DETAILED FLORA AND VEGETATION SURVEY OF THE MT MARION PROJECT AREA

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Prepared for:

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EXECUTIVE SUMMARY

Mineral Resources Ltd. (ASX: MIN) is a mining services company, with a growing world-class portfolio of mining operations across multiple commodities, including iron ore and lithium and is the operator of its Mt Marion project in Western Australia. Mineral Resources provided Native Vegetation Solutions (NVS) with a survey area which encompasses the main mining areas as well as other infrastructure related to mining the Mt Marion mineral resource. The location of this survey area is approximately 36 km south of Kalgoorlie-Boulder in the Coolgardie Bioregion of Western Australia (Figure 1).

The survey area, for the purposes of this report, covers an area totalling approximately 1,439 ha. The area encompasses sections of land within the Hamptons Lease Area 53, portions of Exploration License E 15/1599, Mining Licence M 15/0999 and Miscellaneous Licence L 15/0353. At this stage, the final footprint of mining related disturbances is yet to be finalised, however will be entirely within the survey area, and is expected to be less than 1,439 hectares.

The survey area is located in the Eastern Goldfields Interim Biogeographic Regionalisation for Australia (IBRA) subregion. The vegetation of the Eastern Goldfields botanical subregion consists of Mallees, *Acacia* thickets and shrubheaths on sandplains. Diverse *Eucalyptus* woodlands occur around salt lakes, on ranges, and in valleys. Salt lakes support dwarf shrublands of samphire. Woodlands and *Dodonaea* shrubland are known to occur on basic graninulites of the Fraser Range some distance to the southeast of the survey area (CALM, 2002).

The *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* Protected Matters Search Tool revealed that the survey area may contain habitat for the invasive weed species *Carrichtera annua* (Ward's Weed) (DAWE, 2021). The EPBC Protected Matters report indicated no Threatened Ecological Communities (TECs) or Commonwealth Reserves within the requested search area, however, the Yallari Timber Reserve is located adjacent to the western extent of the survey area.

The Western Australian Department of Biodiversity Conservation and Attractions (DBCA) database searches revealed a potential for one Threatened and 22 Priority Flora species to occur within a 20 km radius of the survey area (DBCA, 2021a). No known locations of Threatened or Priority Flora occur within the survey area, with the closest Threatened Flora and the closest Priority Flora located approximately 19 km south and 1 km south of the survey area respectively.

The Priority Ecological Communities (PEC) and Threatened Ecological Communities (TEC) search revealed no PEC/TECs within the survey area (DBCA, 2021).

The survey area does not lie within or contain any Environmentally Sensitive Areas (ESA) or Conservation Reserves (DWER, 2021).

No water bodies were identified within the survey area via the Clearing Permit System (CPS) Map Viewer (DWER, 2021).

The survey area lies south of the 26th parallel, however receives average annual rainfall of approximately 264.9mm (BOM, 2021). There is no record of *Phytophthora cinnamomi* (Dieback) establishing in natural ecosystems in regions receiving <400mm rainfall per annum (CALM, 2003). Therefore, Dieback is not considered an issue for this survey area, however all measures should be taken to prevent any possible soil contamination (seeds of non-native species *etc*.) which poses a risk in the survey area during seasonally favourable conditions.

Eleven vegetation groups were identified during this survey, largely following topographical features and dominant species. Mapping of the 11 vegetation groups, as well as the quadrat locations can be seen in Appendix C. Photographs of each quadrat and the relevant vegetation group can be seen in Appendix F.

One hundred and forty-eight species were recorded within the survey area with 130 species recorded within quadrats. Thirty-one families and 72 genera were found. These are listed in Appendix E, per Quadrat as well as per Vegetation Group. Of the native species, Chenopodiaceae was the highest represented family, with 27 species from 10 genera. The next best represented families were Myrtaceae and Scrophulariaceae each with 18 species.

Of the 148 taxa recorded one was an introduced weed species. *Oncosiphon suffruticosum* (Calomba daisy) was recorded in Quadrat 12. This species is not listed as a declared pest in the state of Western Australia by the Department of Primary Industries and Regional Development (DPIRD, 2021).

The most common and widespread species were *Exocarpos aphyllus* which was recorded within 30 quadrats followed by *Ptilotus obovatus* and *Maireana trichoptera* which were both recorded within 26 quadrats.

There were 36 taxa recorded from within a single site, which was Quadrat 4 (Q4).

There was one Priority and one Threatened flora recorded during the survey. Threatened flora *Seringia exastia (T)* was identified within the survey area and is gazetted as Threatened pursuant to Section 5(1) of the *Biodiversity Conservation Act 2016*, and as Threatened pursuant to Schedule 1 of the *Environment Protection and Biodiversity Conservation Act 1999.* A nomination to delist the species due to no plausible significant threats to the species has been prepared and considered by the WA Threatened Species Scientific Committee (TSSC). However, until changes are officially made to the threatened species list, *S. exastia* is still legally listed as Threatened flora, and authorisation to take under section 40 of the *Biodiversity Conservation Act 2016* is still required.

Priority flora *Eremophila acutifolia* (P3) was recored in Quadrats 30 and 31. Both populations were dominant lower stratum species. This species is both widespread and in large numbers throughout the local and regional area and is well documented by previous flora surveys. Recorded locations range from Coolgardie, Norseman, Kambalda, Widgiemooltha and Madoonia Downs. Using data from the NVS (2019) survey to compare local numbers of *Eremophila acutifolia* (P3) with the current survey area, clearing within the proposed survey area will likely affect approximately 7.39% of the local population.

Vegetation condition was generally ‘Good’ to ‘Very Good’ (Keighery 1994). Disturbance was present within the survey area mostly attributed to, access tracks, exploration related activities and grazing.

The Environmental Protection Authority’s (EPA) objective for flora and vegetation is to maintain the abundance, species diversity and geographical distribution of flora and vegetation as well as protect Threatened flora, consistent with the provisions of the *Biodiversity Conservation Act 2016.*

The proposed clearing of vegetation will result in the loss of some individuals from the local area; however, the impact will not be great enough to remove whole communities or populations. Most of the species and communities recorded during this survey are widespread throughout the Eastern Goldfields subregion and adjoining regions, and therefore the loss of a small proportion from this area will not be significant.

This report summarises the results of a detailed flora and vegetation survey, incorporating the Spring survey of 2021.

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1 INTRODUCTION

1.1 BACKGROUND

Mineral Resources (ASX: MIN) is a mining services company, with a growing portfolio of mining operations across multiple commodities, including iron ore and lithium and is the operator of its Mt Marion project in Western Australia. Mineral Resources provided Native Vegetation Solutions (NVS) with a survey area which encompasses the main mining areas as well as other infrastructure related to mining the Mt Marion mineral resource. The location of this survey area is approximately 36 km south of Kalgoorlie-Boulder in the Coolgardie Bioregion of Western Australia (Figure 1).

This report will support numerous applications including mining proposals and clearing permits submitted to relative Government Departments.

The survey area, for the purposes of this report, covers an area totalling approximately 1,439 ha. The area encompasses sections of land within the Hamptons Lease Area 53, portions of Exploration License E 15/1599, Mining Licence M 15/999 and Miscellaneous Licence L 15/353. At this stage, the final footprint of mining related disturbances is yet to be finalised, however will be entirely within the survey area, and is expected to be less than 1,439 hectares.

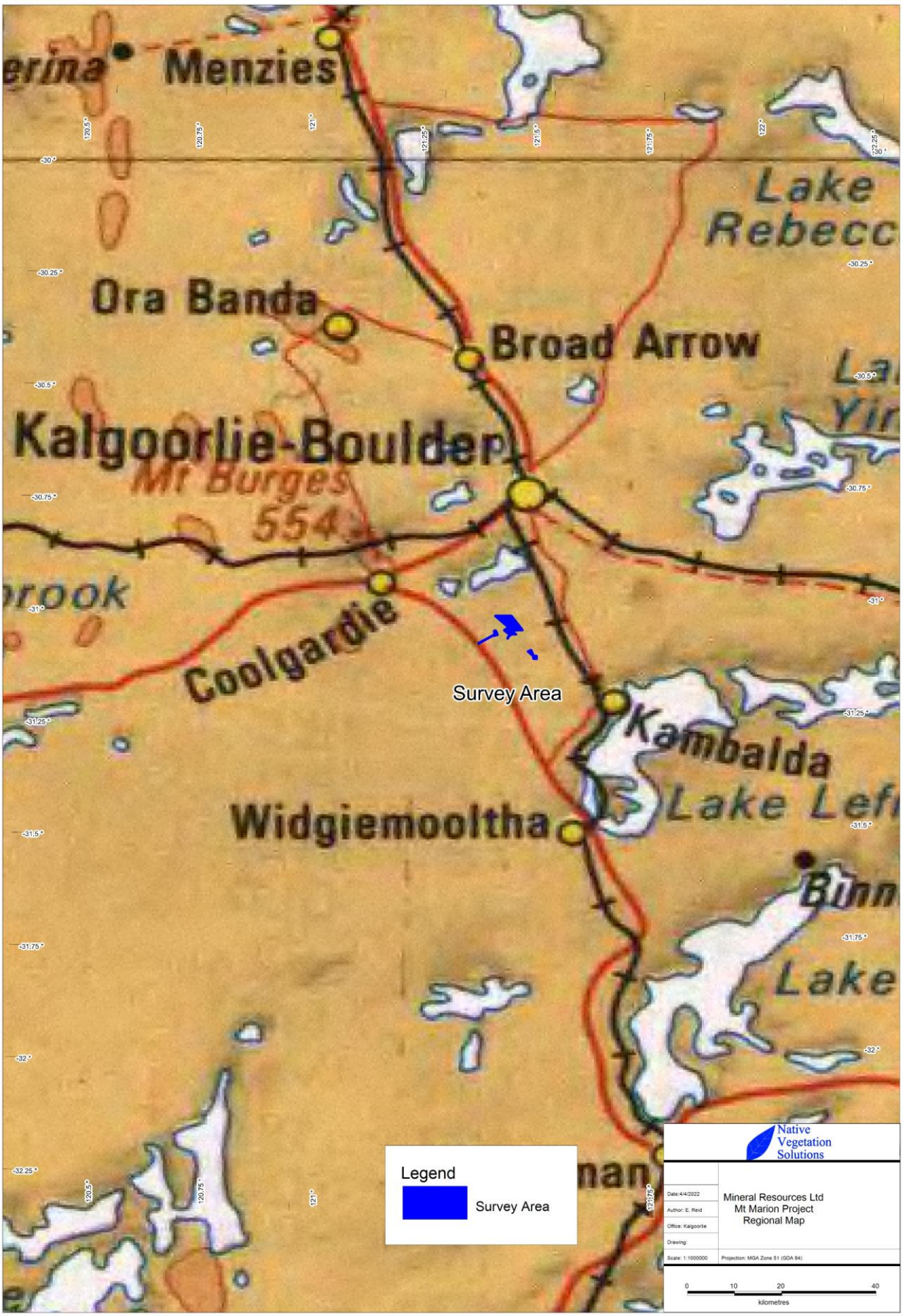

Figure 1: Regional Location of the Mt Marion Project Area

1.2 PURPOSE AND SCOPE

The objective of this report is to record and analyse the results of the flora and vegetation component of a Detailed assessment conducted in accordance with the following documents:

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

A Detailed Flora and Vegetation Survey has two components:

1) Reconnaissance Survey
   a) Desktop study which includes a literature review and a search of the relevant databases; and
   b) Reconnaissance survey of the subject area to verify the desktop survey, undertake low impact sampling, define vegetation groups present in the area, search for species of conservation significance and to determine potential sensitivity to impact.

2) Detailed Plot Based Survey
   a) Detailed survey, comprising multiple visits in main flowering seasons or other seasons and replication of plots in vegetation units incorporating greater coverage than a reconnaissance survey; and
   b) Comprehensive survey when necessary to: enhance the level of knowledge at the locality or sub-regional scale, in order to provide wider context for the local scale.

Therefore, the scope of work for the Detailed flora and vegetation survey was to:

- Conduct a desktop study that includes a literature review and search of relevant databases
- Conduct a plot-based survey within the survey area (incorporating 20m x 20m quadrats)
- Prepare an inventory of species occurring in the study area
- Conduct PATN© analysis of quadrat-based presence/absence data
- Quantify survey intensity via a Species Accumulation Curve
- Describe the vegetation associations in the survey area
- Identify any vegetation communities or flora species of particular conservation significance
- Map broad-scale vegetation groups found within the survey area, including vegetation condition; and
- Provide recommendations, including the management of perceived impacts to flora and vegetation, particularly flora of conservation significance, within the study area.

1.3 STATUTORY FRAMEWORK AND GUIDANCE

This assessment took into account relevant sections of Commonwealth and State legislation and guidelines:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- *Environmental Protection Act 1986* (EP Act)
- *Biodiversity Conservation Act 2016* (BC Act)
- *Biosecurity and Agriculture Management Act 2007* (BAM Act)

The Minister for the Environment publishes lists of flora species in need of special protection because they are considered rare, likely to become extinct, or are presumed extinct. The current listings were published in the Government Gazette on 5 December 2018 (Smith and Jones, 2018) and were taken into account.

As well as those listed above, the assessment took into account relevant sections of:

- EPA (2016) *Statement of Environmental Principles, Factors and Objectives*; and
- EPA (2016a) *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment*, known as *Flora and Vegetation Technical Guidance*

1.3.1 Western Australian *Biodiversity Conservation Act 2016*

The Western Australian *Biodiversity Conservation Act 2016* (BC Act, the Act) provides for the conservation, protection and ecologically sustainable use of biodiversity and biodiversity components in Western Australia. The BC Act replaces the *Wildlife Conservation Act 1950*.

Threatened species (both flora and fauna) that meet the categories listed within the Act are highly protected and require authorisation by the Ministerial to take or disturb. These are known as Threatened Flora and Threatened Fauna. The conservation categories of Critically Endangered, Endangered and Vulnerable have been aligned with those detailed in the EPBC Act, as below.

Flora and fauna species may be listed as being of special conservation interest if they have a naturally low population, restricted natural range, are subject to or recovering from a significant population decline or reduction of range or are of special interest, and the Minister considers that taking may result in depletion of the species. Migratory species and those subject to international agreement are also listed under the Act. These are known as specially protected species in the Act.

Threatened Ecological Communities (TECs) are also protected under the Act and are categorised using the same criteria as threatened species.

1.3.2 Environmental Protection Act 1986

The *EP Act 1986* was created to provide for an Environmental Protection Authority (the EPA) that has the responsibility for:

- prevention, control and abatement of pollution and environmental harm
- conservation, preservation, protection, enhancement and management of the environment
- matters incidental to or connected with the above.

The EPA is responsible for providing the guidance and policy under which environmental assessments are conducted. It conducts environmental impact assessments (based on the information included in environmental assessments and provided by the proponent), initiates measures to protect the environment and provides advice to the Minister responsible for environmental matters.

1.3.3 Environment Protection and Biodiversity Conservation Act 1999

At a Commonwealth level, Threatened taxa are protected under the EPBC Act, which lists species and ecological communities that are considered Critically Endangered, Endangered, Vulnerable, Conservation Dependent, Extinct, or Extinct in the Wild (Section 6 below).

