X	
Elapidae	*Acanthophis antarcticus*	Southern Death Adder		P3	X	

Family	Scientific Name	Species	EPBC listing	DBCA listing	Phase 1	Phase 2
Elapidae	*Pseudonaja affinis*	Dugite				X
Elapidae	*Parasuta gouldii*	Gould's Hooded Snake			X	X
Elapidae	*Suta nigriceps*	Mallee Black-backed Snake				X
Elapidae	*Notechis scutatus*	Tiger Snake				X
Gekkonidae	*Christinus marmoratus*	Marbled Gecko				X
Gekkonidae	*Diplodactylus lateroides*	Speckled stone gecko			X	X
Pygopodidae	*Aprasia pulchella*	Pretty Worm-lizard				X
Scincidae	*Tiliqua rugosa*	Bobtail			X	
Scincidae	*Cryptoblepharus buchananii*	Buchanan's Snake-eyed Skink			X	X
Scincidae	*Menetia greyii*	Common Dwarf Skink			X	X
Scincidae	*Ctenotus labillardieri*	Common south-west Ctenotus			X	X
Scincidae	*Egernia kingii*	King's Skink				X
Scincidae	*Egernia napoleonis*	Napoleon Skink				X
Scincidae	*Morethia obscura*	Shrubland Skink			X	X
Scincidae	*Acritoscincus trilineatus*	South-western cool-skink			X	X
Scincidae	*Hemiergis initialis*	South-western earless skink			X	X
Scincidae	*Lerista distinguenda*	South-western Orange-tailed Slider			X	X
Typhlopidae	*Anilios australis*	Southern Blind Snake				X
Varanidae	*Varanus tristis*	Black-headed Monitor			X	
Varanidae	*Varanus gouldii*	Gould's Monitor			X	X
Varanidae	*Varanus rosenbergi*	Rosenburg's Monitor			X	X
Amphibians						
Limnodynastidae	*Heleioporus eyrei*	Moaning Frog			X	X
Myobatrachidae	*Crinia pseudinsignifera*	Bleating Froglet			X	
Myobatrachidae	*Crinia georgiana*	Quacking Frog			X	X
Myobatrachidae	*Crinia glauerti*	Rattling Froglet				X
Myobatrachidae	*Crinia pseudinsignifera*	False western froglet			X	

Family	Scientific Name	Species	EPBC listing	DBCA listing	Phase 1	Phase 2
Myobatrachidae	*Geocrinia leai*	Leas (ticking) frog			X	X
Pelodryadidae	*Litoria adelaidensis*	Slender Tree Frog			X	X

Phase 1 (June/July 2020): Species recorded during the trapping program including bat detection, bird acoustic, bird census, opportunistic observations, active searches and remote cameras

Family	Taxa	Common name	TL 1	TL2	TL3	TL4	TL5	TL6	TL7	TL8	TL9	TL10	TL11	TL12	Cage Line 1	Cage Line 2	Cage Line 3	Cage Line 4	Cage Line 5	Other (eg. active search etc)	Bird acoustic	Bat acoustic	Camera	Total
Mammals																								
Canidae	*Vulpes vulpes*	Fox	0	0	0	0	0	0	0	0	0	0	0	0						0			3	3
Dasyuridae	*Sminthopsis gilberti*	Gilberts Dunnart	0	0	0	0	0	0	0	0	0	0	0	0						1			6	7
Dasyuridae	*Antechinus flavipes*	Mardo	2	2	0	0	4	5	5	21	0	5	4	1						0			287	336
Dasyuridae	*Dasyurus geoffroii*	Chuditch	0	0	0	0	0	0	0	0	0	0	0	0						1			1	2
Felidae	*Felis catus*	Domestic Cat	0	0	0	0	0	0	0	0	0	0	0	0						0			2	2
Leporidae	*Oryctolagus cuniculus*	European Rabbit	0	0	0	0	0	0	0	0	0	0	0	0						0			1	1
Macropodidae	*Notamacropus irma*	Western Brush Wallaby	0	0	0	0	0	0	0	0	0	0	0	0						47			18	65
Macropodidae	*Macropus fuliginosus*	Western Grey Kangaroo	0	0	0	0	0	0	0	0	0	0	0	0						19			76	95
Macropodidae	*Setonix brachyurus*	Quokka	0	0	0	0	0	0	0	0	0	0	0	0						0			54	54
Molossidae	*Austronomus australis*	White-striped Free-tailed Bat	0	0	0	0	0	0	0	0	0	0	0	0								4		4
Molossidae	*Ozimops kitcheneri*	South-western Free-tailed Bat	0	0	0	0	0	0	0	0	0	0	0	0								20		20
Muridae	*Hydromys chrysogaster*	Rakali	0	0	0	0	0	0	0	0	0	0	0	0									1	1
Muridae	*Mus musculus*	House Mouse	0	0	0	0	0	0	0	0	0	0	0	0						0			38	38
Muridae	*Rattus rattus*	Black Rat	0	0	0	0	0	0	0	0	0	0	0	0						2			61	63
Peramelidae	*Isoodon fusciventer*	Quenda	0	0	0	0	0	0	0	0	0	0	0	1						7			81	89
Phalangeridae	*Trichosurus vulpecula*	Common Brushtail Possum	0	0	0	0	0	0	0	0	0	0	0	0						1			19	20
Suidae	*Sus scrofa*	Feral Pig	0	0	0	0	0	0	0	0	0	0	0	0						2			22	24
Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna	0	0	0	0	0	0	0	0	0	0	0	0						1			30	31
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat	0	0	0	0	0	0	0	0	0	0	0	0								6		6
Vespertilionidae	*Chalinolobus morio*	Chocolate Wattled Bat	0	0	0	0	0	0	0	0	0	0	0	0								2		2
Vespertilionidae	*Falsistrellus mackenziei*	Western False Pipistrelle	0	0	0	0	0	0	0	0	0	0	0	0								3		3
Vespertilionidae	*Vespadelus regulus*	Southern Forest Bat	0	0	0	0	0	0	0	0	0	0	0	0								28		28
Birds																								
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill	0	2	0	3	0	0	0	0	0	0	0	0						4	X			9
Acanthizidae	*Smicrornis brevirostris*	Weebill	2	0	0	1	0	4	0	0	6	4	1	0						9	X			27
Acanthizidae	*Gerygone fusca*	Western Gerygone	1	0	0	0	0	0	0	0	0	0	0	0						2	X			3
Acanthizidae	*Acanthiza inornata*	Western Thornbill	1	0	0	0	0	0	0	0	0	0	0	0						2	X			3
Acanthizidae	*Sericornis frontalis*	White-browed Scrub-wren	0	0	0	0	0	0	0	0	0	0	1	0						2			5	3
Accipitridae	*Aquila audax*	Wedge-tailed Eagle	0	0	0	0	1	0	0	0	0	0	0	0						0				1
Alcedinidae	*Dacelo novaeguineae*	Laughing Kookaburra	0	0	0	0	1	0	0	0	0	1	0	0						10	X		8	20
Anatidae	*Chenonetta jubata*	Australian Wood Duck	0	0	0	0	0	0	0	0	0	0	0	0						0	X		3	3
Anatidae	*Anas superciliosa*	Pacific Black Duck	0	0	0	0	0	2	0	0	0	0	0	0						2			2	6
Artamidae	*Cracticus torquatus*	Grey Butcherbird	0	1	0	0	0	0	0	0	0	0	0	0						0			0	1
Artamidae	*Strepera versicolor*	Grey Currawong	0	0	0	0	0	0	1	4	2	0	1	1						10			1	20
Artamidae	*Cracticus tibicen*	Magpie	1	0	0	0	0	0	0	0	0	0	0	2						9			8	20
Cacatuidae	*Calyptorhynchus baudinii*	Baudin's Cockatoo	0	0	0	0	0	0	0	0	0	0	0	0						49	X			49
Cacatuidae	*Calyptorhynchus latirostris*	Carnaby's Cockatoo	2	0	0	0	0	0	0	0	0	0	0	0						524	X			526
Cacatuidae	*Calyptorhynchus banksii*	Forest Red-tailed Black Cockatoo	10	2	1	0	0	0	0		25	0	1	4						233			4	280

Family	Taxa	Common name	TL 1	TL2	TL3	TL4	TL5	TL6	TL7	TL8	TL9	TL10	TL11	TL12	Cage Line 1	Cage Line 2	Cage Line 3	Cage Line 4	Cage Line 5	Other (eg. active search etc)	Bird acoustic	Bat acoustic	Camera	Total
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike	0	0	0	0	0	0	0	0	0	0	0	0						2			0	2
Casuariidae	*Dromaius novaehollandiae*	Emu	0	0	0	2	0	0	0	0	0	0	0	0						4	X		2	8
Charadriidae	*Vanellus tricolor*	Banded Lapwing	0	0	0	0	0	0	0	0	0	0	0	0						0	X		1	1
Climacteridae	*Climacteris rufus*	Rufous Tree Creeper	0	1	2	1	0	0	0	0	0	0	0	0						1			0	5
Columbidae	*Phaps elegans*	Brush Bronzewing	0	0	0	0	0	0	0	0	0	0	0	0						0			1	1
Columbidae	*Phaps chalcoptera*	Common Bronzewing	0	0	0	0	0	0	0	0	0	0	0	0						3	X		1	4
Corvidae	*Corvus coronoides*	Australian Raven	0	1	15	1	1	0	1	2	5	0	0	2						6			15	49
Corvidae	*Corvus bennetti*	Little Crow	0	0	0	0	0	0	0	0	0	0	0	0						0	X		4	4
Cuculidae	*Cacomantis flabelliformis*	Fan-tailed Cuckoo	0	1	0	0	0	0	0	0	0	0	1	0						1	X		0	3
Dicaeidae	*Dicaeum hirundinaceum*	Mistletoebird																		1				1
Hirundinidae	*Petrochelidon ariel*	Fairy Martin	0	0	0	0	0	0	0	0	0	0	0	0						4	X		0	4
Hirundinidae	*Petrochelidon nigricans*	Tree Martin																		1				1
Locustellidae	*Megalurus cruralis*	Brown Songlark	0	0	0	0	0	0	0	0	0	0	0	0						0	X		3	3
Maluridae	*Malurus elegans*	Red-winged Fairywren	0	0	0	0	0	0	0	0	0	0	0	0						0	X		2	3
Maluridae	*Malurus splendens*	Splendid Fairywren	2	2	0	0	0	0	0	0	1	0	6	0						1	X		76	88
Maluridae	*Sericornis maculatus*	Spotted Scrubwren	0	0	0	0	0	0	0	0	0	0	0	0						0			2	2
Maluridae	*Malurus lamberti*	Variegated Fairy Wren	0	0	0	0	0	0	0	0	0	0	0	0						0	X		23	23
Meliphagidae	*Phylidonyris novaehollandiae*	New Holland Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0						1			1	2
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird	2	0	0	0	1	0	0	0	0	2	1	0						5	X		0	11
Meliphagidae	*Acanthorhynchus superciliosus*	Western Spinebill	0	0	1	0	0	0	0	0	0	0	0	0						0	X		1	2
Monarchidae	*Myiagra inquieta*	Restless Flycatcher	0	0	0	1	0	0	0	0	0	0	0	0						0	X		0	1
Pachycephalidae	*Pachycephala pectoralis*	Golden Whistler	0	0	0	0	0	0	0	0	0	1	0	0						3	X		0	4
Pachycephalidae	*Colluricincla harmonica*	Grey Strike Thrush	2	0	1	0	0	0	0	0	0	0	2	1						5			0	11
Pachycephalidae	*Pachycephala occidentalis*	Western Whistler	0	0	0	0	0	0	0	0	0	0	0	0						0	X		1	1
Petroicidae	*Petroica boodang*	Scarlet Robin	0	0	0	1	0	0	0	0	0	0	1	0						9			17	28
Petroicidae	*Eopsaltria griseogularis*	Western Yellow Robin	2	0	0	0	0	0	0	0	0	0	0	0						6			0	8
Petroicidae	*Eopsaltria georgiana*	White-breasted Robin	0	0	0	0	0	0	0	0	0	0	1	0						2			1	4
Podargidae	*Podargus strigoides*	Tawny Frogmouth																		2				2
Psittaculidae	*Platycercus zonarius*	Australian Ringneck Parrot	0	1	1	0	0	3	0	4	2	2	5	0						4			1	23
Psittaculidae	*Purpureicephalus spurius*	Red-capped Parrot	0	0	0	0	0	0	0	0	1	0	0	0						4			1	6
Psittaculidae	*Platycercus icterotis*	Western Rosella	0	0	0	0	0	0	0	0	0	0	0	0						6	X		5	11
Rallidae	*Fulica atra*	Eurasian coot	0	0	0	0	0	0	0	0	0	0	0	0						0	X		1	1
Rhipiduridae	*Rhipidura albiscapa*	Grey Fantail	0	2	0	3	0	0	0	0	2	0	1	1						3			0	12
Strigidae	*Ninox boobook*	Southern Boobook	0	0	0	0	0	0	0	0	0	0	0	0						0	X		2	2
Turnicidae	*Turnix varius*	Painted Button Quail	0	0	0	0	0	0	0	0	0	0	0	0						0	X		7	7
Tytonidae	*Tyto novaehollandiae*	Masked Owl	0	0	0	0	0	0	0	0	0	0	0	0						0			2	2
Reptiles																								
Agamidae	*Ctenophorus ornatus*	Ornate Crevice-dragon	0	0	0	0	5	0	0	0	0	0	0	0						15			0	20
Boidae	*Morelia spilota imbricata*	Carpet Python	0	0	0	0	0	0	0	0	0	0	0	0						2			0	2
Carphodactylidae	*Underwoodisaurus milii*	Barking Gecko	0	0	0	0	2	0	0	0	0	0	5	0						45			0	52