1.3.4 Flora

1.3.4.1 Threatened and Priority Flora

Conservation significant flora species are those that are listed as TF (Threatened Flora) and (within Western Australia) as PF (Priority Flora). TF species are listed as threatened by the

Western Australian Department of Biodiversity Conservation and Attractions (DBCA) and protected under the provisions of the BC Act. Some State-listed TF are provided with additional protection as they are also listed under the Commonwealth EPBC Act.

Flora are listed as PF where populations are geographically restricted or threatened by local processes, or where there is insufficient information to formally assign them to TF categories. Whilst PF are not specifically listed in the BC Act, some may qualify as being of special conservation interest and these have a greater level of protection than unlisted species.

There are seven categories covering State-listed TF and PF species (DBCA, 2019) which are defined in Section 8 below. PF for Western Australia are regularly reviewed by DBCA whenever new information becomes available, with species status altered or removed from the list (Smith and Jones, 2018) when data indicates that they no longer meet the requirements outlined in Section 8 below.

1.3.4.2 Other Significant Flora

According to the Flora and Vegetation Technical Guidance (EPA 2016a) other than being listed as Threatened or Priority Flora, a species can be considered as significant if it is considered to be:

- locally endemic or association with a restricted habitat type (e.g., surface water or groundwater dependent ecosystems)
- a new species or has anomalous features that indicate a potential new species
- at the extremes of range, recently discovered range extensions (generally considered greater than 100 km or in a different bioregion), or isolated outliers of the main range
- unusual species, including restricted subspecies, varieties or naturally occurring hybrids and
- relictual status, being representative of taxonomic groups that no longer occur widely in the broader landscape.

1.3.5 Ecological Communities and Vegetation

1.3.5.1 Threatened and Priority Ecological Communities

Nationally Listed Threatened Ecological Communities
An ecological community is a naturally occurring group of plants, animals and other organisms interacting in a unique habitat. The complex range of interactions between the component species provides an important level of biological diversity in addition to genetics and species. At Commonwealth level, Threatened Flora and Threatened Ecological Communities (TECs) are protected under the Commonwealth EPBC Act. An ecological community may be categorised into one of the three subcategories:

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

State Listed Threatened Ecological Communities
The Western Australian DBCA also maintains a list of TECs which are further categorised into three subcategories much like those of the EPBC Act.

State Listed Priority Ecological Communities
DBCA maintains a list of Priority Ecological Communities (PECs). PECs include potential TECs that do not meet survey criteria, or that are not adequately defined.

1.3.5.2 Other Significant Vegetation

According to the Flora and Vegetation Technical Guidance (EPA 2016a), other than being listed as a TEC or PEC, vegetation can be considered as significant if it is considered to have:

- restricted distribution
- a degree of historical impact from threatening processes
- a role as a refuge; and/or
- provides an important function required to maintain ecological integrity of a significant ecosystem.

1.3.5.3 Declared Pest Plants

The Western Australian Organism List (WAOL) details organisms listed as Declared Pests under the BAM Act). Under the BAM Act, Declared Pests are listed as one of the three categories, or exempt:

- C1 (exclusion), that applies to pests not established in Western Australia; control measures are to be taken to prevent their entry and establishment
- C2 (eradication), that applies to pests that are present in Western Australia but in low numbers or in limited areas where eradication is still a possibility
- C3 (management), that applies to established pests where it is not feasible or desirable to manage them in order to limit their damage; or
- Exempt (no category).

2 EXISTING ENVIRONMENT

2.1 CLIMATE

The subregion climate is Arid to Semi-arid with 200-300 mm of rainfall, sometimes in summer but usually in winter (CALM, 2002). The nearest official meteorological weather station with the most complete and up to date information is Kalgoorlie- Boulder Airport, which is located approximately 32 km north of the survey area. Recordings of the local climatic conditions commenced at Kalgoorlie-Boulder in 1939 (BOM, 2021) and data collected at this station 012038 was used for this report.

2.1.1 Temperature

Mean annual minimum temperature at Kalgoorlie is 11.8°C and mean annual maximum temperature is 25.3°C. The coldest temperatures occur in July (mean minimum temperature 5.1°C), the hottest is January (mean maximum temperature 33.6°C) and diurnal temperature variations are relatively consistent throughout the year (Figure 2).

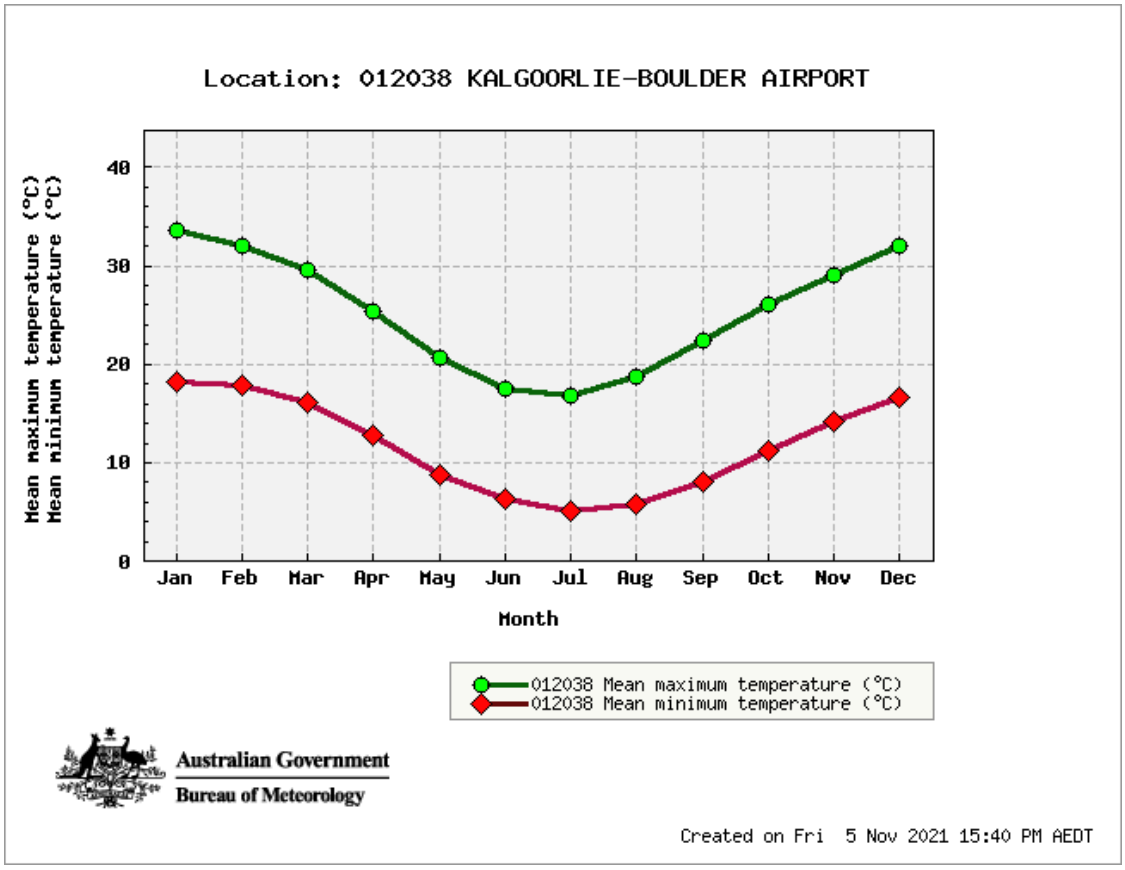

Figure 2: Mean temperature ranges for Kalgoorlie-Boulder Airport Meteorological Station (BOM, 2021)

2.1.2 Rainfall

The annual average rainfall at Kalgoorlie-Boulder Airport is 264.9mm over an average of 39 rain days (BOM, 2021). Average rainfall varies across the months, with slightly larger rainfall events falling between January to March and May to July (Figure 3). Rainfall for 2021 was above average for the months of February, March, May, June, July and October, and below average for all other months prior to the survey.

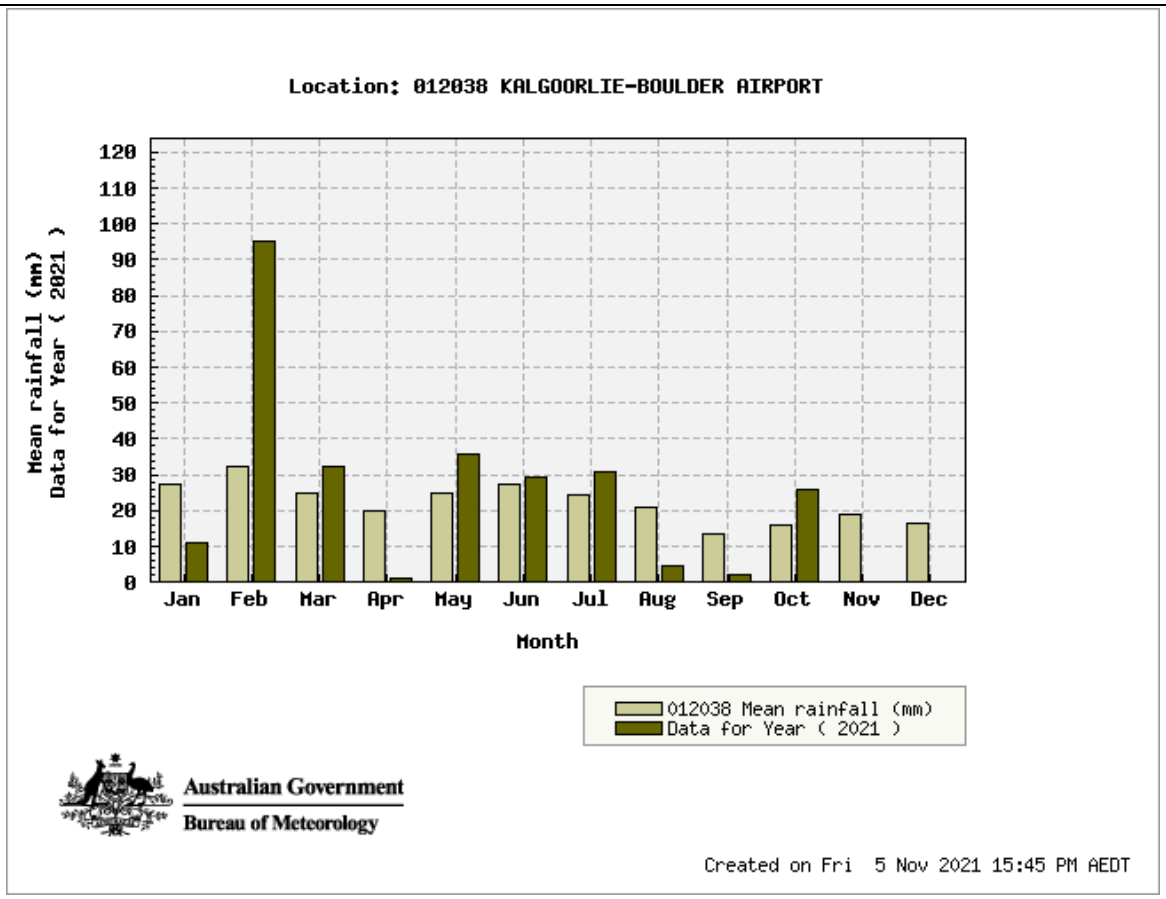

Figure 3: Rainfall data for the Kalgoorlie-Boulder Airport Meteorological Station (BOM, 2021)

2.2 INTERIM BIOGEOGRAPHIC REGIONALISATION OF AUSTRALIA (IBRA) REGION

The IBRA recognises 89 bioregions within Australia and 419 subregions (DAWE, 2021). The project is located in the Eastern Goldfields IBRA subregion (COO03) which totals over 5 million hectares (CALM, 2002). The Eastern Goldfields subregion is characterised by undulating plains, greenstone ridges, playa lakes, and scattered exposed bedrock (CALM 2002).

2.3 LANDFORMS AND SOILS

The Eastern Goldfields comprises Yilgarn craton's 'Eastern Goldfields' Terrains, and is characterised by gentle undulating plains, the west containing Archaean greenstone ridges and low hills, while the east contains a horst of Proterozoic granulite. In the western half there are a series of large playa lakes which are remnants of an ancient major drainage line. The dominant soil type is Calcareous earth, which cover most of the plains and greenstone areas (CALM 2002).

2.4 BOTANICAL SUBREGION AND EXISTING VEGETATION

The vegetation of the Eastern Goldfields botanical subregion consists of Mallees, *Acacia* thickets and shrubheaths on sandplains. Diverse *Eucalyptus* woodlands occur around salt lakes, on ranges, and in valleys. Salt lakes support dwarf shrublands of *Tecticornia* (samphire). Woodlands and *Dodonaea* shrubland are known to occur on basic graninulites of the Fraser Range some distance to the southeast of the survey area (CALM, 2002).

3 METHODS

3.1 PERSONNEL AND REPORTING

The following personnel were involved in the single season detailed flora and vegetation survey (October 2021):

- Mr Eren Reid (*BSc*- Biological Science), Principal Botanist, Native Vegetation Solutions (NVS), undertook field work of the detailed survey in October 2021, vegetation mapping, data collation, identification of flora during field work and preparation and review of the report
- Ms Adele Thomasz (*BSc*- Conservation and Wildlife Biology), Native Vegetation Solutions, data collation and preparation of the report; and
- Mr Frank Obbens (*BSc*) Consultant Botanist, Bushtech Consultancy, undertook the identification of unknown flora samples collected by NVS in the field. Threatened flora range extensions and new locations were submitted to the WAHERB as per the EPA Technical Guidelines (EPA 2016a).

3.2 PRELIMINARY DESKTOP STUDY

A preliminary assessment of the survey area and its potential constraints was undertaken by reviewing relevant government agency managed databases (Sections 3.2.1 to 3.2.6, and Appendices A & D) and consulting with government agencies where necessary. The following sections provide a summary of desktop searches undertaken for the project.

3.2.1 *Environment Protection and Biodiversity Conservation Act* Protected Matters

The *EPBC Act* Protected Matters Search tool was utilised to provide results for matters of National Environmental Significance within the survey area using the coordinates displayed within the search results (Appendix A) with a 1 km buffer (DAWE, 2021a).

3.2.2 Threatened Flora and Communities

The Threatened and Priority Flora Database managed by the Department of Biodiversity, Conservation and Attractions (DBCA) was searched for threatened and priority flora within a 20 km radial area of the survey area shapefile (DBCA, 2021a).

The presence of Threatened and Priority Ecological Communities (TECs & PECs) was determined by examining Geographic Information System (GIS) data supplied by the DBCA upon request within a 50 km buffer of the survey area shapefile (DBCA, 2021).

3.2.3 Environmentally Sensitive Areas (ESAs) and Conservation Reserves

The Department of Water and Environmental Regulation (DWER) Clearing Permit System (CPS) Map Viewer was used to determine the location of any ESAs and Conservation Reserves (DWER, 2021).

3.2.4 Land Systems

As part of the Rangeland resource surveys, the Department of Agriculture mapped the Land Systems of Western Australia (DPIRD, 2017). The purpose of the survey was to provide comprehensive description and mapping of the biophysical resources of the region, together with an evaluation of the condition of the soils and vegetation throughout. The report and the accompanying series of maps at 1:250,000 scale, are primarily intended as a reference for land managers, land management advisers and land administrators, that is, the people most involved in planning and implementing land management practices. The report and complementary maps

also provide researchers and the public with a basic reference on the landscape resources in Western Australia.