Family	Taxa	Common name	TL 1	TL2	TL3	TL4	TL5	TL6	TL7	TL8	TL9	TL10	TL11	TL12	Cage Line 1	Cage Line 2	Cage Line 3	Cage Line 4	Cage Line 5	Other (eg. active search etc)	Bird acoustic	Bat acoustic	Camera	Total
Elapidae	*Acanthophis antarcticus*	Southern Death Adder	0	0	0	0	0	0	0	0	0	0	0	0						2			0	2
Elapidae	*Suta gouldii*	Gould's hooded snake	0	0	0	0	0	0	0	0	0	0	0	0						2			0	2
Gekkonidae	*Diplodactylus lateroides*	Speckled stone gecko	0	0	0	0	0	0	0	0	0	0	0	0						2			0	2
Scincidae	*Tiliqua rugosa*	Bobtail	0	0	0	0	0	0	0	0	0	0	0	0						0			5	5
Scincidae	*Cryptoblepharus buchananii*	Buchanan's Snake-eyed Skink	0	0	0	0	0	0	0	0	0	0	0	0						2				2
Scincidae	*Menetia greyii*	Common Dwarf skink	0	0	0	0	0	0	0	0	0	0	1	0						0			0	1
Scincidae	*Ctenotus labillardieri*	Common south-west Ctenotus	0	0	0	0	0	0	0	0	0	0	0	0						4			0	4
Scincidae	*Morethia obscura*	Shrubland Skink	0	0	0	0	0	0	0	0	1	1	0	0						0			0	2
Scincidae	*Acritoscincus trilineatus*	South western cool-skink	0	0	0	0	0	0	0	0	0	0	0	3						0			0	3
Scincidae	*Hemiergis initialis*	Southwestern earless skink	0	0	0	0	0	0	0	0	1	1	0	0						5			0	7
Scincidae	*Lerista distinguenda*	South-western Orange-tailed Slider	0	0	0	0	0	0	0	0	0	0	0	0						1				1
Varanidae	*Varanus gouldii*	Gould's Monitor	0	0	0	0	0	0	0	0	0	0	0	0						0			1	1
Varanidae	*Varanus tristis*	Black-headed Monitor	0	0	0	0	0	0	0	0	0	0	0	0						1				1
Varanidae	*Varanus rosenbergi*	Rosenberg's Monitor	0	0	0	0	0	0	0	0	0	0	0	0						0			1	1
Amphibians																								
Limnodynastidae	*Heleioporus eyrei*	Moaning Frog	0	0	0	0	1	0	0	0	0	0	1	0						0			0	2
Myobatrachidae	*Crinia pseudinsignifera*	Bleating Froglet	1	0	0	0	2	0	0	0	0	0	0	1						0			0	4
Myobatrachidae	*Crinia georgiana*	Quacking Frog	0	1	0	0	2	2	0	0	0	0	1	3						54			0	63
Myobatrachidae	*Crinia glauerti*	Glauert’s Froglet	0	0	0	0	0	0	0	0	0	0	0	0						51			0	51
Myobatrachidae	*Geocrinia leai*	Lea’s (ticking) frog	0	0	0	0	0	0	0	0	0	0	0	0						22			0	22
Pelodryadidae	*Litoria adelaidensis*	Slender Tree Frog	0	0	0	0	0	0	0	0	0	0	0	1						0			0	1

*Note: numbers per trap line include animals physically captured in traps as well as those detected via active search, bird census or opportunistically at that trap site.

X – indicates the presence of a species detected either by signs (scat, tracks, feathers, etc.) as well as those detected on an acoustic recorder where number of individuals could not be determined however presence of species could be confirmed.

Trap Line habitat assessment summary

Trap Line I.D	Location		Habitat type/structure	Veg condition	Aspect	Slope	Soil type	Soil colour	Drainage	Bare ground cover	Litter cover	Last fire	Disturbance
	Easting	Northing											
Trap Line 1	426987	6413519	Upland Jarrah Marri forest over mid storey shrubland. Mid to upper slope areas on gravel-lateritic clay loam soil.	Excellent	North/ East	none	gravel sandy clay	orange/ brown	Good	2-10%	31-70%	Moderate (3 to 5 yr) but for phase 2 the site was burnt 3 weeks prior	road
Trap Line 2	424252	6425012	Blackbutt forest over sparse *Banksia littoralis*.	Excellent	south	gentle	clay loam	brown	Good	2-10%	31-70%	Moderate (3 to 5 yr)	frequent fire
Trap Line 3	427900	6412972	Melaleuca dampland - with isolated Jarrah over sparse isolated *Banksia littoralis* low shrubs on grey clay loam.	Excellent	Flat	none	clay	pale brown	poor	2-10%	50-10%	Moderate (3 to 5 yr)	negligible
Trap Line 4	426279	6422853	Upland Jarrah Marri forest over mid storey shrubland. Mid to upper slope areas on gravel-lateritic clay loam soil.	Excellent	Flat	none	gravel sandy clay	orange/ brown	Good	2-10%	31-70%	Old (6+ yr)	road
Trap Line 5	419173	6422951	Granite Outcrop with *Banksia* woodland - *Melaleuca pressiana*, Jarrah Marri forest, over mid shrubland.	Very Good	Flat	none	Sand	grey	Good	2-10%	31-70%	Moderate (3 to 5 yr)	fire
Trap Line 6	420734	6417238	Flooded Gum woodland - tall open forest associated with drainage lines. Low sparse woodland over long low shrub/sedgeland	Very Good	Flat	none	Clay	brown	Seasonal wet	2-10%	11-30%	Moderate (3 to 5 yr)	negligible
Trap Line 7	421559	6418605	Jarrah Marri forest with Sheoak over low closed shrub	Excellent	Flat		Gritty sand	yellow/ brown	Good	11-30%	11-30%	Moderate (3 to 5 yr)	negligible

Trap Line 8	428302	6417251	Upland Jarrah Marri forest with Sheoak.	Excellent	West	gentle	Gritty sand	yellow	Good	2-10%	31-70%	Old (6+ yr)	road
Trap Line 9	427604	6410609	Jarrah Marri forest with Sheoak over low open woodland and shrubland	Excellent	North/ East	none	Gritty sand	orange	Good	11-30%	31-70%	Old (6+ yr)	negligible
Trap Line 10	413197	6421772	Jarrah Marri forest Low Hills - occasional Sheoak, over *Banksia grandis*, low-mid shrubland.	Excellent	East	gentle	Gritty sand	yellow	Good	2-10%	31-70%	Old (6+ yr)	negligible
Trap Line 11	424815	6421905	Granite Outcrop amongst Jarrah Marri forest with Sheoak	Excellent	North/ East	moderate	Gritty sand	yellow	Good	<2%	31-70%	Old (6+ yr)	Dieback (?) uphill
Trap Line 12	418020	6420561	*Banksia littoralis* Riparian, Jarrah Marri forest, with Sheoak over shrubs	Very Good	Flat	gentle	Gritty sand	orange	Seasonal wet	2-10%	11-30%	Old (6+ yr)	road

Results from bird acoustic analysis

Bat call analysis summary report

Call identification was assisted by consulting distribution information for potential species (Armstrong 2011; Churchill 2008; Van Dyck *et al.* 2013) and records from NatureMap (2020). No reference calls were collected during the survey.

Data was processed and analysed using a combination of manual review and automated processes using Kaleidoscope Pro (Wildlife Acoustic, version 5.3.6) and Anabat Insight (Titley Scientific, version 1.9.2) using the following process:

1. Files were downloaded from the units and saved to an external hard drive (back up copy) following the survey for later processing and analysis
2. For compressed .wav4 and .wac files (full spectrum) collected using the Song Meter units, files were converted to standard .wav using the conversion function in Kaleidoscope Pro
3. For each night data was manually reviewed for bat calls using Kaleidoscope Pro or Anabat Insight from sunset onwards for approximately 30 minutes by visually comparing the time-frequency graph and call characteristics (e.g. peak frequency, characteristic frequency and call shape) with species call descriptions from published guidelines (e.g. Webala *et al*. 2010, Burgar *et al* various dates)
4. Data was then processed using Wildlife Acoustic Kaleidoscope Pro signal parameter batch processing, then cluster analysis features
5. Data from the cluster analysis process was then labelled and reviewed against the data labelled during step 3 for validation purposes to accurately identify species.

A call (pass) was defined as a sequence of three or more consecutive pulses of similar frequency. Calls with less than three defined consecutive pulses of similar frequency and shape were not unambiguously identified to a species but may be used as part of the activity count for the Survey Area. Due to variability in the quality of calls and the difficulty in distinguishing some species the identification of each call was assigned a confidence rating (see Mills *et al.* 1996 & Duffy *et al*. 2000) during the manual validation process as summarised in the table below.

Confidence rating applied to calls

Identification	Description
D - Definite	Species identification not in doubt.
PR - Probable	Call most likely to represent a particular species, but there exists a low probability of confusion with species of similar call type or call lacks sufficient detail.
SG - Species Group	Call made by one of two or more species. Call characteristics overlap, particularly poor quality calls or mixed species calls making it difficult to distinguish between species.

Bat detector effort and site location

Bat detector site	Phase	Detector name	Start Date	End Date	Easting	Northing	Location details
1	1	sm4-1	24/06/20	30/06/20	426282	6417199	Along cage line 41-50
2	1	sm4-5	24/06/20	29/06/20	419249	6423008	TL1
3	1	sm2-3	24/06/20	30/06/20	417973	6420593	Drainage line
4	1	sm4-4	24/06/20	30/06/20	417931	6422315	Drainage line
5	1	sm4-5	29/06/20	2/07/20	421589	6418754	Near TL2 in blackbutt
6	1	sm4-1	30/06/20	2/07/20	427915	6412940	TL5
7	1	sm4-4	30/06/20	3/07/20	425197	6414173	open Jarrah between tl2 and tl3
8	1	sm2-3	30/06/20	2/07/20	424270	6416696	near TL3 - melaleuca lowland/Jarrah
9	1	sm4-5	2/07/20	6/07/20	427860	6411147	on granite boulder, surface water present, near tl6
10	1	sm4-1	2/07/20	4/07/20	425818	6421856	upland Jarrah/Marri woodland
11	1	sm4-4	3/07/20	6/07/20	421309	6416290	Jarrah woodland
12	2	SM4-4	3/11/20	5/11/20	415676	6414950	Granite
13	2	SM4-1	3/11/20	6/11/20	420798	6417251	Granite
14	2	SM4-4	3/11/20	6/11/20	420771	6417263	Serpentine Dam carpark
15	2	SM4-1	6/11/20	9/11/20	426302	6422178	Near eastern survey boundary
16	2	SM4-2	6/11/20	9/11/20	425097	6426021	Northern Survey Area
17	2	SM2-3	6/11/20	9/11/20	423254	6417433	Undulating low hills
18	2	SM4-4	6/11/20	9/11/20	421492	6418891	TL2
19	2	SM4 -1	9/11/20	11/11/20	422176	6420640	Central north - drainage line?

Results

Approximately 59,516 full spectrum .wav files were analysed (all sites all nights combined) of which approximately 68% were identified as bat call of some description. At least seven species were positively (Definite) identified of the 11 or so species that are known to occur from the locality of the Study Area. As many as two other species may also have been recorded, but poor data quality and/or interspecific call similarities precluded reliable identification of additional species. Table 3, 4, 5 and 3 provides a list of definite and probable species recorded for each night.

No threatened species listed under the *Biodiversity Conservation Act 2016* and *Environment Protection and Biodiversity Conservation Act 1999* were recorded (Definite) as a result of call analysis.

Myara North Phase 1 bat call analysis results per site

Site / date	White-striped Free-tailed Bat *Austronomus australis*	South-Western Free-tailed Bat *Ozimops kitcheneri*	Gould's Wattled Bat *Chalinolobus gouldii*	*C. gouldii/O. kitcheneri*	Western False Pipistrelle *Falsistrellus mackenziei*	Southern Forest Bat *Vespadelus regulus*	Chocolate Wattled Bat *Chalinolobus morio*	Long-eared Bat sp *Nyctophilus geoffroyi/gouldi/major*
SM2-3								
24/06/2020	D					D		
25/06/2020						D		
26/06/2020	D				D	D		
27/06/2020					D	D		
SM4-1								
26/06/2020		D				D		
27/06/2020		D		SG		D		
28/06/2020				SG				
30/06/2020		D	D			D		
1/07/2020		D	D		PR	D		SG
3/07/2020						D		
SM4-4								
24/06/2020		D		SG		D		
25/06/2020	D					D		
26/06/2020		D		SG		D	PR	
27/06/2020			D	SG		D		
28/06/2020						PR		
30/06/2020		PR	PR					
1/07/2020		PR				D		
3/07/2020						D		SG
4/07/2020		D		SG		D		
5/07/2020		D	D		D	D		
6/07/2020						PR		
SM4-5								
24/06/2020						D		
25/06/2020		PR				PR		
27/06/2020	D					D	PR	
28/06/2020						D		SG
29/06/2020				SG				
30/06/2020						D		SG
1/07/2020						D		
2/07/2020						D		
3/07/2020						D		
4/07/2020		D	D			D		

Myara North Phase 2 bat call analysis results per site

Site / date	White-striped Free-tailed Bat *Austronomus australis*	South-Western Free-tailed Bat *Ozimops kitcheneri*	Gould's Wattled Bat Chalinolobus gouldii	C. gouldii/ F. mackenzie	Western False Pipistrelle *Falsistrellus mackenziei*	Southern Forest Bat *Vespadelus regulus*	Chocolate Wattled Bat *Chalinolobus morio*
SM2-3							
6/11/2020	D	PR	D	SG		D	D
7/11/2020	D	D	D	SG	PR	D	D
8/11/2020	D	D	D	SG	PR	D	D
9/11/2020		PR	D	SG		D	
SM4-1A							
3/11/2020		D				D	
4/11/2020	D	PR				D	
5/11/2020	D	D		SG		D	
6/11/2020	D	D	D	SG	D	D	D
7/11/2020		PR	D	SG	D	D	D
8/11/2020	D	D	D	SG	D	D	PR
9/11/2020	D					PR	
SM4-2							
6/11/2020	D	PR		SG	PR	D	
7/11/2020	D		D	SG	D	D	
8/11/2020	D	D	D	SG		D	
9/11/2020	D	PR	D	SG	PR	D	
SM4-4							
3/11/2020	D	PR				D	
4/11/2020		D				D	
5/11/2020	D	PR		SG	D	D	
6/11/2020	D	D	D	SG	D	D	D
7/11/2020	D	D	D	SG	PR	D	D
8/11/2020	D	D	D	SG	D	D	D
9/11/2020		PR				D	PR

References

Armstrong, K. N. (2011). The current status of bats in Western Australia. In: 'The biology and conservation of Australasian bats.' (Eds B. Law, P. Eby, D. Lunney and L. Lumsden.) pp. 257–269. (Royal Zoological Society of New South Wales: Mosman.)

Burgar, Joanna (2014) Bat habitat use of restored Jarrah eucalypt forests in south-western Australia. Submitted PHD. School of Veterinary & Life Sciences Murdoch University, Perth, Western Australia.

Burgar, Joanna & Craig, Michael & Stokes, Vicki. (2012). Investigating the congruence between vegetation succession and faunal recolonization in a production landscape: A case study of bats in south-western Australia.

Burgar, Joanna & Stokes, Vicki & Craig, Michael. (2017). Habitat features act as unidirectional and dynamic filters to bat use of production landscapes. Biological Conservation. 209. 280-288. 10.1016/j.biocon.2017.02.024.