3.2.5 Vegetation Type, Extent and Status

Vegetation extent and status data was sourced from the Department of Agriculture and Food (DAFWA) report and its associated GIS file (Shepherd *et al*, 2002). This data comprises Beard's Pre-European vegetation groups.

DBCA's Statewide Vegetation Statistics (DBCA, 2019) was also referenced for the current extent of Beard's Vegetation Groups. The purpose of examining this information is to determine if the survey area lies within any vegetation groups defined by Beard that may have been subjected to widescale clearing for European settlement. The national objectives and targets for biodiversity conservation recognise that the retention of 30% or more of the pre-clearing extent of a Beard vegetation association is necessary if Australia's biological diversity is to be protected.

3.2.6 Wetlands

The potential of wetlands within the project area was determined by examining DWER's Clearing Permit System Map Viewer (DWER, 2021).

3.2.7 Dieback

Dieback is only considered a potential issue for any project if both of the below factors are relevant for the project (CALM, 2003):

- The project area lies within the South West Land Division; and
- the mean annual rainfall of the area is greater than 400 mm.

3.3 SITE INVESTIGATION

The field survey was conducted by Mr. Eren Reid, Botanist of Native Vegetation Solutions (NVS), from the 7th to 15th October 2021. NVS established 33 quadrats within the survey area, recording 149 vascular plant species within 11 vegetation groups.

A Reconnaissance Flora and Vegetation survey was conducted in the area by NVS in April 2019 (NVS, 2019). Vegetation mapping from the 2019 report was used in the 2021 report for the majority of the survey area, alongside field notes taken in the 2021 survey.

A total of 48 hours was spent on site traversing the survey area in October 2021. While a vehicle was used to reach the site, all traverses were made on foot or via a Yamaha Viking.

The survey was conducted in accordance with relevant EPA's Statements and Guidelines (Section 1.2).

The EPA uses the Interim Biogeographic Regionalisation of Australia (IBRA) as the largest unit for Environmental Impact Assessment decision making in relation to the conservation of biodiversity. Given the scale and nature of the proposed disturbance as well as the existing disturbance, and that the survey area is located within the Coolgardie IBRA region, a detailed flora and vegetation survey was deemed appropriate.

3.3.1 Licenses

Flora was collected for identification under the Scientific Collection License FB62000171, held by Mr Eren Reid with expiry 08/10/2022.

3.3.2 Field Methods

Prior to the field work, the aerial photography was examined and representative sample sites for quadrat locations were chosen to provide coverage over all viable vegetation types.

20 x 20m quadrats were established at these sites in appropriate locations, taking into account representation of surrounding vegetation and vegetation boundaries.

Each quadrat site was marked in all corners with a 97cm galvanized fence dropper and was defined by tape measures. The location of the North-East (NE) corner was captured on a TwoNav Aventura GPS at ±4m accuracy, using Universal Transverse Mercator location on GDA2020 datum. Digital photographs were taken of each quadrat site from the NE corner.

Data collected at each of the 33 quadrats included:

- Species Present
- Topography
- Rock Type
- Soil Colour and Type
- % Bare Ground and Litter
- Disturbance Level
- Vegetation Condition

A complete list of all species encountered was also recorded, detailing the average height and estimated coverage of the dominant species from the three stratum levels (Tallest, Mid and Lower).

Specimens of taxa not recognised by the Botanist were collected and pressed along with specimens of taxa recognised as, or thought to be, conservation-significant species.

The vegetation structure was assessed using the method developed by Muir (1977). Definitions of the vegetation structure are presented in Appendix B.

The condition of each quadrat was assessed using the method developed by Keighery (1994). Definitions of the condition scale are presented in Appendix B.

Vegetation groups were mapped (section 3.3.4 below).

Relevé sites were used between quadrat sampling points, via wandering traverses, for opportunistic sampling of plant taxa, to collect flora specimens and to aid vegetation group mapping in the survey area. Opportunistic sampled plant taxa are listed in the table “Species List per Vegetation Group” in Appendix E.

Maps of all sample sites are included in Appendix C, Map 2, with detailed quadrat information listed in Appendix F.

3.3.3 Post-Field Methods

Unknown specimens collected in the field were identified post field work by Eren Reid and Frank Obbens with reference to published keys and samples held in the Reference Section of the Western Australian Herbarium (WAHERB). Threatened flora range extensions and new locations were submitted to the WAHERB as per the EPA Technical Guidelines (EPA 2016a).

Species information was transferred into Microsoft Excel® worksheets in preparation for PATN analysis (Belbin, 1994), via Bray and Curtis Flexible unweighted pair group method with arithmetic mean (UPGMA).

PATN Analysis was completed on both the dominant species and all species recorded within each quadrat. PATN is a software package that aims to try and display patterns in complex data. Complex in PATN's terms, requires a minimum of 6 objects (i.e., different species) and a suite of more than 4 variables (i.e., different quadrats) that describe the objects. The vegetation groups listed in Section 4.2.1.2 show the grouping of quadrats based on similarities in the flora species that are present or absent in each quadrat. This data is entered into the PATN Analysis software which produces a quantitative estimate of the relationship between species composition of each quadrat.

A Species Accumulation Curve is also generated via input into a computer program (Seaby & Henderson, 2006).

3.3.4 Mapping

Vegetation mapping was produced via GPS recorded information in the field, cross-referenced with vegetation descriptions made in the field, overlaid on aerial imagery of the survey area. The GPS utilized (TwoNav Aventura GPS) displayed aerial imagery, hence real-time mapping of vegetation groups was available during field work.

GPS tracks and waypoints recorded during field work are presented in Appendix C. Vegetation Health Condition was assessed in the field with reference to Keighery (1994).

3.3.5 IBSA Data Package

The Environmental Protection Authority (EPA), Department of Water and Environmental Regulation (DWER) and Department of Mines, Industry Regulation and Safety (DMIRS) require Index of Biodiversity Surveys for Assessments (IBSA) Data Packages to be submitted to support assessment and compliance under the *Environmental Protection Act 1986.*

An IBSA data package is a single file in .zip format, containing:

- one **Metadata and Licensing Statement** in .pdf format
- one **survey report** in .pdf format
- one **plain-text survey report** in .txt format; and
- a set of electronic data files, comprising:
    - one **survey details** spatial dataset in shapefile (.shp, etc.) or Mapinfo (.tab, etc.) format; and
    - one or more **survey data** spatial datasets, as required, in shapefile (.shp, etc.) or Mapinfo (.tab, etc.) format.

The IBSA Data package for this survey has been submitted via the DWER IBSA Submission Portal.

3.4 NOMENCLATURE AND TAXONOMY

Nomenclature follows that used by the WAHERB.

The WAHERB has updated its sequence and arrangement of collections to conform to the systematic sequence of the Angiosperm Phylogeny Group (APGIII), with the result that many Families and Genera have been moved or renamed. This report attempts to follow those changes in relation to species recorded during this survey. Definitions of Threatened Flora are also included in Section 8 below.

3.5 LIMITATIONS

Table 1 lists potential limitations that may have affected the survey.

Table 1: List of potential survey limitations

Possible Limitation	Constraint	Comment
Competency/experience of the consultant carrying out the survey	No	Experienced and competent personnel conducted the survey. Eren Reid has over 18 years' experience in botanical surveys throughout the Goldfields and over a variety of environments across Western Australia.
Scope	No	The Scope of work was adequately defined. Vascular flora species were the focus of the survey and were thoroughly sampled.
Proportion of flora identified, recorded and/or collected	No	All taxa not identified in the field were collected and pressed, and later identified by Eren Reid or Frank Obbens. New Threatened flora locations or range extensions were submitted to the WAHERB as per the EPA Technical Guidelines (EPA 2016a). See also Species Accumulation Curves in section 4.2.2.2.
Sources of information	No	Information on flora and vegetation of the region and local area was available from publicly available databases, books and reports.
Proportion of the tasks achieved	No	All tasks completed.
Timing/season	No	This survey was undertaken in October 2021. Local rainfall in 2021 was above average for most months prior to the survey excluding January, April, August and September. Timing was good as the survey coincided with flowering of many flora species.
Disturbance in survey area	No	Minimal disturbance (historical access tracks and exploration) was observed within the survey area, however did not compromise the results of the survey as these areas were avoided whilst collecting data.
Intensity of survey effort	No	The survey intensity is considered to have been sufficient for a detailed survey according to EPA (2016) guidelines. Areas most likely to contain threatened and priority species were targeted. Vegetation mapping sites were selected to provide adequate coverage of the survey area.
Resources	No	Resources, in terms of time, equipment, support and personnel were adequate to undertake and complete the detailed survey.
Remoteness and/or access problems	No	All the areas in need of survey were easily accessible from existing tracks, or by foot.
Availability of contextual information for the region	No	Contextual information regarding vegetation and flora around the Eastern Goldfields subregion is readily available. Adequate information was able to be accessed from available databases.

4 RESULTS

4.1 PRELIMINARY DESKTOP ASSESSMENT

4.1.1 EPBC Protected Matters Search Tool

The EPBC Protected Matters Search Tool revealed that the survey area may contain habitat for the invasive weed species *Carrichtera annua* (Ward's Weed) (DAWE, 2021).

Carrichtera annua was introduced into Australia from the eastern Mediterranean, and is now widespread throughout South Australia, the Interior, and Western Australia (Lamp & Collet, 1999). This species is not listed as a declared plant by DPIRD (2021), however according to the EPBC search tool this invasive weed species is considered a threat to the rangeland biodiversity within the Southern Australian Sheep and Cattle Grazing Land Management Zone (DAWE, 2021).

The EPBC Protected Matters report indicated no TECs or Commonwealth Reserves within the requested search area.

The EPBC report indicated that the Yallari Timber Reserve 5(1)(h) is located to the Southwest of the Survey Area. As defined in the CALM Act, land categorised as 5(1)(h) Reserve, is land reserved under the Land Administration Act (1997), which is vested in the Conservation and Parks Commission of WA that is not a National Park, Conservation Park, Nature Reserve, Marine Park or Marine Nature Reserve (DMIRS, 2021). The Reserve is separated from the survey area by the Coolgardie-Esperance Highway.

The results of the EPBC Protected Matters search are included in Appendix A.

4.1.2 Threatened Flora and Communities

The DBCA database searches revealed a potential for one Threatened and 22 Priority Flora species to occur within a 20 km radius of the survey area (DBCA, 2021a). No known locations of Threatened or Priority Flora occur within the survey area, with the closest Threatened Flora and the closest Priority Flora located approximately 19 km south and 1 km south of the survey area respectively.

Results of the threatened flora database search are included in Appendix D.

The PEC/TEC search revealed no PEC/TECs within the survey area (DBCA, 2021).

4.1.3 Environmentally Sensitive Areas and Conservation Reserves

The survey area does not lie within or contain any ESA's or Conservation Reserves (DWER, 2021). The closest DBCA Managed land was the Class C Yallari Timber Reserve located on the western side of the Coolgardie-Esperance Highway (DWER, 2021). This Timber Reserve is vested with the Conservation Commission for the purpose of Timber Production, however, is considered by the DBCA as an area for the conservation of flora and fauna.

4.1.4 Land Systems

As part of the Rangeland resource surveys, the Department of Agriculture mapped the Land Systems of Western Australia (DPIRD, 2017). The Land Systems occurring within the survey area are listed in Table 2 below, and displayed in Appendix C.

Table 2: Land Systems occurring within the survey area (DPIRD, 2017)

Land System	Description	Extent of Survey Area (ha)	% Of Survey Area (%)
BB5	Rocky ranges and hills of greenstones-basic igneous rocks	1116.40	77.58
Mx41	Flat to undulating pediments marginal to unit AC1; granitic rock outcrop; some low escarpments	13.32	0.93
Mx43	Gently undulating valley plains and pediments; some outcrop of basic rock	69.06	4.80
My154	Undulating country on acid volcanic rocks and sedimentary materials	240.21	16.69

4.1.5 Vegetation Type, Extent and Status

Four vegetation units defined by Beard (1990) were identified as part of the desktop assessment. These vegetation units identify the Pre-European extent of vegetation, as mapped by Beard (1990). The national objectives and targets for biodiversity conservation recognise that the retention of 30% or more of the pre-clearing extent of Beard's vegetation associations is necessary if Australia's biological diversity is to be protected.

Information relating to known Beard (1990) vegetation units within the survey area have been summarised in Tables 3 to 7 below. This information has been compiled through both desktop assessments and the site visit. The extent of all four Beard vegetation units within the survey area is less than 1% of the total area at each scale (Table 3), and each are above the 30% threshold at a State, bioregional and subregional level (Tables 4 to 7).

Table 3: Extent of Beard Associations within the survey area

Beard Vegetation Association	Extent within survey area (ha)	% of survey area (%)	% of extent at each scale^
9	1355.10	94.18	<1%
128	4.69	0.33	<1%
936	65.30	4.54	<1%
1413	13.79	0.96	<1%

^ **By Association** (WA) (Shepherd et al., 2002), **By Association** (WA), **By IBRA Region** (Coolgardie), **By IBRA Sub-region** (Eastern Goldfield) and **By LGA** (Shire of Coolgardie) (DBCA, 2019).