Burgar, Joanna & Craig, Michael & Stokes, Vicki. (2015). The importance of mature forest as bat roosting habitat within a production landscape. Forest Ecology and Management. 356. 10.1016/j.foreco.2015.07.027.

Churchill, S (2008). Australian Bats, Allen and Unwin, Australia.

Duffy, AM, Lumsden, LF, Caddle, CR, Chick, RR & Newell, GR (2000). The efficacy of Anabat ultrasonic detectors and harp traps for surveying microchiropterans in southeastern Australia, Acta Chiropterologica 2: 127-144.

Mills, DJ, Norton, TW, Parnaby, HE, Cunningham, RB & Nix, HA (1996), Designing surveys for microchiropteran bats in complex forest landscapes – a pilot study from south-east Australia. Forest Ecology and management 85 (1-3):149-161.

Reardon, T. B., McKenzie, N. L., Cooper, S. J. B., Appleton., B., Carthew, S. and Adams, M (2014) A molecular and morphological investigation of species boundaries and phylogenetic relationships in Australian free-tailed bats Mormopterus (Chiroptera : Molossidae). Australian Journal of Zoology 62: 109-136.

Van Dyke. S, Gynther. I, and Baker. A. (2013). Field Companion To The Mammals of Australia. New Holland Publishers.

Webala, Paul & Craig, Michael & Law, Bradley & Armstrong, Kyle & Wayne, Adrian & Bradley, J. (2010). Bat habitat use in logged Jarrah eucalypt forests of south-western Australia. Journal of Applied Ecology. 48. 398 - 406. 10.1111/j.1365-2664.2010.01934.x

Rakali transcript data

Myara North Rakali												Rakali evidence			Other evidence							Suitability	
Plot	date	Lats	Long	type	size	bank	substrate	vegetation	TsFire	water prnt/ size	condition	shtig	print	midn.	tdpls	frogs	Crust.	fish	Roo	Pig	water plant	Rakali	Comments
					(width)	(height)	(type)	(Broad type)	(years)														
R1	11/11/20	423939	6412164	creek	4m	1.8m	mud	mixed shrubs/sedge over Marri, Jarrah, Blackbutt	3-5y	yes-pool 4x1.5m x 15cm	Excellent						burrow, shells			trots		Potential seasonally	Mid Serpentine River
R2	11/11/20	427580	6410417	creek	4m	1.6m	mud	mixed shrubs/sedge over *E. rudis* and Blackbutt	3-5y	yes-pool 6x0.5m x 10cm	Excellent						burrow				yes	Too seasonal	Upper reaches Serpentine River
R3	10/11/20	425302	6413889	creek	3.5m	1m	mud	Low mixed shrubs over Marri, Jarrah, Melaleuca	3-5y	yes-pool 15x3m x 20cm	excellent				2		burrow					Too seasonal	
R4	10/11/20	424314	6416065	creek	2m	0.6m	rock/sand	regrowth mixed shrub	2y	dry	excellent									digs		Too seasonal	
R5	10/11/20	425384	6419120	creek	2.5m	1.2m	rock/sand	Mixed shrubs and sedge over Jarrah, Marri	3-5y	dry, damp soil	excellent				3	3					yes	Too seasonal	
R6	10/11/20	421498	6418609	creek	3m	1.6m	rocky/mud	Mixed shrub/ Bracken over Blackbutt, Marri	5-10y	dry	excellent											Too seasonal	
R7	10/11/20	416107	6417671	creek	2m	1m	loam	mixed shrub/sedge/Banksia over Marri/Jarrah	3-5y	dry	excellent				2							Too seasonal	
R8	10/11/20	417942	6420003	creek	3m	0.6m	bauxite	nothing	1y	yes-pool 3x10mx20cm	burnt					2						Too seasonal	
R9	11/11/20	420847	6407516	creek	20m	0.6m	rock/loam	regrowth mixed shrub and sedge	3-5y	yes -flow 1m deep	excellent					2	shells		scat	trot		suitable, large water body, specimen recorded on camera	Section of Big Brook
R10	11/11/20	419328	6404941	creek	3m	0.8m	rock/loam	mixed shrub/sedge/Banksia over Marri/Jarrah	5-10y	yes -flow to 3m deep	excellent					1			scat			suitable	
R11	5/11/20	419780	6417774	creek	5m	1.5m	mud/sand	mixed shrubs over Jarrah/Marri	10y	yes -flow 1m deep	pristine				6				2			suitable	
R12	4/11/2020	424220	6416019	creek	2m	0.6m	rock/sand	regrowth mixed shrub	2y	dry	excellent											Too seasonal	
R13	4/11/2020	425346	6413895	creek	4m	1.2m	rock/sand	mixed shrubs on granite	3-5y	yes-pool 4x3mx 40 cm	excellent											Too seasonal	
R14	5/11/2020	424902	6413431	creek	5m	1.5m	rock/sand	mixed shrubs on granite	3-5y	yes-pool 6 x 5mx 50 cm	excellent				4		burrow					Too seasonal	

Carters Freshwater Mussel transect data

Myara North Carters Freshwater Mussel												Mussel evidence			Other evidence							Suitability
Plot	date	Easting	Northing	type	size	bank	substrate	vegetation	TsFire	water present/ size	condition	sighting	shells	shells	tdpls	frogs	Yabbie	fish	Roo	Pig	wtrplnt	Mussel
					(wdth)	(hght)	(type)	(Broad type)	(yrs)	(cm)		(Live)	(water)	(bank)								
CFM1																						
1	11/11/20	423939	6412164	creek	4m	1.8m	mud	mixed shrubs/sedge over Marri/Jarrah/Blackbutt	3-5y	water 4x1.5m x 15cm	Excellent						burrow					Not suitable, too seasonal
2	11/11/20	423959	6412148	creek	4m	1.8m	mud	mixed shrubs/sedge over Marri/Jarrah/Blackbutt	3-5y	dry, damp	Excellent											Not suitable, too seasonal
3	11/11/20	423965	6412141	creek	4m	1.8m	mud	mixed shrubs/sedge over Marri/Jarrah/Blackbutt	3-5y	dry, damp	Excellent											Not suitable, too seasonal
4	11/11/20	423973	6412134	creek	4m	1.8m	mud	mixed shrubs/sedge over Marri/Jarrah/Blackbutt	3-5y	dry, damp	Excellent											Not suitable, too seasonal
5	11/11/20	423948	6412176	creek	4m	1.8m	mud	mixed shrubs/sedge over Marri/Jarrah/Blackbutt	3-5y	dry, damp	Excellent											Not suitable, too seasonal
6	11/11/20	423953	6412203	creek	4m	1.8m	mud	mixed shrubs/sedge over Marri/Jarrah/Blackbutt	3-5y	dry, damp	Excellent											Not suitable, too seasonal
7	11/11/20	423934	6412229	creek	4m	1.8m	mud/rock	mixed shrubs/sedge over Marri/Jarrah/Blackbutt	3-5y	dry, damp	Excellent											Not suitable, too seasonal
8	11/11/20	423906	6412241	creek	4m	1.8m	mud/rock	mixed shrubs/sedge over Marri/Jarrah/Blackbutt	3-5y	dry, damp	Excellent						shells					Not suitable, too seasonal
9	11/11/20	423887	6412256	creek	4m	1.8m	mud	mixed shrubs/sedge over Marri/Jarrah/Blackbutt	3-5y	dry, damp	Excellent									trot		Not suitable, too seasonal
10	11/11/20	423867	6412273	creek	4m	1.8m	mud	mixed shrubs/sedge over Marri/Jarrah/Blackbutt	3-5y	dry, damp	Excellent											Not suitable, too seasonal
CFM2																						
1	11/11/20	427580	6410417	creek	4m	1.6m	mud	mixed shrubs/sedge over *E.rudis*/Blackbutt	3-5y	water 6x0.5m x 10cm	Excellent						burrow				yes	Not suitable, too seasonal and small
2	11/11/20	427593	6410412	creek	4m	1.6m	mud	mixed shrubs/sedge over *E.rudis*/Blackbutt	3-5y	dry, damp	Excellent											Not suitable, too seasonal and small
3	11/11/20	427612	6410413	creek	4m	1.6m	mud	mixed shrubs/sedge over *E.rudis*/Blackbutt	3-5y	dry, damp	Excellent						burrow					Not suitable, too seasonal and small
4	11/11/20	427620	6410395	creek	4m	1.6m	mud	mixed shrubs/sedge over *E.rudis*/Blackbutt	3-5y	dry, damp	Excellent											Not suitable, too seasonal and small
5	11/11/20	427556	6410443	creek	4m	1.6m	mud	mixed shrubs/sedge over *E.rudis*/Blackbutt	3-5y	dry, damp	Excellent											Not suitable, too seasonal and small
6	11/11/20	427531	6410448	creek	4m	1.6m	mud	mixed shrubs/sedge over *E.rudis*/Blackbutt	3-5y	dry, damp	Excellent											Not suitable, too seasonal and small
7	11/11/20	427532	6410420	creek	4m	1.6m	mud	mixed shrubs/sedge over *E.rudis*/Blackbutt	3-5y	dry, damp	Excellent											Not suitable, too seasonal and small
8	11/11/20	427519	6410412	creek	4m	1.6m	mud	mixed shrubs/sedge over *E.rudis*/Blackbutt	3-5y	water 15x4m x 50cm	Excellent						burrow					Not suitable, too seasonal and small
9	11/11/20	427511	6410427	creek	4m	1.6m	mud	mixed shrubs/sedge over *E.rudis*/Blackbutt	3-5y	water 15x4m x 50cm	Excellent						burrow					Not suitable, too seasonal and small
CFM3																						