Table 4: Summary of information regarding Pre-European and current vegetation extent of vegetation association 9 within the survey area

Factor	**Value**				
Beard Vegetation Association*	9				
Vegetation Association Description*	Medium woodland; coral gum (*E. torquata*) & Goldfields blackbutt (*E. lesouefii*)				
Pre-European Extent (ha)	**Scale**				
	By Association *(WA)*	***By Association*** *(WA)*	***By IBRA Region*** *(Coolgardie)*	***By IBRA Sub-region*** *(Eastern Goldfield)*	***By LGA*** *(Shire of Coolgardie)*
	244,735*	240,509.33**	240,441.99**	235,047.15**	166,572.37**
% Pre-European Extent Remaining	*100.00%**	*97.78%***	*97.78%***	*97.75%***	*98.29%***
Surrounding Land Use***	Mining, Exploration, Prospecting, Pastoral Lease				
Weed prevalence***	Low				

* Source: Shepherd *et al.* (2002) Appendix 2
**Source: DBCA, (2019)
*** Source: Field Assessment

Table 5: Summary of information regarding Pre-European and current vegetation extent of vegetation association 128 within the survey area

Factor	**Value**				
Beard Vegetation Association*	128				
Vegetation Association Description*	Bare areas; rock outcrops				
Pre-European Extent (ha)	**Scale**				
	By Association *(WA)*	***By Association*** *(WA)*	***By IBRA Region*** *(Coolgardie)*	***By IBRA Sub-region*** *(Eastern Goldfield)*	***By LGA*** *(Shire of Coolgardie)*
	503,092*	329,836.19**	184,549.90**	26,871.74**	96,232.93**
% Pre-European Extent Remaining	*60.14%**	*87.56%***	*99.64%***	*99.93%***	*99.98%***
Surrounding Land Use***	Mining, Exploration, Prospecting, Pastoral Lease				
Weed prevalence***	Low				

* Source: Shepherd *et al.* (2002) Appendix 2
**Source: DBCA, (2019)
*** Source: Field Assessment

Table 6: Summary of information regarding Pre-European and current vegetation extent of vegetation association 936 within the survey area

Factor	**Value**				
Beard Vegetation Association*	936				
Vegetation Association Description*	Medium woodland; salmon gum				
Pre-European Extent (ha)	**Scale**				
	By Association *(WA)*	***By Association*** *(WA)*	***By IBRA Region*** *(Coolgardie)*	***By IBRA Sub-region*** *(Eastern Goldfield)*	***By LGA*** *(Shire of Coolgardie)*
	924,675*	698,752**	586,792.23**	310,897.74**	359,122.73**
% Pre-European Extent Remaining	*96.46%**	*96.84%***	*99.58%***	*99.22%***	*99.32%***
Surrounding Land Use***	Mining, Exploration, Prospecting, Pastoral Lease				
Weed prevalence***	Low				

* Source: Shepherd *et al.* (2002) Appendix 2
**Source: DBCA, (2019)
*** Source: Field Assessment

Table 7: Summary of information regarding Pre-European and current vegetation extent of vegetation association 1413 within the survey area

Factor	**Value**				
Beard Vegetation Association*	1413				
Vegetation Association Description*	Shrublands; *Acacia*, *Casuarina* & *Melaleuca* thicket				
Pre-European Extent (ha)	**Scale**				
	By Association *(WA)*	***By Association*** *(WA)*	***By IBRA Region*** *(Coolgardie)*	***By IBRA Sub-region*** *(Eastern Goldfield)*	***By LGA*** *(Shire of Coolgardie)*
	1,981,503*	1,679,916.32**	1,061,212.28**	107,974.55**	334,488.08**
% Pre-European Extent Remaining	*67.05%**	*76.60%***	*98.24%***	*99.77%***	*99.93%***
Surrounding Land Use***	Mining, Exploration, Prospecting, Pastoral Lease				
Weed prevalence***	Low				

* Source: Shepherd *et al.* (2002) Appendix 2
**Source: DBCA, (2019)
*** Source: Field Assessment

4.1.6 Wetlands

No water bodies were identified within the survey area via the CPS Map Viewer. The closest waterbody lies 24 km to the southeast from the survey area (DWER, 2021).

4.1.7 Dieback

The survey area receives average annual rainfall of approximately 264.9mm (BOM, 2021). There is no record of *Phytophthora cinnamomi* establishing in natural ecosystems in regions receiving less than 400mm of rainfall per annum (CALM, 2003).

Given the above, Dieback is not considered an issue for this survey area, however all measures should be taken to prevent any possible soil contamination (seeds of non-native species *etc*.) which poses a risk in the survey area during seasonally favourable conditions.

4.2 FIELD ASSESSMENT

4.2.1 Vegetation of the Survey Area

Beard's vegetation associations are very broad and are used over large areas in which there is also a large amount of variation at a more local level. The vegetation groups described below for the survey area fit into the broader Beard description above in section 4.1.4.

The vegetation groups described below were determined visually based on dominant species and topographical features, to form the descriptions taken at the time of the field survey.

Descriptions of all 33 sites/quadrats are presented in Appendix F. For each of these sites, the physical features, vegetation description and unit, along with the species lists for the 20 x 20m plots with typical canopy cover and height, are provided.

4.2.1.1 Vegetation Groups

Eleven vegetation groups were identified during this survey, largely following topographical features and dominant species. Table 8 summarises the vegetation group extent and relative Quadrat and flora information. Mapping of the 11 vegetation groups, as well as the quadrat locations can be seen in Appendix C, Maps 4 and 5. Photographs of each quadrat and the relevant vegetation group can be seen in Appendix F. The Vegetation Group Code in Table 8 below is synonymous to the 2019 reconnaissance flora and vegetation survey report (NVS, 2019).

Table 8: Vegetation Group Extent within Survey Area

Vegetation Group	Vegetation Group Code	Quadrats	Family	Genus	Species	Area (ha)	Percentage of Survey Area (%)
Transitional *Eucalyptus* Woodland over mixed shrubland	A	Q1, Q2, Q3, Q4, Q22, Q27	20	31	75	63.12	4.39
Mixed *Eucalyptus* woodland over sclerophyll shrubland on undulating hills	B	Q5, Q6, Q7, Q26, Q28	23	31	55	62.91	4.37
Acacia acuminata shrubland with emergent *Eucalyptus griffithsii*	C	Q10, Q33	15	30	40	1.27	0.09
Open *Eucalyptus salmonophloia* woodland	D	Q11, Q12, Q13, Q14	13	23	50	0.42	0.03
Eucalyptus lesouefii and *Eucalyptus gracilis* on rocky hill slopes	G	Q16	8	14	25	3.99	0.28
Mixed *Eucalyptus* over *Melaleuca sheathiana* shrubland	H	Q17, Q18, Q19	12	21	36	64.58	4.49
Eucalyptus ravida woodland	I	Q15, Q20, Q21, Q29	14	25	51	8.12	0.56
Mixed *Eucalyptus* woodland over sclerophyll shrubland with *Eremophila acutifolia* (P3) on undulating hills	K	Q30, Q31	12	18	30	21.08	1.47
Eucalyptus gracilis woodland	N	Q23	10	13	22	502.98	34.97
Eucalyptus griffithsii woodland	R	Q24, Q25	13	26	40	665.02	46.23
Acacia quadrimarginea shrubland on undulating hills	X	Q8, Q9, Q32	22	29	41	44.87	3.12
		Total	**31***	**72***	**148***	**1438.36#**	**100#**

*Denotes total recorded in the survey area (not sum of column)
# Denotes sum of column

4.2.1.2 **PATN Analysis of Quadrat Data**

PATN analysis was used to determine the similarities or differences between and within the delineated vegetation groups. The results are supplied below in Figure 4 and Figure 5 as dendrograms. Dendrograms demonstrate the hierarchical relationship between objects.

Quadrats representing similar vegetation groups (as depicted in field work by NVS) are based on species composition, density, topographical features and/or lithology. The PATN analysis does not take these factors into account, and only demonstrates similarities based on presence/absence data within each quadrat. Therefore, PATN analysis groupings are not necessarily distinct, when defining vegetation groups. Hence quadrats depicted as outliers are expected when variations in species composition occurs between quadrats of the same predetermined vegetation grouping.

The PATN analysis dendrogram of the dominant species in Figure 4, displays each quadrat with like symbols representing the NVS mapped vegetation groups, and coloured lines depicting PATN defined vegetation groups. The dendrogram shows a good association between vegetation groups described in section 4.2.1.1, however there were some outliers (highlighted green). Outliers are quadrats that do not show a good association with other quadrats in the same NVS mapped vegetation group.

These outliers are expected to occur for most vegetation groups. In most cases one or two dominant species will be present within a 20x20 quadrat, but it will not contain all the varieties of dominant species that will occur across that vegetation type, and as such some quadrats of the same vegetation group will be separated when assessed by the PATN Analysis.

Vegetation Group A was represented via dominant species, with Q1, Q22 and Q27 grouped together in the PATN Analysis. Q2, Q3, and Q4 were considered outliers, as Q3 compared more similarly to Q5 from Vegetation Group D, Q2 was grouped with Vegetation Group I, and Q4 compared more similarly to Q23 (Vegetation Group N) and Q26 (Vegetation Group B).

When all species were analysed via PATN, Q2, Q4, Q22 and Q24 were most similar, grouped alongside Vegetation Groups D, G and I, as well as Q17. The three remaining Quadrats from Vegetation Group A were segregated.

Vegetation Group A is quite vast and varied due to the intricate transition of upper-storey (*Eucalyptus* spp.) and lower-storey species. The delineation of these dominant species is almost impossible to map, hence the name of the vegetation group. The present/absent data analysed by PATN shows some outliers due to the variation of these dominant species, and their similarity to other Vegetation groups which were more obvious standalone vegetation groups.

Similarly to Vegetation Group A, Vegetation Group B was quite an expansive and varied vegetation group, however the lower-storey species and topographical feature determined this vegetation group more readily from others. In the dominant species PATN analysis Q6, Q7 and Q28 were compared most similarly to Q1, Q22 and Q27 from Vegetation Group A and Q17 (Vegetation Group H). Q5 compared most similarly to outlier Q3, while Q26 compared most similarly to Vegetation Group N and outlier Q4. In the all species PATN analysis Q5, Q6 and Q28 compared most similarly to outliers Q1 and Q18, while Q26 compared most similarly to Q30, and Q7 formed its own group. These outliers can be mostly attributed to the varied upper storey species (*Eucalyptus* spp.).

Vegetation Group C was well represented by dominant species via PATN analysis, but not well represented in the all species PATN analysis. Q10 compared more similarly to Vegetation Group R and Q33 formed its own group. Therefore, the dominant species of Vegetation Group C are

more distinct to this group, while the all species PATN analysis suggests the composition of species grouped in Vegetation Group C are less distinct to this group.

Vegetation Group D was not well represented via dominant species PATN analysis with Q12 and Q13 comparing most similarly to Vegetation Group R, Q11 comparing most similarly to Vegetation Group G, and Q14 forming its own group. In the all species PATN analysis, Vegetation Group D was considered significantly similar to Vegetation Groups G and I, as well as quadrats from Vegetation Groups A and H. *Eucalyptus salmonophloia* is a very common species and was recorded in five additional quadrats outside of the Vegetation Group D defined by NVS, as both a dominant and non-dominant species, (depending on the vegetation group). Hence, PATN displayed an unweighted bias of present/absent data and did not take into account the topographical/lithological features of each vegetation group or the density of other significant species within the quadrats, that help to define each vegetation group.

Vegetation Group G was considered most similar to outlier Q11 via dominant species PATN analysis. In the all species PATN analysis, Vegetation Group G was grouped alongside Vegetation Groups D and I, as well as quadrats from Vegetation Groups A and H. This vegetation group was geographically smaller than other vegetation groups and was only able to be represented by one quadrat, and perhaps was not statistically differentiated from other more varied vegetation groups like Vegetation Group A.

Vegetation Group H was represented via dominant species PATN analysis with Q18 and Q19 forming a group, while Q17 was compared most similarly to Q1, Q22 and Q27 (Vegetation Group A) and Q6, Q7 and Q28 (Vegetation Group B). Vegetation Group H was not well represented via all species PATN analysis. Q19 formed its own group, Q18 compared most similarly with quadrats from Vegetation Group B and outlier Q1, and Q17 was considered significantly similar to Vegetation Groups D, G and I, as well as quadrats from Vegetation Group A. Again the statistical analysis via PATN did not account for the density of dominant species that determine this group, suggesting that the composition is similar to other vegetation groups, however is mapped separately based on the density of dominant species.

Vegetation Group I was well represented via dominant species PATN analysis and all species analysis, with all quadrats grouped together.

Vegetation Group K was well represented via dominant species PATN analysis with both quadrats forming one group. In the all species PATN analysis Q30 compared most similarly to outlier Q26 (Vegetation Group B), while Q31 was an outlier comparing most similarly to Vegetation Group N. The transitional variation of the upper-storey species may have attributed to this analysis.

Vegetation Group N was considered most similar to outliers Q4 (Vegetation Group A) and Q26 (Vegetation Group B) via the dominant species PATN analysis, while in the all species PATN analysis Vegetation Group N compared most similarly to outlier Q21 (Vegetation Group I). This vegetation group was considered a separate group due to the density/dominance of the upper storey species (*Eucalyptus gracilis*) however PATN analysis produced some anomalies due to the unweighted nature of the analysis, and perhaps the variation of the understorey species.

Vegetation Group R was well represented by both PATN analyses. However, in the dominant species analysis Vegetation Group R was grouped alongside outliers Q12 and Q13 from Vegetation Group D, and in the all species analysis Vegetation Group R was grouped alongside outlier Q10 from Vegetation Group C. This vegetation group was considered a separate group due to the density/dominance of the upper storey species (*Eucalyptus griffithsii*) however PATN analysis produced some anomalies due to the unweighted nature of the analysis, and perhaps the variation of the understorey species.

Vegetation Group X was well represented by dominant species via PATN analysis. When all species were analysed via PATN analysis Q8 and Q32 were grouped together, and Q9 was an

outlier. Again the unweighted nature of the presence/absence data did not take into account the dominance/density of the key species for this group.

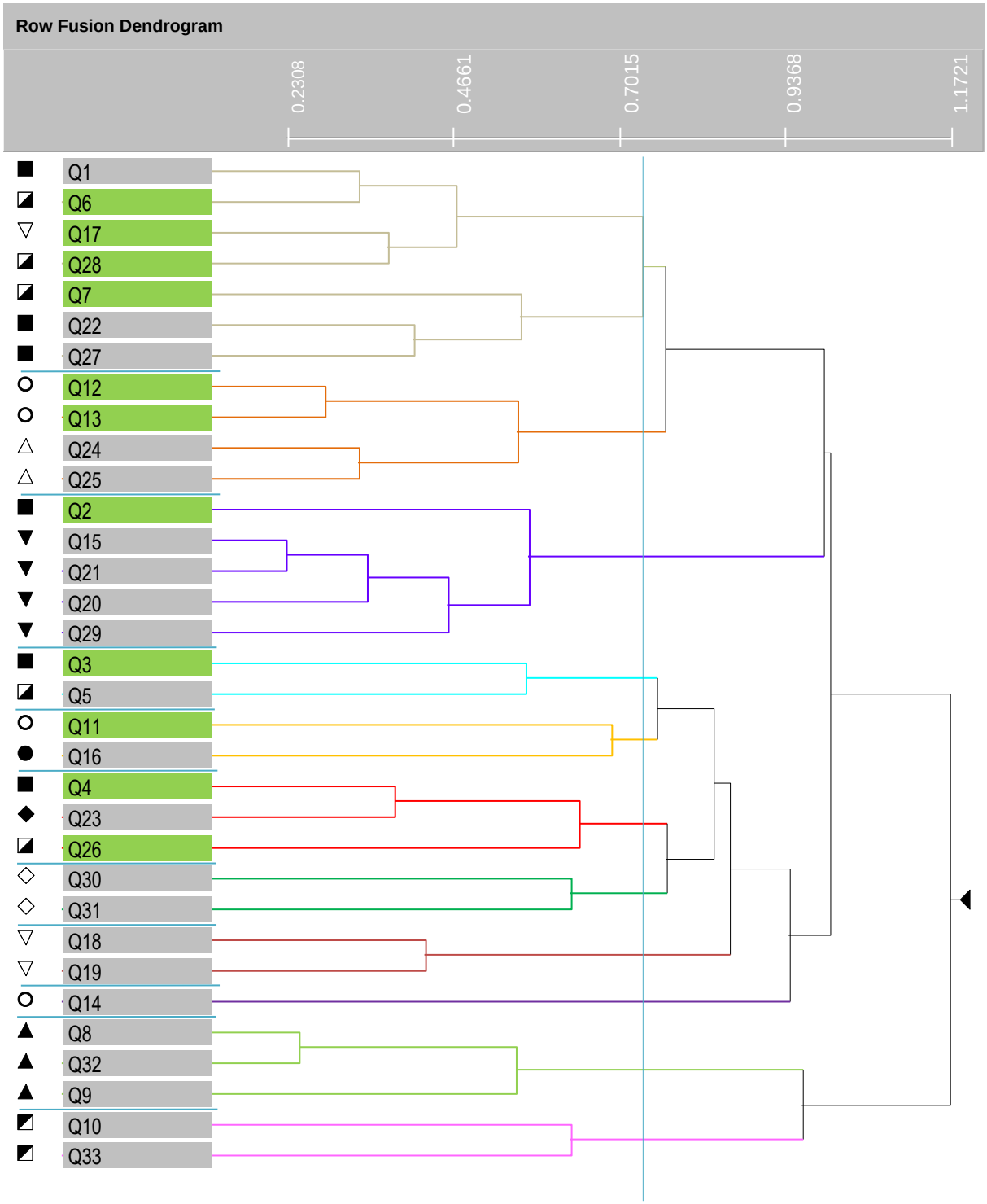

Figure 4: PATN Analysis of Dominant Species into 11 groups

The dendrogram below (Figure 5) of the analysis of all species shows a correlation to pre-grouped quadrats described in section 4.2.1.1. The dendrogram displays each quadrat with like symbols representing NVS mapped vegetation groups, and coloured lines depicting PATN defined vegetation groups. However, there were several outliers, and these are highlighted in green (Figure 5). Outliers are quadrats that do not show a good association with other quadrats in the same NVS mapped vegetation group, which is expected due to the unweighted nature of PATN analysis, which does not take into account topographical/lithological features or the density of key species defining the vegetation group.