Myara North Carters Freshwater Mussel												Mussel evidence			Other evidence							Suitability
Plot	date	Easting	Northing	type	size	bank	substrate	vegetation	TsFire	water present/ size	condition	sighting	shells	shells	tdpls	frogs	Yabbie	fish	Roo	Pig	wtrplnt	Mussel
					(wdth)	(hght)	(type)	(Broad type)	(yrs)	(cm)		(Live)	(water)	(bank)								
1	10/11/20	425302	6413889	creek	3.5m	1m	mud	Low mixed shrubs over Marri/Jarrah/Melaleuca	3-5y	water 15x3m x 20cm	excellent											Not suitable, too seasonal and small
2	10/11/20	425328	6413913	creek	3.5m	1m	mud	Low mixed shrubs over Marri/Jarrah/Melaleuca	3-5y	water 4x3m x 10cm	excellent				2		burrow					Not suitable, too seasonal and small
3	10/11/20	425349	6413897	creek	3.5m	1m	granite	Low mixed shrubs over Marri/Jarrah/Melaleuca	3-5y	water 12x3m x 30cm	excellent						burrow					Not suitable, too seasonal and small
4	10/11/20	425383	6413884	creek	3.5m	1m	granite	Low mixed shrubs over Marri/Jarrah/Melaleuca	3-5y	dry	excellent											Not suitable, too seasonal and small
5	10/11/20	425411	6413878	creek	3.5m	1m	granite	Low mixed shrubs over Marri/Jarrah/Melaleuca	3-5y	dry	excellent											Not suitable, too seasonal and small
6	10/11/20	425306	6413865	creek	3.5m	1m	sand/rock	Low mixed shrubs over Marri/Jarrah/Melaleuca	3-5y	dry, damp soil	excellent											Not suitable, too seasonal and small
7	10/11/20	425312	6413842	creek	3.5m	1m	sand/rock	Low mixed shrubs over Marri/Jarrah/Melaleuca	3-5y	dry, damp soil	excellent											Not suitable, too seasonal and small
8	10/11/20	425283	6413823	creek	3.5m	1m	sand/rock	Low mixed shrubs over Marri/Jarrah/Melaleuca	3-5y	dry, damp soil	excellent											Not suitable, too seasonal and small
9	10/11/20	425246	6413809	creek	3.5m	1m	sand/rock	Low mixed shrubs over Marri/Jarrah/Melaleuca	3-5y	dry, damp soil	excellent											Not suitable, too seasonal and small
10	10/11/20	425217	6413809	creek	3.5m	1m	sand/rock	Low mixed shrubs over Marri/Jarrah/Melaleuca	3-5y	dry, damp soil	excellent											Not suitable, too seasonal and small
CFM4																						
1	10/11/20	424314	6416065	creek	2m	0.6m	rock/sand	regrowth mixed shrub	2y	dry	excellent											Not suitable, too seasonal and small
2	10/11/20	424340	6416092	creek	2m	0.6m	rock/sand	regrowth mixed shrub	2y	dry	excellent											Not suitable, too seasonal and small
3	10/11/20	424368	6416108	creek	3m	0.6m	rock/sand	regrowth mixed shrub	2y	dry	excellent											Not suitable, too seasonal and small
4	10/11/20	424404	6416136	creek	2m	0.6m	sand	regrowth mixed shrub	2y	dry	excellent											Not suitable, too seasonal and small
5	10/11/20	424400	6416176	creek	2m	0.6m	sand	regrowth mixed shrub	2y	dry	excellent											Not suitable, too seasonal and small
6	10/11/20	424291	6416034	creek	2m	0.6m	sand damp	regrowth mixed shrub	2y	dry	excellent											Not suitable, too seasonal and small
7	10/11/20	424269	6416056	creek	2m	1m	sand damp	regrowth mixed shrub	2y	dry	excellent									digs		Not suitable, too seasonal and small