When comparing outliers of the PATN analysis of all species versus dominant species, there are greater outliers in the former. Therefore, the vegetation groups mapped by NVS demonstrate a reliance on dominant species within the quadrat as opposed to all species present.

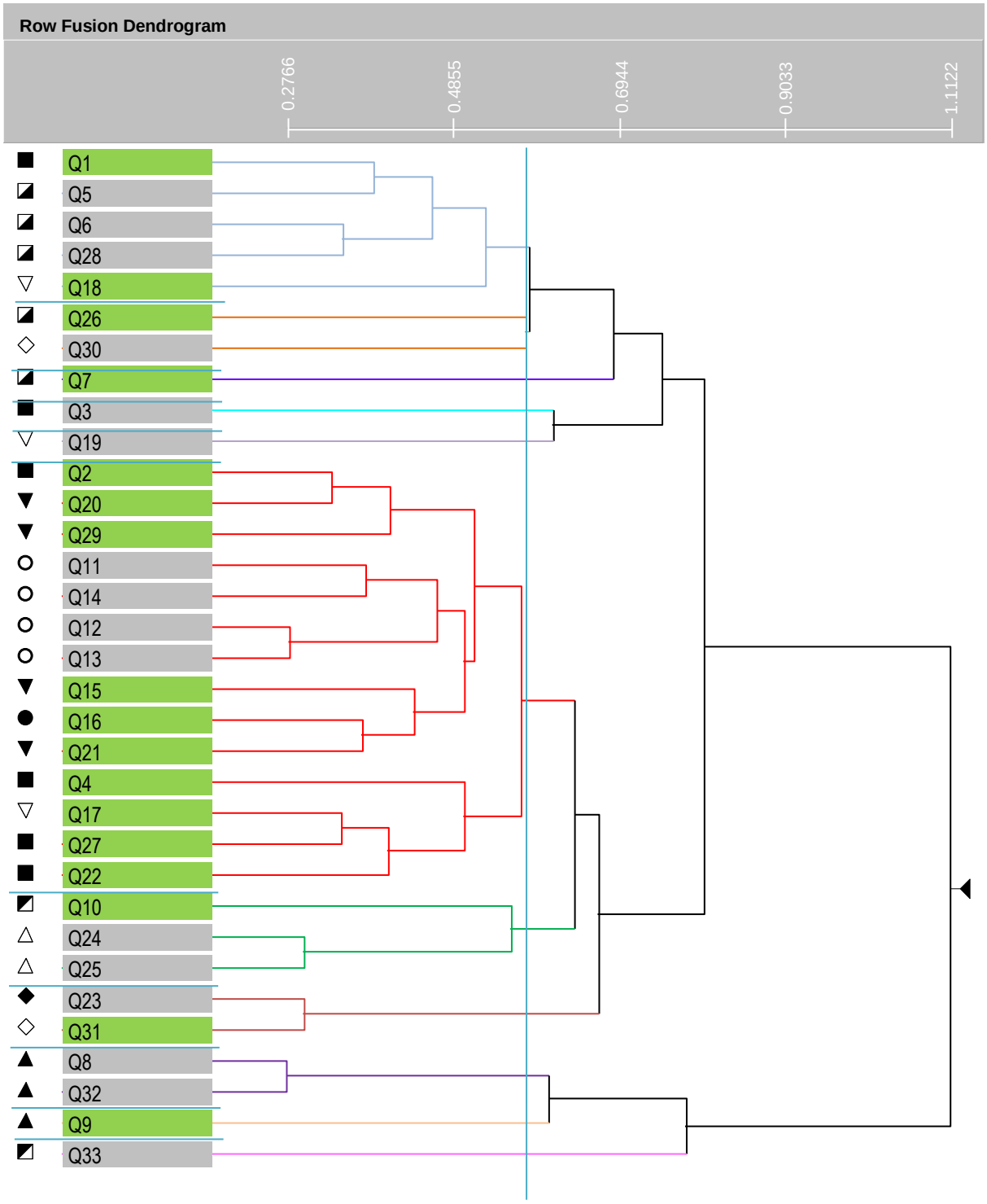

Figure 5: PATN Analysis of All Species into 11 groups

4.2.1.3 Vegetation Condition

Vegetation in the survey area has been subjected to historic exploration activities and grazing.

In accordance with the Keighery (1994) scale, most of the sites/quadrats inspected were in Good to Very Good condition (Appendix F). Disturbed areas were present within the survey area, mostly attributed to access tracks and exploration activities. The vegetation more than 0.5m off these tracks was mostly in a Good to Very Good condition (Keighery 1994).

As discussed below in Section 4.2.2.4, there was one non-native species recorded in the quadrats, and no non-native species recorded elsewhere within the survey area.

4.2.2 Flora of the Survey Area

4.2.2.1 General

One hundred and forty-eight species were recorded within the survey area with 130 species recorded within quadrats. Thirty-one families and 72 genera were recorded overall. These are listed in Appendix E, per Quadrat as well as per vegetation group. Of the native species, Chenopodiaceae had the highest representation, with 27 species from 10 genera. The next best represented families were Myrtaceae and Scrophulariaceae each with 18 species.

Of the 148 taxa recorded one was an introduced weed species. *Oncosiphon suffruticosum* (Calomba daisy) was recorded in quadrat 12. This species is not listed as a declared pest in the state of Western Australia by DPIRD (2022).

The most common and widespread species were *Exocarpos aphyllus* which was recorded within 30 quadrats, followed by *Ptilotus obovatus* and *Maireana trichoptera* which were both recorded within 26 quadrats.

Quadrat 4 had the richest species list with 36 taxa recorded.

4.2.2.2 Species Accumulation Curve

A Species Accumulation Curve was generated using the computer programme Species Diversity and Richness- Version 4.1.2 (Seaby & Henderson, 2006). The model assumed 33 random selections of sample order. This curve was then fitted to a logarithmic curve in Excel® (Figure 6). The logarithmic trend line and R^2 values were generated in Excel®. According to the Species Accumulation Curve below, the R^2 value (0.995) shows an acceptable fit for a logarithmic curve of the total accumulated species per number of quadrats established (Figure 6).

Sufficient sampling was inferred via the effort of intensity (number of quadrats established) versus the return of species collected (total accumulated species). From this fitted logarithmic curve formula, sufficient sampling was determined where the gain of new species was less than 1% for every new quadrat established. Based on this reasoning, sufficient sampling was reached at 27 quadrats, at which the extrapolated total accumulated number of species was 118. Therefore the 130 species collected within the 33 quadrats represents 105.84% of the predicted total abundance.

Hence sufficient quadrat sampling can be assumed for the survey area.

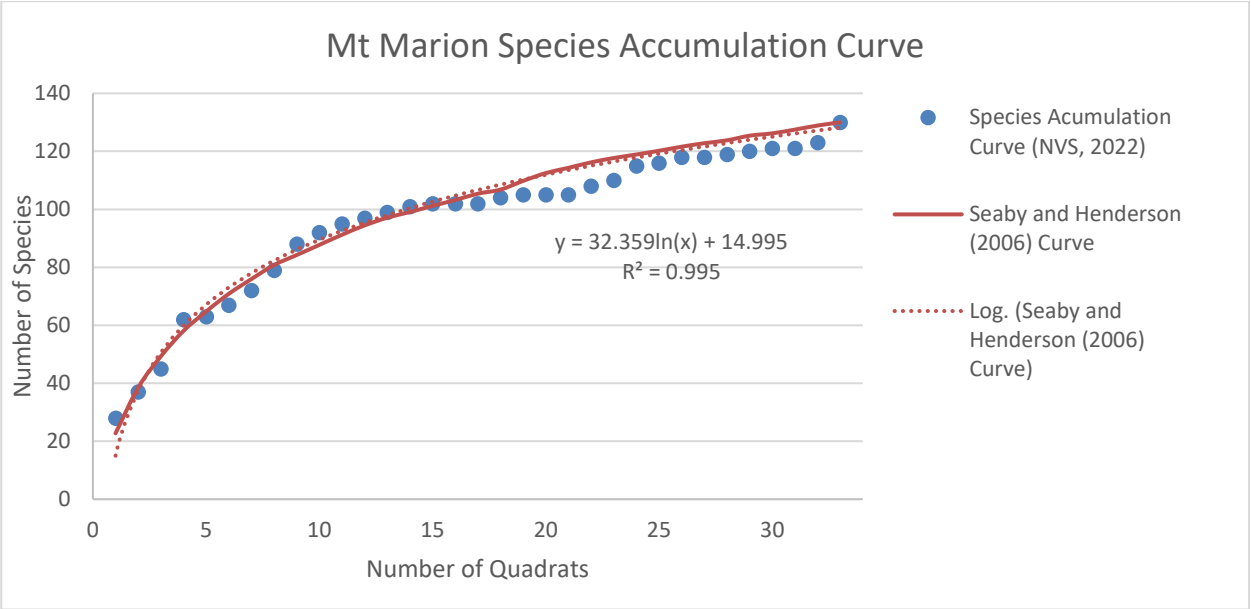

Figure 6: Species Accumulation Curve for the 33 sampled quadrats

4.2.2.3 Conservation significant species

There was one Priority and one Threatened flora recorded during the survey. The DBCA database searches had no records of these species occurring within a 20 km radius of the survey area (DBCA, 2021a).

The Threatened taxon recorded in the survey area (gazetted as Threatened pursuant to Section 5(1) of the *Biodiversity Conservation Act 2016*, and as Threatened pursuant to Schedule 1 of the *Environment Protection and Biodiversity Conservation Act 1999),* was *Seringia exastia (T).*

Seringia exastia (previous known as *Keraudrenia exastia*) was a species only known from the Kimberley Region. A recently completed taxonomic study that assessed genomic and morphological characters in several *Seringia* taxa (Binks et al. 2020) concluded that *Seringia exastia* and *S. elliptica* are the same species. The taxonomy of the genus has been revised to synonymise *S. exastia* and *S. elliptica* under the oldest valid name of *S. exastia*. Because *S. elliptica* was common and widespread throughout the Pilbara region, central WA, Northern Territory and also extends into South Australia, following the taxonomic revision, *S. exastia* is now considered common and widespread. When observing the regional extent of this species, all records are located north of Kalgoorlie in Western Australia. Hence, the location of this species within the survey area suggests that this species may have been introduced by earthworks machinery utilised whilst clearing vegetation for the construction of a Pastoral Station fence at this location.

A nomination to delist the species due to no plausible significant threats to the species has been prepared and considered by the WA Threatened Species Scientific Committee (TSSC). It is anticipated that at the next TSSC meeting, recommendations will be made to the Minister to delist. However, until changes are officially made to the threatened species list, *S. exastia* is still legally listed as threatened flora, and authorisation to take under section 40 of the *Biodiversity Conservation Act 2016* is still required. Although some loss of plants is likely to have occurred and will continue to occur during mining and road works in some parts of the species' distribution, this is not expected to be significant in the context of the entire population. Therefore, there should be no impediments to granting authorisation, following the standard process of application made to DBCA's Species and Communities Program.

Priority flora *Eremophila acutifolia* (P3) was found in Quadrats 30 and 31. Both populations were dominant lower stratum species. *Eremophila acutifolia* (P3) is both widespread and found in large

numbers throughout the local and regional area and is well documented by previous flora surveys. Recorded locations range from Coolgardie, Norseman, Kambalda, Widgiemooltha and Madoonia Downs.

Population numbers and GPS locations of priority flora recorded within the survey area are included in Table 9 below. This data is also included in the IBSA Data Package.

Table 9: Priority flora recorded in Quadrats within the survey area

Taxon	Abundance	Total observed	Date of observation	Longitude	Latitude	Location
Eremophila acutifolia (P3)	45	231	14/10/2021	121.43819	-31.06226	Q30
Eremophila acutifolia (P3)	186		14/10/2021	121.43580	-31.06497	Q31
Seringia exastia (T)	1	1	14/10/2021	121.36896	-31.08042	Western extent of survey Area

Data from the NVS (2019) survey is included in table 10 below to compare local numbers of *Eremophila acutifolia* (P3) with the current survey area. The NVS survey in 2019 included a local search/count of Priority flora that occurred in the greater Mt Marion Project Area. The number of plants of *Eremophila acutifolia* (P3) counted within the survey area represents approximately 7.39% of the wider local population recorded by NVS (2019).

Table 10: Local Priority Flora Population numbers to be affected by proposed clearing

Taxon	Population abundance inside survey area	Population abundance outside survey area	Total population abundance	% of population within survey area (%)
Eremophila acutifolia (P3)	674	380	1054	63.95%
Eremophila acutifolia (P3)	171	122	293	58.36%
Eremophila acutifolia (P3)	736	19,814	20,048	3.67%
Total	**1581**	**19814**	**21395**	**7.39%**

4.2.2.4 Introduced species

The introduced weed species *Oncosiphon suffruticosum* (Calomba daisy) was recorded at Quadrat 12. This species is not listed as a declared plant by DPIRD (2021).

4.3 ASSESSMENT OF THE CLEARING PRINCIPLES

The DMIRS and DWER assess clearing permits against ten principles relating to the effect of clearing. NVS submits the following comments regarding the clearing principles specifically related to Native Vegetation.

a). Native vegetation should not be cleared if it comprises a high level of biological diversity.

One hundred and forty-eight species were recorded within the survey area with 130 species recorded within quadrats. Thirty-one families and 72 genera were found. Species composition and vegetation types within the application area are typical of the local region and not considered to be unusually diverse. Based on the low level of disturbance, the lack of fragmentation of vegetation and vegetation condition generally rated as 'Good' to 'Very Good' on the Keighery scale (Keighery, 1994), the area proposed to be cleared is not considered to be remnant vegetation.

No Threatened or Priority Ecological Communities were identified within the survey area.

One weed species was identified within the survey area and is therefore not considered to be a significant threat to biodiversity in the area. Weeds have the potential to significantly change the dynamics of a natural ecosystem and lower the biodiversity of an area.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

b). Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

Not addressed in this assessment.

c). Native vegetation should not be cleared if it includes, or is necessary for, the continued existence of rare flora

The DBCA database searches revealed a potential for one Threatened and 22 Priority Flora species to occur within a 20 km radius of the survey area (DBCA, 2021a). None of these known locations of Threatened or Priority Flora occur within the survey area, with the closest Threatened Flora and the closest Priority Flora located approximately 19 km south and 1 km south of the survey area respectively.

NVS recorded one Priority and one Threatened flora recorded during the survey.

Threatened flora *Seringia exastia (T)* was identified within the survey area. Because *S. exastia* is still legally listed as threatened flora, an authorisation to take under section 40 of the *Biodiversity Conservation Act 2016* is still required. However, there should be no impediments to granting authorisation, following the standard process of application made to DBCA's Species and Communities Program, as this species is considered both common and widespread. Although some loss of plants is likely to occur, this is not expected to be significant in the context of the entire population.

Priority flora *Eremophila acutifolia* (P3) was found in Quadrats 30 and 31. Both populations were dominant lower stratum species. This species is both widespread and in large numbers throughout the local and regional area and is well documented by previous flora surveys. Recorded locations range from Coolgardie, Norseman, Kambalda, Widgiemooltha and Madoonia Downs. Using data from the NVS (2019) survey to compare local numbers of *Eremophila*

acutifolia (P3) with the current survey area, the survey area contains less than 7.39% of the wider local population, and hence clearing is unlikely to have an impact on the conservation significance of this species.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

d). Native vegetation should not be cleared if it comprises the whole or part of, or is necessary for the maintenance of a threatened ecological community

There are no known Threatened or Priority Ecological communities previously recorded in the survey area and none were recorded in this survey.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

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

As demonstrated in section 4.1.4, four beard vegetation associations fall within the survey area, each with less than 1% of the total association extent inside the survey area at all scales. All four vegetation associations are above the 30% threshold of their known spatial area remaining post European settlement at a state, bioregional and subregional level, and are not adversely affected by extensive clearing.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

f). Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland

The survey area contains no watercourses or wetlands. The closest waterbody lies 24 km to the southeast from the survey area (DWER, 2021).

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

g). Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation

Not addressed in this assessment.

h). 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

No conservation areas occur within the survey area.

The DBCA managed Yallari Timber Reserve 5(1)(h) is separated from the survey area by the Coolgardie-Esperance Highway. This Timber Reserve is vested with the Conservation Commission for the purpose of Timber Production, however, is considered by the DBCA as an area for the conservation of flora and fauna.

Given the distance of the survey area from the nearest conservation area, the proposed clearing is not likely to prevent a significant ecological linkage and is not likely to impact the environmental values of the conservation area.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

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

Not addressed in this assessment.

5 DISCUSSION

The survey area is located within the Eastern Goldfields subregion (CALM, 2002). Results of this survey indicate that the majority of the flora within the survey area is not unique and is in fact common throughout the Eastern Goldfields subregion and adjoining regions.

One hundred and forty-eight species were recorded within the survey area with 130 species recorded within quadrats. Thirty-one families and 72 genera were found. These are listed in Appendix E, per Quadrat as well as per vegetation group. Of the native species, Chenopodiaceae had the highest representation, with 27 species from 10 genera. The next best represented Family were Myrtaceae and Scrophulariaceae each with 18 species.

Of the 148 taxa recorded one was an introduced weed species. *Oncosiphon suffruticosum* (Calomba daisy) was recorded in Quadrat 12. This species is not listed as a declared pest in the state of Western Australia by DPIRD (2021).

The most common and widespread species were *Exocarpos aphyllus* which was recorded within 30 quadrats, followed by *Ptilotus obovatus* and *Maireana trichoptera* which were both recorded within 26 quadrats.

Quadrat 4 demonstrated the largest species richness with 36 taxa recorded from within a single site.

The DBCA database searches revealed a potential for one Threatened and 22 Priority Flora species to occur within a 20 km radius of the survey area (DBCA, 2021a). No known locations of Threatened or Priority Flora occur within the survey area, with the closest Threatened Flora and the closest Priority Flora located approximately 19 km south and 1 km south of the survey area respectively.

There was one Priority and one Threatened flora recorded during the survey. Threatened flora *Seringia exastia (T)* was identified within the survey area and is gazetted as Threatened pursuant to Section 5(1) of the *Biodiversity Conservation Act 2016*, and as Threatened pursuant to Schedule 1 of the *Environment Protection and Biodiversity Conservation Act 1999.* A nomination to delist the species (due to no plausible significant threats) has been prepared by the WA Threatened Species Scientific Committee (TSSC) for the Minister to consider. However, until changes are officially made to the threatened species list, *S. exastia* is still legally listed as threatened flora, and authorisation to take under section 40 of the *Biodiversity Conservation Act 2016* is still required. Although some loss of plants is likely to have occurred and will continue to occur during mining and road works in some parts of the species' distribution, this is not expected to be significant in the context of the entire population. Therefore, there should be no impediments to granting authorisation, following the standard process of application made to DBCA's Species and Communities Program.

Priority flora *Eremophila acutifolia* (P3) was found in Quadrats 30 and 31. This species is both widespread and in large numbers throughout the local and regional area and is well documented by previous flora surveys. Recorded locations range from Coolgardie, Norseman, Kambalda, Widgiemooltha and Madoonia Downs. Using data from the NVS (2019) survey to compare local numbers of *Eremophila acutifolia* (P3) with the current survey area, clearing within the proposed survey area will likely affect approximately 7.39% of the local population.

The PEC/TEC search revealed no PEC/TECs within the survey area (DBCA, 2021).

Vegetation condition was generally 'Good' to 'Very Good' (Keighery 1994). Disturbance was present within the survey area and mostly attributed to access tracks, exploration related activities and grazing.

Given the above it is not expected that the proposed clearing will result in significant impacts such as vegetation fragmentation or the loss of vegetation associations or species that may be unique. This is partially due to the relevant size of the proposed clearing in comparison to similar abundant vegetation and habitat represented and retained outside of the survey area.

IMPACT ASSESSMENT

5.1 THREATENING PROCESSES

The processes that may impact the Flora within the survey area as a result of the proposed clearing include:

- Localised vegetation clearing resulting in a reduction in biodiversity in the immediate area, however it is adequately represented in the surrounding vegetation in the local area and region
- Vehicle use damaging vegetation if existing tracks are not adhered to
- The introduction and increased abundance of non-native species
- Dust generated during clearing of native vegetation and associated activities may settle on adjacent native vegetation, causing possible stress and perhaps death, especially during drier months; and
- Accidental fire arising from clearing and associated activities, may affect vegetation in surrounding areas.

6 CONCLUSIONS

This report summarises the results of a detailed flora and vegetation survey.

The survey established that the condition of the vegetation in the survey area is overall 'Good' to 'Very Good' condition. No Threatened Flora were recorded in the area. The survey area lies to the northeast of the Yallari Timber Reserve and is separated from the survey area by the Coolgardie-Esperance Highway. No PEC/TECs were recorded in the survey area.

There was one Priority and one Threatened flora recorded during the survey. Clearing within the survey area that directly affects these species will not significantly impact on the conservation significance of either.

The EPA objective for flora and vegetation is to maintain the abundance, species diversity and geographical distribution of flora and vegetation as well as protect Threatened flora consistent with the provisions of the *Biodiversity Conservation Act 2016.* The proposed clearing of vegetation will result in the loss of some individuals from the local area; however, the impact will not be great enough to remove whole communities or populations. Most of the species and communities recorded during this survey are widespread throughout the Eastern Goldfields subregion and adjoining regions, and therefore the loss of a small proportion from this area will not be significant.

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8 GLOSSARY

Acronyms:

BAM Act	*Biosecurity and Agriculture Management Act 2007,* Western Australia
BC Act	*Biodiversity Conservation Act 2016* (partly enacted), Western Australia
BOM	Bureau of Meteorology, Australian Government
BSc	Bachelor of Science
CALM	Department of Conservation and Land Management (now DBCA)
COO	Coolgardie Bioregion, IBRA
COO03	Eastern Goldfields Subregion, IBRA
CPS	Clearing Permit System (DWER)
DAWE	Department of Agriculture, Water and the Environment, Australian Government
DBCA	Department of Biodiversity, Conservation and Attractions, Western Australia
DMIRS	Department of Mines, Industry Regulation and Safety, Western Australia
DPAW	Department of Parks and Wildlife, Western Australia (now DBCA)
DPIRD	Department of Primary Industries and Regional Development, Western Australia
DRF	Declared Rare Flora
DWER	Department of Water and Environmental Regulation, Western Australia
EPA	Environmental Protection Authority, Western Australia
EP Act	*Environmental Protection Act 1986*, Western Australia
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth Act)
ESA	Environmentally Sensitive Area
GIS	Geographical Information System
ha	Hectare (10,000 square metres)
IBRA	Interim Biogeographic Regionalisation for Australia, DAWE
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
km	Kilometres
m	Metres
NVS	Native Vegetation Solutions
PEC	Priority Ecological Community, Western Australia
Ramsar	A wetland site designated of international importance under the Ramsar Convention (UNESCO)
TEC	Threatened Ecological Community
UNESCO	United Nations Educational, Scientific and Cultural Organization
WA	Western Australia
WAHERB	Western Australian Herbarium, DBCA
WAOL	Western Australian Organism List
WC Act	*Wildlife Conservation Act 1950*, Western Australia

Definitions:

{DBCA (2019a) Conservation Codes for Western Australian Flora and Fauna. Department of Biodiversity, Conservation and Attractions, Western Australia, January 2019}: -

T Threatened species:

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

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

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

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

CR Critically endangered species

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

Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the *Wildlife Conservation (Specially*

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

EN Endangered species

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

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

VU Vulnerable species

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

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.

Extinct species:

Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.

EX Extinct species

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

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

EW Extinct in the wild species

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

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

Specially protected species

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

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

MI Migratory species

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

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

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

CD Species of special conservation interest (conservation dependent fauna)

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

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

OS Other specially protected species

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

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

P <u>Priority Species</u>

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

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

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

Priority 1: Poorly known species

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

Priority 2: Poorly known species

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

Priority 3: Poorly known species

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

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

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

Appendix A - EPBC and Other Government Database Search Results

Australian Government
Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

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

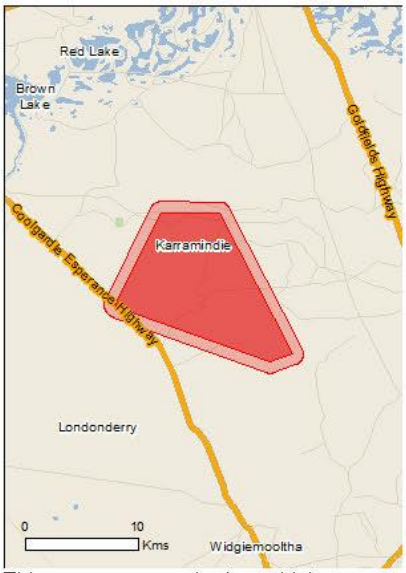
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

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

Report created: 05/11/21 19:47:51

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

Caveat
Acknowledgements



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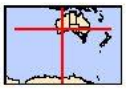


Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	5
Listed Migratory Species:	6

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	9
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:	1
Regional Forest Agreements:	None
Invasive Species:	11
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat may occur within area
Mammals		
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat 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

Name	Threatened	Type of Presence
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Resource Information]

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

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat 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
Chrysococcyx osculans Black-eared Cuckoo [705]		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

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Yallari Timber Reserve	WA

Invasive Species	[Resource Information]

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

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Mammals		
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
Equus asinus Donkey, Ass [4]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		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
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
Vulpes vulpes Red Fox, Fox [18]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Plants		
Carrichtera annua Ward's Weed [9511]		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

-31.01756 121.40407,-31.01778 121.45049,-31.11412 121.50842,-31.11943 121.49091,-31.08174 121.3691,-31.08057 121.36774,-31.01756 121.40407