Myara North Carters Freshwater Mussel												Mussel evidence			Other evidence							Suitability
Plot	date	Easting	Northing	type	size	bank	substrate	vegetation	TsFire	water present/ size	condition	sighting	shells	shells	tdpls	frogs	Yabbie	fish	Roo	Pig	wtrplnt	Mussel
					(wdth)	(hght)	(type)	(Broad type)	(yrs)	(cm)		(Live)	(water)	(bank)								
8	10/11/20	424231	6416035	creek	2m	1m	sand damp	regrowth mixed shrub	2y	dry	excellent									digs		Not suitable, too seasonal and small
9	10/11/20	424197	6416010	creek	2m	1m	rock/sand	regrowth mixed shrub	2y	dry	excellent									digs		Not suitable, too seasonal and small
10	10/11/20	424176	6416000	creek	2m	1m	rock/sand	regrowth mixed shrub	2y	dry	excellent									digs		Not suitable, too seasonal and small
CFM5																						
1	10/11/20	425384	6419120	creek	2.5m	1.2m	rock/sand	Mixed shrubs and sedge over Jarrah/Marri	3-5y	dry, damp soil	excellent											Not suitable, too seasonal and small
2	10/11/20	425343	6419098	creek	2.5m	1.2m	rock/sand	Mixed shrubs and sedge over Jarrah/Marri	3-5y	water 6x4mx40cm	excellent				3	3					yes	Not suitable, too seasonal and small
3	10/11/20	425316	6419108	creek	2.5m	1.2m	rock/sand	Mixed shrubs and sedge over Jarrah/Marri	3-5y	dry, damp soil	excellent											Not suitable, too seasonal and small
4	10/11/20	425381	6419083	creek	2.5m	1.2m	rock/sand	Mixed shrubs and sedge over Jarrah/Marri	3-5y	dry, damp soil	excellent											Not suitable, too seasonal and small
5	10/11/20	425414	6419077	creek	2.5m	1.2m	rock/sand	Mixed shrubs and sedge over Jarrah/Marri	3-5y	dry, damp soil	excellent											Not suitable, too seasonal and small
6	10/11/20	425292	6419119	creek	2.5m	1.2m	rock/sand	Mixed shrubs and sedge over Jarrah/Marri	3-5y	water 6x4mx30cm	excellent				1	1					yes	Not suitable, too seasonal and small
7	10/11/20	425271	6419130	creek	2.5m	1.2m	rock/sand	Mixed shrubs and sedge over Jarrah/Marri	3-5y	water 3x3mx20cm	excellent				1	1					yes	Not suitable, too seasonal and small
8	10/11/20	425247	6419119	creek	2.5m	1.2m	rock/sand	Mixed shrubs and sedge over Jarrah/Marri	3-5y	dry, damp soil	excellent											Not suitable, too seasonal and small
9	10/11/20	425218	6419138	creek	2.5m	1.2m	rock/sand	Mixed shrubs and sedge over Jarrah/Marri	3-5y	water 35x2mx30cm	excellent				2						yes	Not suitable, too seasonal and small
10	10/12/20	425193	6419143	creek	2.5m	1.2m	rock/sand	Mixed shrubs and sedge over Jarrah/Marri	3-5y	dry, damp soil	excellent											Not suitable, too seasonal and small
CFM6																						
1	10/11/20	421498	6418609	creek	3m	1.6m	rocky/mud	Mixed shrub/ Bracken over Blackbutt/Marri	5-10y	dry	excellent											Not suitable, too seasonal and small
2	10/11/20	421539	6418540	creek	3m	1.6m	rocky/mud	Mixed shrub/ Bracken over Blackbutt/Marri	5-10y	dry	excellent											Not suitable, too seasonal and small
3	10/11/20	421557	6418506	creek	3m	1.6m	rocky/mud	Mixed shrub/ Bracken over Blackbutt/Marri	5-10y	dry	excellent											Not suitable, too seasonal and small
4	10/11/20	421592	6418460	creek	3m	1.6m	rocky/mud	Mixed shrub/ Bracken over Blackbutt/Marri	5-10y	dry	excellent											Not suitable, too seasonal and small

Myara North Carters Freshwater Mussel												Mussel evidence			Other evidence							Suitability
Plot	date	Easting	Northing	type	size	bank	substrate	vegetation	TsFire	water present/ size	condition	sighting	shells	shells	tdpls	frogs	Yabbie	fish	Roo	Pig	wtrplnt	Mussel
					(wdth)	(hght)	(type)	(Broad type)	(yrs)	(cm)		(Live)	(water)	(bank)								
5	10/11/20	421580	6418419	creek	3m	1.6m	rocky/mud	Mixed shrub/ Bracken over Blackbutt/Marri	5-10y	dry	excellent											Not suitable, too seasonal and small
6	10/11/20	421549	6418394	creek	3m	1.6m	rocky/mud	Mixed shrub/ Bracken over Blackbutt/Marri	5-10y	dry, moist	excellent											Not suitable, too seasonal and small
7	10/11/20	421559	6418365	creek	3m	1.6m	rocky/mud	Mixed shrub/ Bracken over Blackbutt/Marri	5-10y	dry	excellent											Not suitable, too seasonal and small
8	10/11/20	421573	6418340	creek	3m	1.6m	rocky/mud	Mixed shrub/ Bracken over Blackbutt/Marri	5-10y	dry	excellent											Not suitable, too seasonal and small
9	10/11/20	421585	6418327	creek	3m	1.6m	rocky/mud	Mixed shrub/ Bracken over Blackbutt/Marri	5-10y	dry	excellent											Not suitable, too seasonal and small
10	10/11/20	421596	6418303	creek	3m	1.6m	rocky/mud	Mixed shrub/ Bracken over Blackbutt/Marri	5-10y	dry	excellent											Not suitable, too seasonal and small
CFM7																						
1	10/11/20	416107	6417671	creek	2m	1m	loam	mixed shrub/sedge/Banksia over Marri/Jarrah	3-5y	dry	excellent											Not suitable, too seasonal and small
2	10/11/20	416107	6417651	creek	2m	1m	loam	mixed shrub/sedge/Banksia over Marri/Jarrah	3-5y	dry	excellent											Not suitable, too seasonal and small
3	10/11/20	416114	6417626	creek	2m	1m	loam	mixed shrub/sedge/Banksia over Marri/Jarrah	3-5y	dry	excellent											Not suitable, too seasonal and small
4	10/11/20	416122	6417597	creek	2m	1m	loam	mixed shrub/sedge/Banksia over Marri/Jarrah	3-5y	dry	excellent											Not suitable, too seasonal and small
5	10/11/20	416133	6417579	creek	2m	1m	loam	mixed shrub/sedge/Banksia over Marri/Jarrah	3-5y	water 3x1mx20cm	excellent				2							Not suitable, to seasonal and small
6	10/11/20	416093	6417700	creek	2m	1m	loam	mixed shrub/sedge/Banksia over Marri/Jarrah	3-5y	dry	excellent											Not suitable, too seasonal and small
7	10/11/20	416086	6417680	creek	2m	1m	loam	mixed shrub/sedge/Banksia over Marri/Jarrah	3-5y	dry	excellent											Not suitable, to seasonal and small
8	10/11/20	416068	6417739	creek	2m	1m	loam	mixed shrub/sedge/Banksia over Marri/Jarrah	3-5y	dry	excellent											Not suitable, too seasonal and small
9	10/11/20	416047	6417809	creek	2m	1m	loam	mixed shrub/sedge/Banksia over Marri/Jarrah	3-5y	dry	excellent											Not suitable, too seasonal and small
10	10/11/20	416002	6417853	creek	2m	1m	loam	mixed shrub/sedge/Banksia over Marri/Jarrah	3-5y	dry	excellent											Not suitable, too seasonal and small
CFM8																						
1	10/11/20	417942	6420003	creek	3m	0.6m	bauxite	nothing	1y	dry	burnt					1						Not suitable, too seasonal and rocky