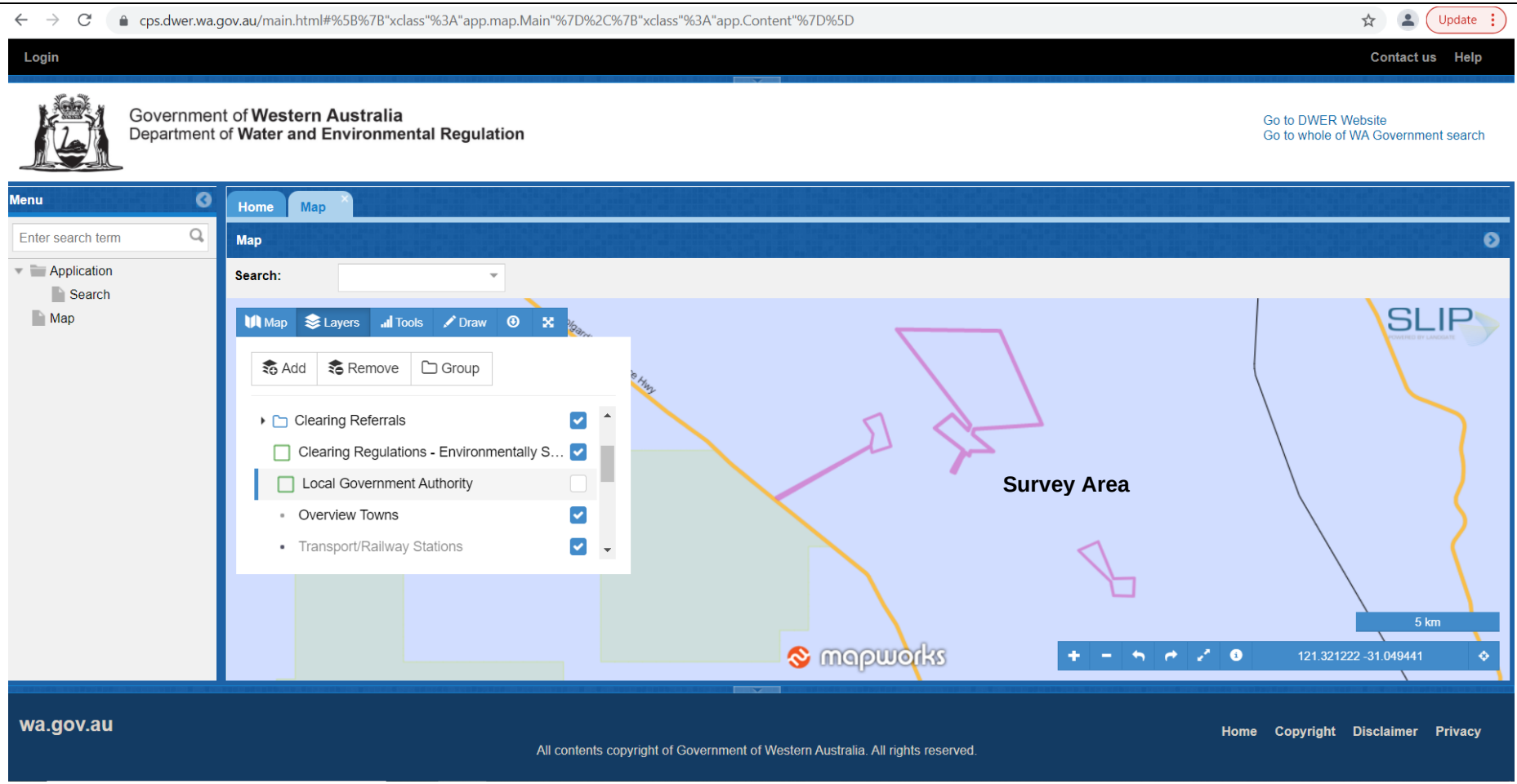
Acknowledgements

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

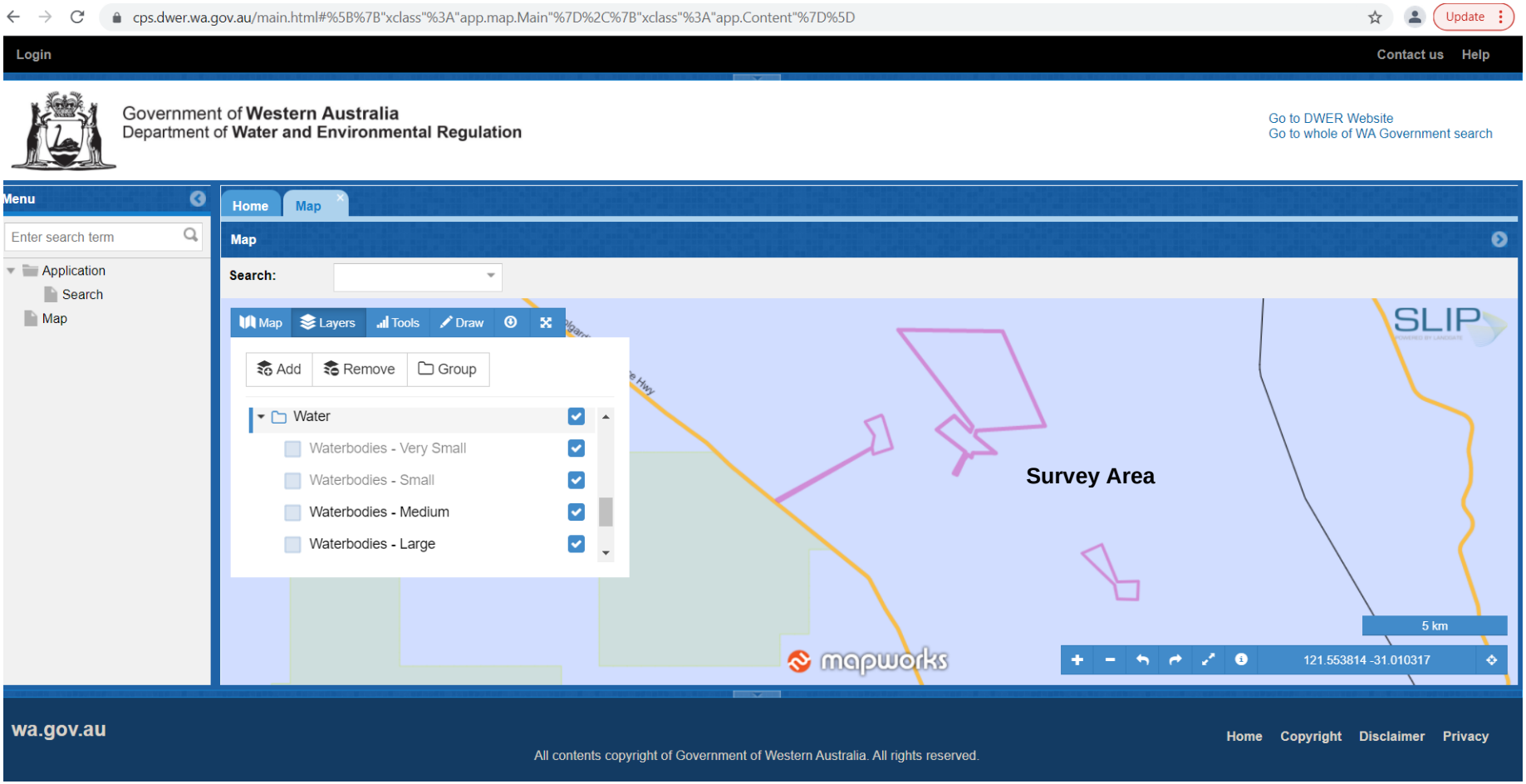
-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, 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.



DWER CPS Map Viewer - showing no ESA's (dark green shaded areas) within the survey area (pink polygons) (DWER, 2021)



DWER CPS Map Viewer - showing no water bodies within the survey area (pink polygons) (DWER, 2021)

Appendix B - Vegetation Definitions

Vegetation Condition Definitions (Keighery, 1994)

Pristine (1). Pristine or nearly so, no obvious signs of disturbance.

Excellent (2). Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.

Very Good (3). Vegetation structure altered, obvious signs of disturbance.
For example, disturbance to vegetation structure caused by repeating fires, the presence of some more aggressive weeds, dieback, logging and grazing.

Good (4). Vegetation structure significantly altered by very obvious signs of multiple disturbance.
Retains basic vegetation structure or ability to regenerate it.
For example, disturbance to vegetation structure caused by frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.

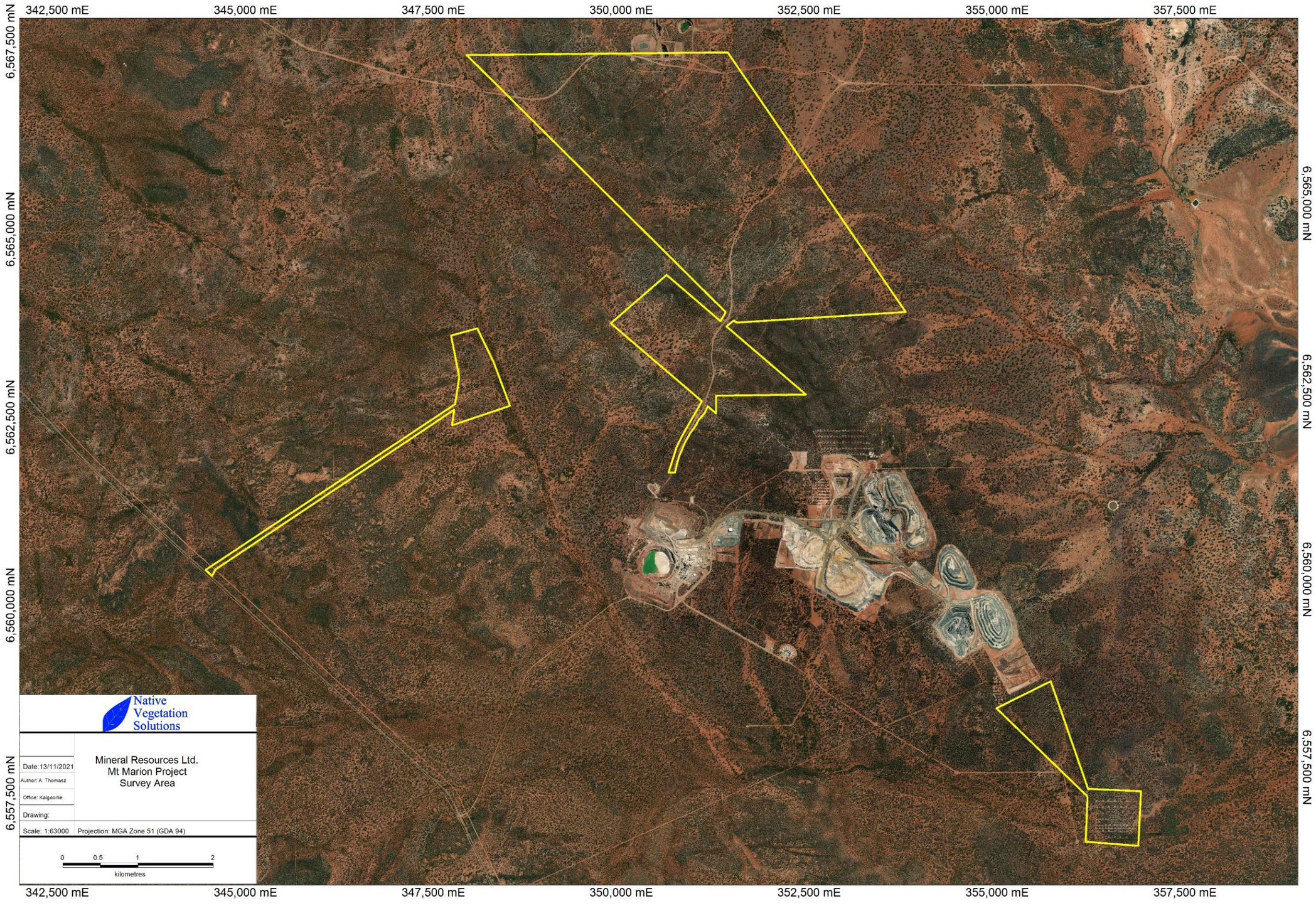
Degraded (5). Basic vegetation structure severely impacted by disturbance.
Scope for regeneration but not to a state approaching good condition without intensive management.
For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.

Completely Degraded (6). 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 compromising weed or crop species with isolated trees or shrubs.

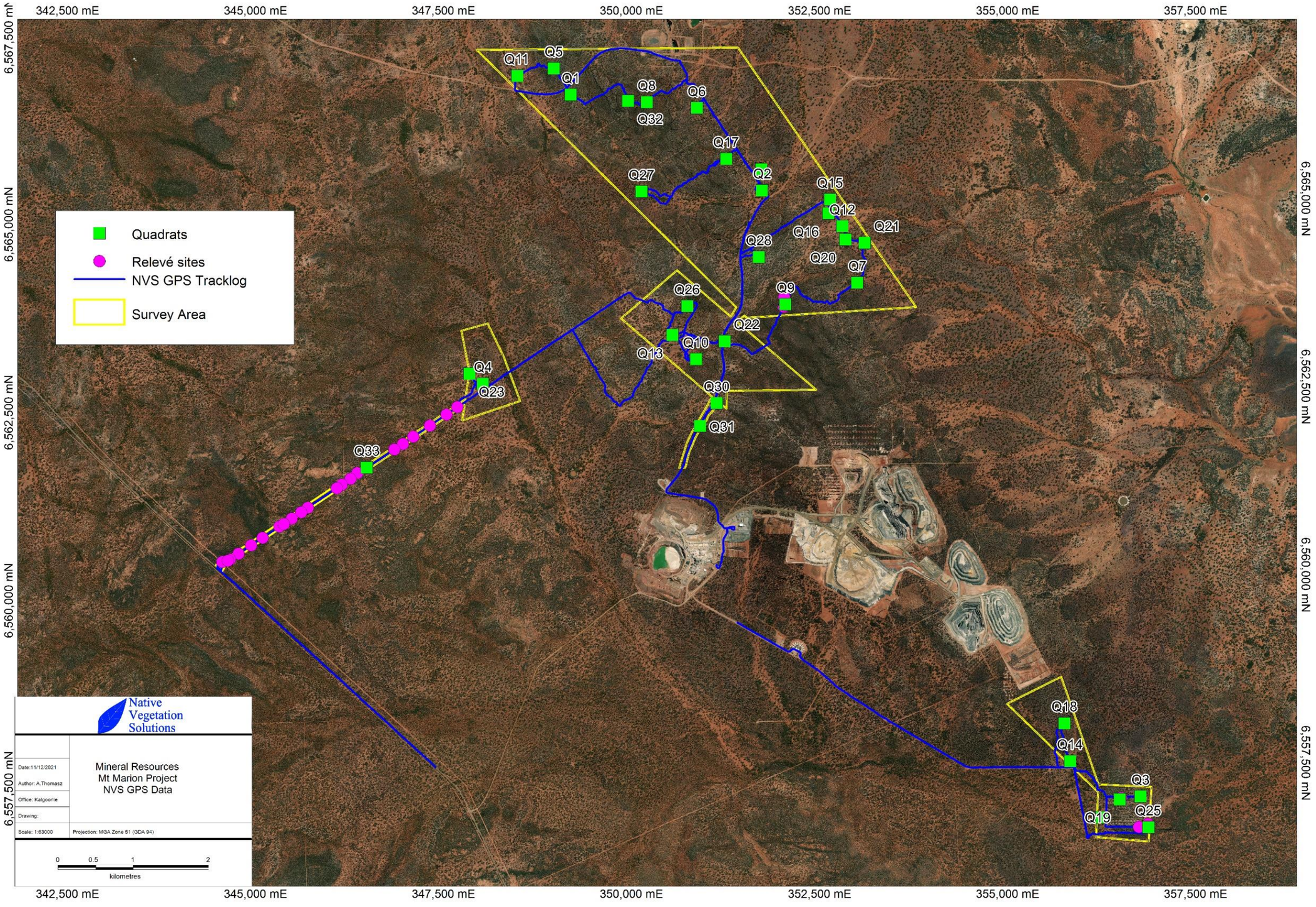
Vegetation Structure Definitions (Muir, 1977)

Life Form/Height Class	Canopy Cover			
	Dense 70-100% d	Mid-Dense 30-70% c	Sparse 10-30% i	Very Sparse 2-10% r
T Trees>30m	Dense Tall Forest	Tall Forest	Tall Woodland	Open Tall Woodland
M Trees 15-30m	Dense Forest	Forest	Woodland	Open Woodlnd
LA Trees 5-15m	Dense Low Forest A	Low Forest A	Low Woodland A	Open Low Woodland A
LB Trees<5m	Dense Low Forest B	Low Forest B	Low Woodland B	Open Low Woodland B
KT Mallee tree form	Dense Tree Mallee	Tree Mallee	Open Tree Mallee	Very Open Tree Mallee
KS Mallee shrub form	Dense Shrub Mallee	Shrub Mallee	Open Shrub Mallee	Very Open Shrub Mallee
S Shrubs>2m	Dense Thicket	Thicket	Scrub	Open Scrub
SA Shrubs 1.5-2.0m	Dense Heath A	Heath A	Low Scrub A	Open Low Scrub A
SB Shrubs 1.0-1.5m	Dense Heath B	Heath B	Low Scrub B	Open Low Scrub B
SC Shrubs 0.5-1.0m	Dense Low Heath C	Low Heath C	Dwarf Scrub C	Open Dwarf Scrub C
SD Shrubs 0.0-0.5m	Dense Low Heath D	Low Heath D	Dwarf Scrub D	Open Dwarf Scrub D
P Mat plants	Dense Mat Plants	Mat Plants	Open Mat Plants	Very Open Mat Plants
H Hummock Grass	Dense Hummock Grass	Mid-Dense Hummock Grass	Hummock Grass	Open Hummock Grass
GT Bunch grass >0.5m	Dense Tall Grass	Tall Grass	Open Tall Grass	Very Open Tall Grass
GL Bunch grass <0.5m	Dense Low Grass	Low Grass	Open Low Grass	Very Open Low Grass
J Herbaceous spp.	Dense Herbs	Herbs	Open Herbs	Very Open Herbs
VT Sedges >0.5m	Dense Tall Sedges	Tall Sedges	Open Tall Sedges	Very Open Tall Sedges
VL Sedges <0.5m	Dense Low Sedges	Low Sedges	Open Low Sedges	Very Open Low Sedges
X Ferns	Dense Ferns	Ferns	Open Ferns	Very Open Ferns
Mosses, liverwort	Dense Mosses	Mosses	Open Mosses	Very Open Mosses