Myara North Carters Freshwater Mussel												Mussel evidence			Other evidence							Suitability
Plot	date	Easting	Northing	type	size	bank	substrate	vegetation	TsFire	water present/ size	condition	sighting	shells	shells	tdpls	frogs	Yabbie	fish	Roo	Pig	wtrplnt	Mussel
					(wdth)	(hght)	(type)	(Broad type)	(yrs)	(cm)		(Live)	(water)	(bank)								
2	10/11/20	417924	6420010	creek	3m	0.6m	bauxite	nothing	1y	dry	burnt					1						Not suitable, too seasonal and rocky
3	10/11/20	417913	6420038	creek	3m	0.6m	bauxite	nothing	1y	puddle 30x 30cm	burnt											Not suitable, too seasonal and rocky
4	10/11/20	417906	6420057	creek	3m	0.6m	bauxite	nothing	1y	dry	burnt					1						Not suitable, too seasonal and rocky
5	10/11/20	417883	6420068	creek	3m	0.6m	bauxite	nothing	1y	dry	burnt					1						Not suitable, too seasonal and rocky
6	10/11/20	417937	6419988	creek	3m	0.6m	bauxite	nothing	1y	dry	burnt											Not suitable, too seasonal and rocky
7	10/11/20	417946	6419970	creek	3m	0.6m	bauxite	nothing	1y	dry	burnt											Not suitable, too seasonal and rocky
8	10/11/20	417969	6419946	creek	3m	0.6m	bauxite	nothing	1y	water 3x10mx20cm	burnt					2						Not suitable, too seasonal and rocky
9	10/11/20	417977	6419923	creek	3m	0.6m	bauxite	nothing	1y	dry	burnt					1						Not suitable, too seasonal and rocky
10	10/11/20	417998	6419892	creek	3m	0.6m	bauxite	nothing	1y	dry	burnt					1						Not suitable, too seasonal and rocky
CFM9																						
1	11/11/20	420847	6407516	creek	20m	0.6m	rock/loam	regrowth mixed shrub and sedge	3-5y	yes -flow 1m deep	excellent					2						Possibly suitable
2	11/11/20	420834	6407529	creek	20m	0.6m	rock/loam	regrowth mixed shrub and sedge	3-5y	yes -flow 1m deep	excellent											Possibly suitable
3	11/11/20	420821	6407540	creek	20m	0.6m	rock/loam	regrowth mixed shrub and sedge	3-5y	yes -flow 1m deep	excellent						shells			trot		Possibly suitable
4	11/11/20	420811	6407555	creek	20m	0.6m	rock/loam	regrowth mixed shrub and sedge	3-5y	yes -flow 1m deep	excellent											Possibly suitable
5	11/11/20	420799	6407589	creek	20m	0.6m	rock/loam	regrowth mixed shrub and sedge	3-5y	yes -flow 1m deep	excellent											Possibly suitable
6	11/11/20	420855	6407510	creek	20m	0.6m	rock/loam	regrowth mixed shrub and sedge	3-5y	yes -flow 1m deep	excellent											Possibly suitable
7	11/11/20	420884	6407472	creek	20m	0.6m	rock/loam	regrowth mixed shrub and sedge	3-5y	yes -flow 1m deep	excellent					1						Possibly suitable
8	11/11/20	420914	6407469	creek	20m	0.6m	rock/loam	regrowth mixed shrub and sedge	3-5y	dry bit	excellent									digs		Possibly suitable
9	11/11/20	420949	6407450	creek	20m	0.6m	rock/loam	regrowth mixed shrub and sedge	3-5y	dry bit	excellent									digs		Possibly suitable
10	11/11/20	420927	6407421	creek	20m	0.6m	rock/loam	regrowth mixed shrub and sedge	3-5y	dry bit	excellent									digs		Possibly suitable
CFM10																						
1	11/11/20	419328	6404941	creek	3m	0.8m	rock/loam	mixed shrub/sedge/Banksia over Marri/Jarrah	5-10y	yes -flow to 3m deep	excellent					1						suitable

Myara North Carters Freshwater Mussel												Mussel evidence			Other evidence							Suitability
Plot	date	Easting	Northing	type	size	bank	substrate	vegetation	TsFire	water present/ size	condition	sighting	shells	shells	tdpls	frogs	Yabbie	fish	Roo	Pig	wtrplnt	Mussel
					(wdth)	(hght)	(type)	(Broad type)	(yrs)	(cm)		(Live)	(water)	(bank)								
2	11/11/20	419327	6404972	creek	3m	0.8m	rock/loam	mixed shrub/sedge/Banksia over Marri/Jarrah	5-10y	yes -flow to 3m deep	excellent					1						suitable
3	11/11/20	419339	6404993	creek	3m	0.8m	rock/loam	mixed shrub/sedge/Banksia over Marri/Jarrah	5-10y	yes -flow to 3m deep	excellent					1						suitable
4	11/11/20	419344	6405002	creek	3m	0.8m	clay	mixed shrub/sedge/Banksia over Marri/Jarrah	5-10y	yes -flow to 3m deep	excellent					1						suitable
5	11/11/20	419356	6405027	creek	3m	0.8m	sand/clay	mixed shrub/sedge/Banksia over Marri/Jarrah	5-10y	yes -flow to 3m deep	excellent					1						suitable
6	11/11/20	419364	6405047	creek	3m	0.8m	rock/loam	mixed shrub/sedge/Banksia over Marri/Jarrah	5-10y	yes -flow to 3m deep	excellent					1			scat			suitable
7	11/11/20	419391	6405078	creek	3m	0.8m	sand/clay	mixed shrub/sedge/Banksia over Marri/Jarrah	5-10y	yes -flow to 3m deep	excellent					1						suitable
8	11/11/20	419407	6405105	creek	3m	0.8m	sand/clay	mixed shrub/sedge/Banksia over Marri/Jarrah	5-10y	yes -flow to 3m deep	excellent					1						suitable
9	11/11/20	419411	6405121	creek	3m	0.8m	sand/clay	mixed shrub/sedge/Banksia over Marri/Jarrah	5-10y	yes -flow to 3m deep	excellent					1			scat			suitable
10	11/11/20	419431	6405120	creek	3m	0.8m	sand/clay	mixed shrub/sedge/Banksia over Marri/Jarrah	5-10y	yes -flow to 3m deep	excellent					1						suitable
CFM11																						
1	5/11/20	419780	6417774	creek	5m	1.5m	mud/sand	mixed shrubs over Jarrah/Marri	10y	yes -flow 1m deep	pristine								2			suitable
2	5/11/20	419781	6417765	creek	5m	1.5m	mud/sand	mixed shrubs over Jarrah/Marri	10y	yes -flow 1m deep	pristine											suitable
3	5/11/20	419787	6417750	creek	5m	1.5m	mud/sand	mixed shrubs over Jarrah/Marri	10y	yes -flow 1m deep	pristine											suitable
4	5/11/20	419782	6417742	creek	5m	1.5m	mud/sand	mixed shrubs over Jarrah/Marri	10y	yes -flow 1m deep	pristine				2							suitable
5	5/11/20	419777	6417730	creek	5m	1.5m	mud/sand	mixed shrubs over Jarrah/Marri	10y	yes -flow 1m deep	pristine				2							suitable
6	5/11/20	419767	6417730	creek	5m	1.5m	mud/sand	mixed shrubs over Jarrah/Marri	10y	yes -flow 1m deep	pristine											suitable
7	5/11/20	419754	6417719	creek	5m	1.5m	mud/sand	mixed shrubs over Jarrah/Marri	10y	yes -flow 1m deep	pristine				2							suitable
8	5/11/20	419729	6417721	creek	5m	1.5m	mud/sand	mixed shrubs over Jarrah/Marri	10y	yes -flow 1m deep	pristine											suitable
9	5/11/20	419717	6417721	creek	5m	1.5m	mud/sand	mixed shrubs over Jarrah/Marri	10y	yes -flow 1m deep	pristine											suitable
10	5/11/20	419711	6417717	creek	5m	1.5m	mud/sand	mixed shrubs over Jarrah/Marri	10y	yes -flow 1m deep	pristine											suitable
11	5/11/20	419705	6417709	creek	5m	1.5m	mud/sand	mixed shrubs over Jarrah/Marri	10y	yes - ends granite	pristine											suitable

ghd.com

The Power of Commitment