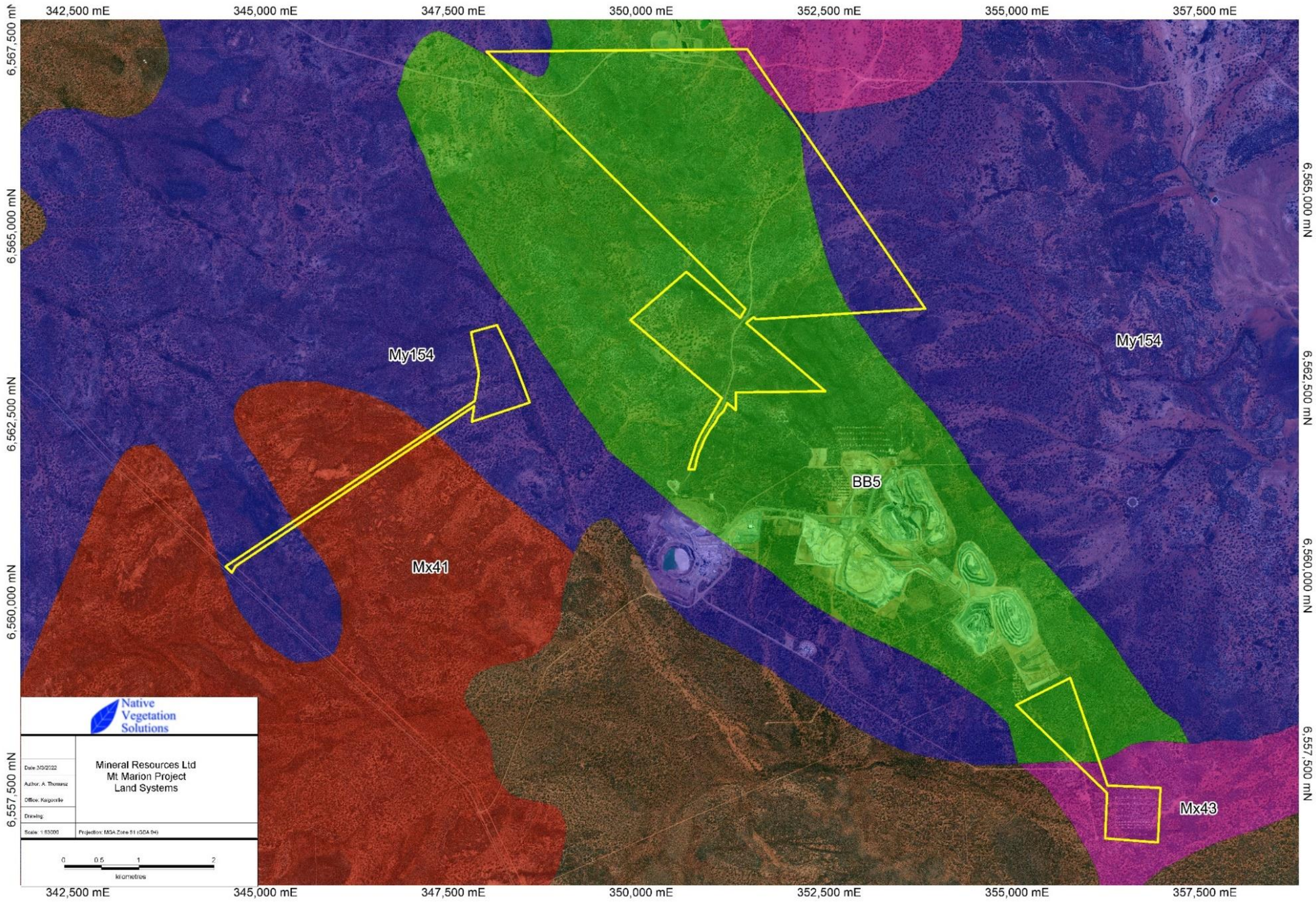
Appendix C - Mapping



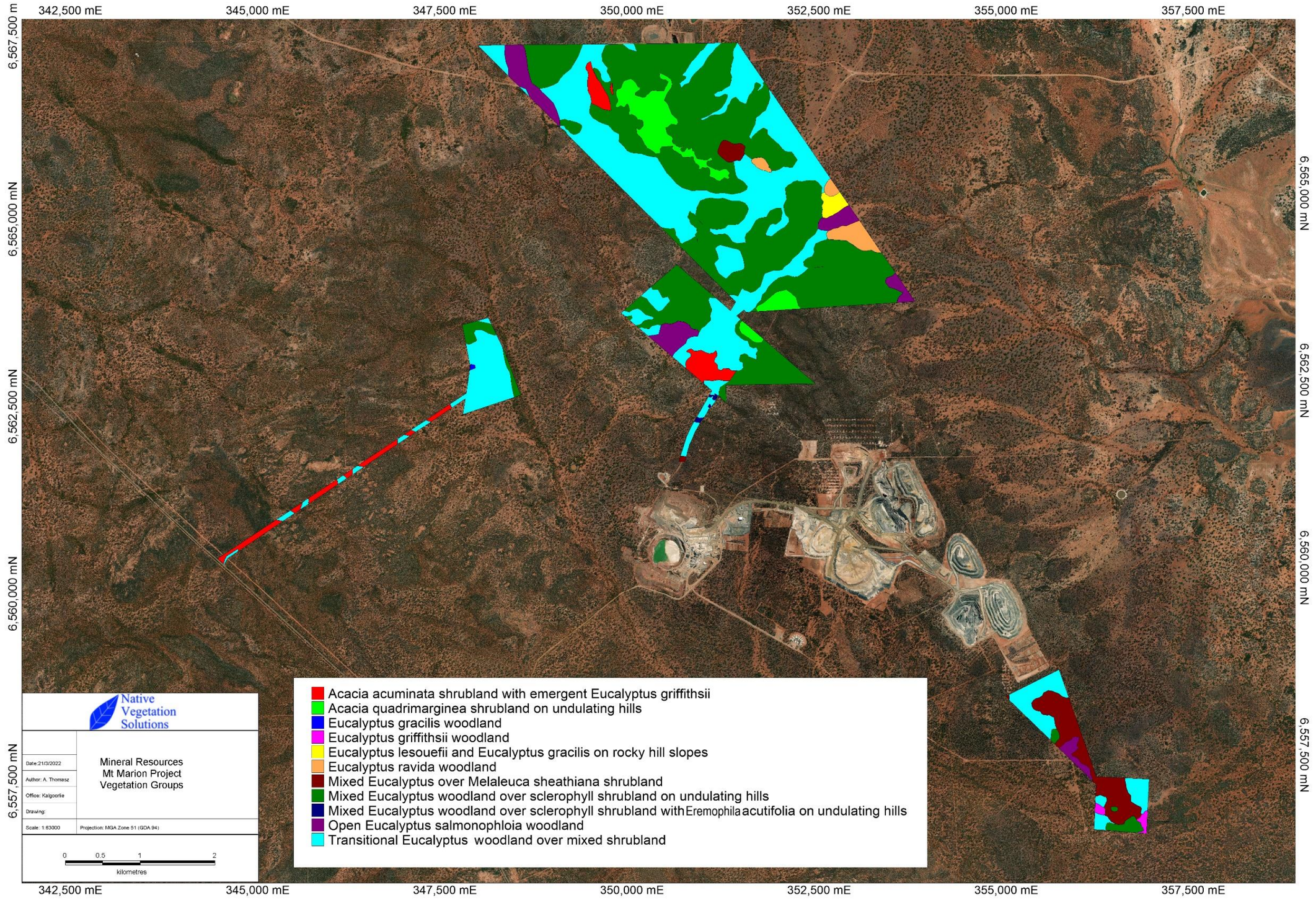
Map 1: Mt Marion Project Survey Area



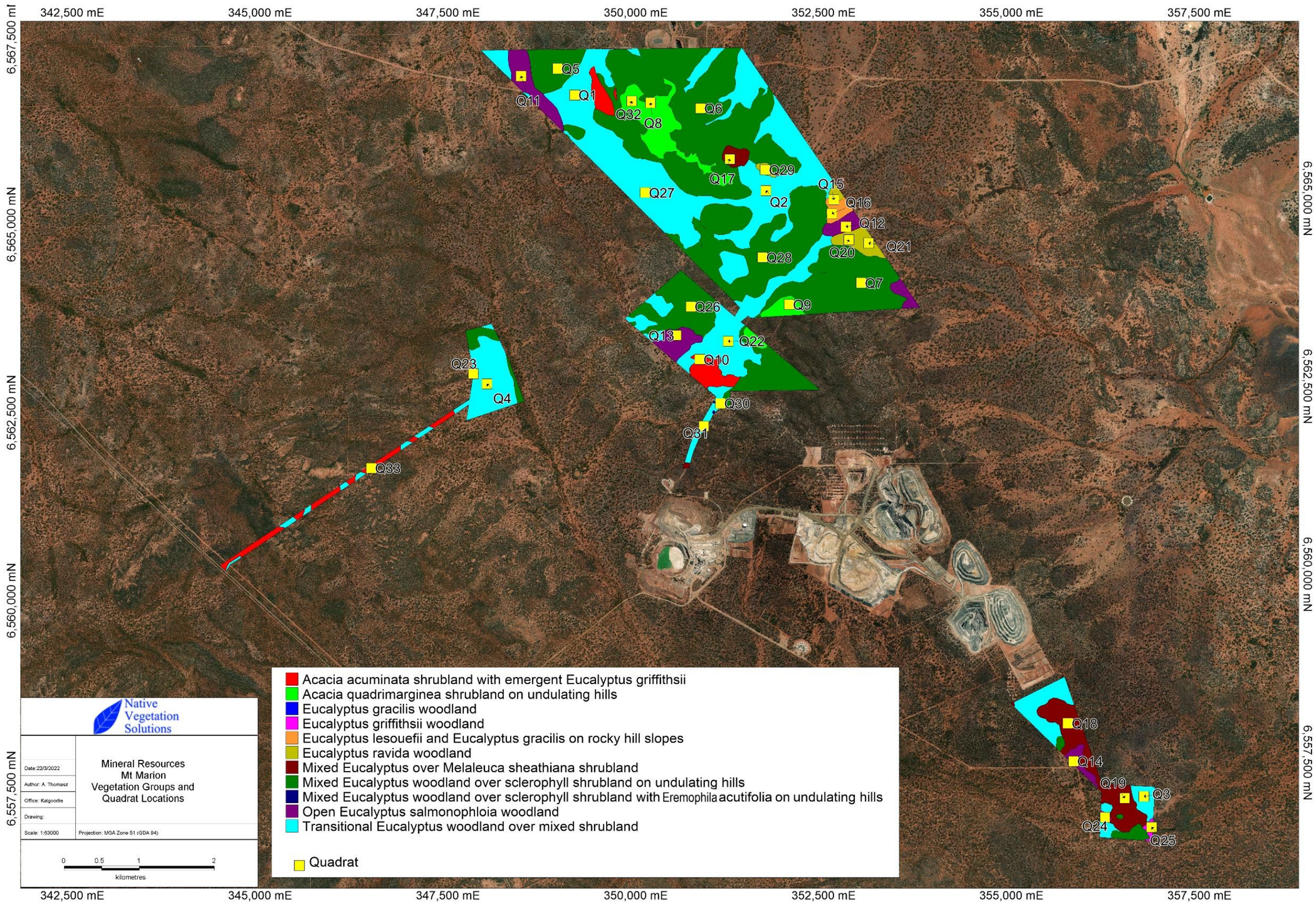
Map 2: NVS GPS Data for Mt Marion Project



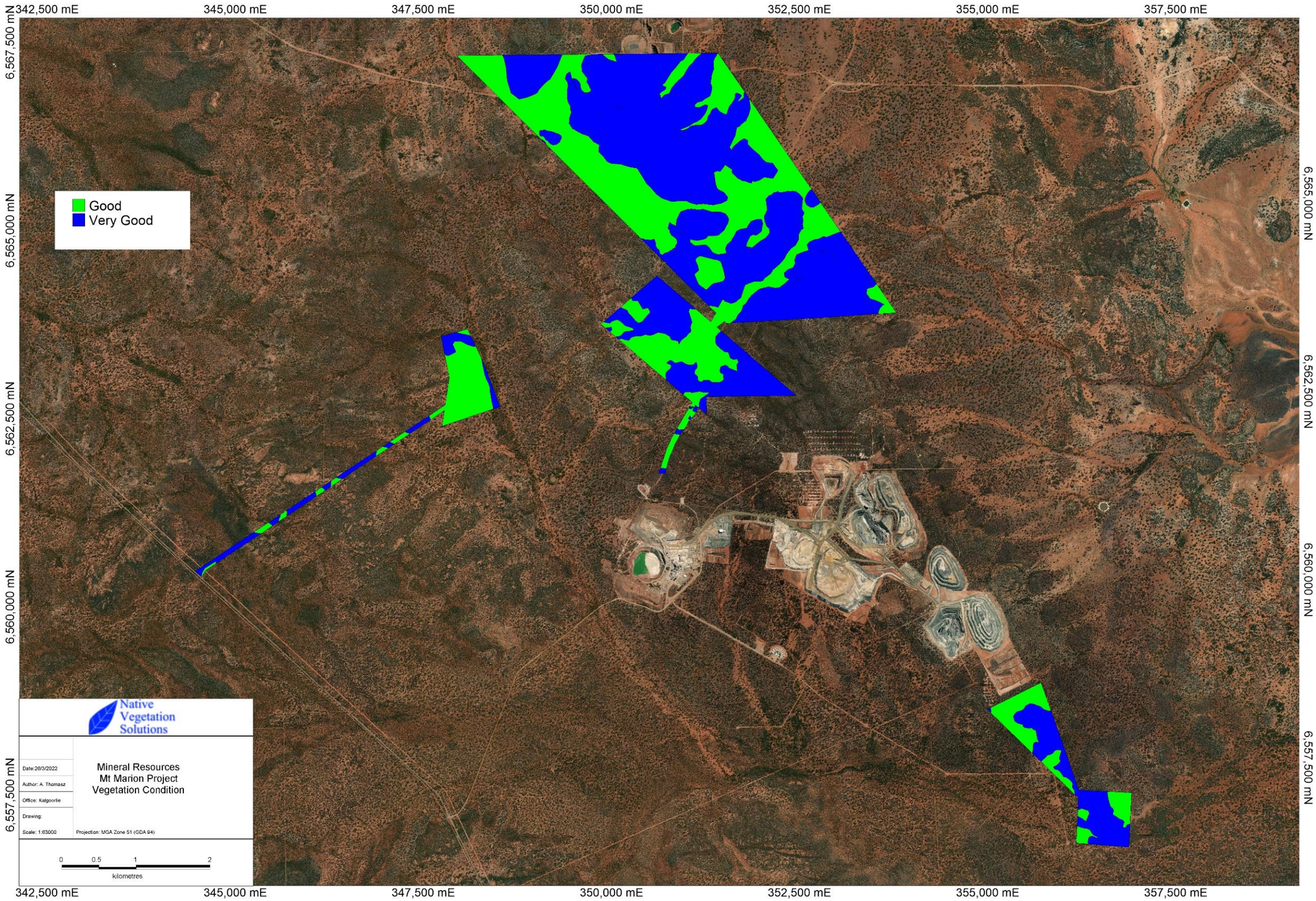
Map 3: Land Systems for Mt Marion Project



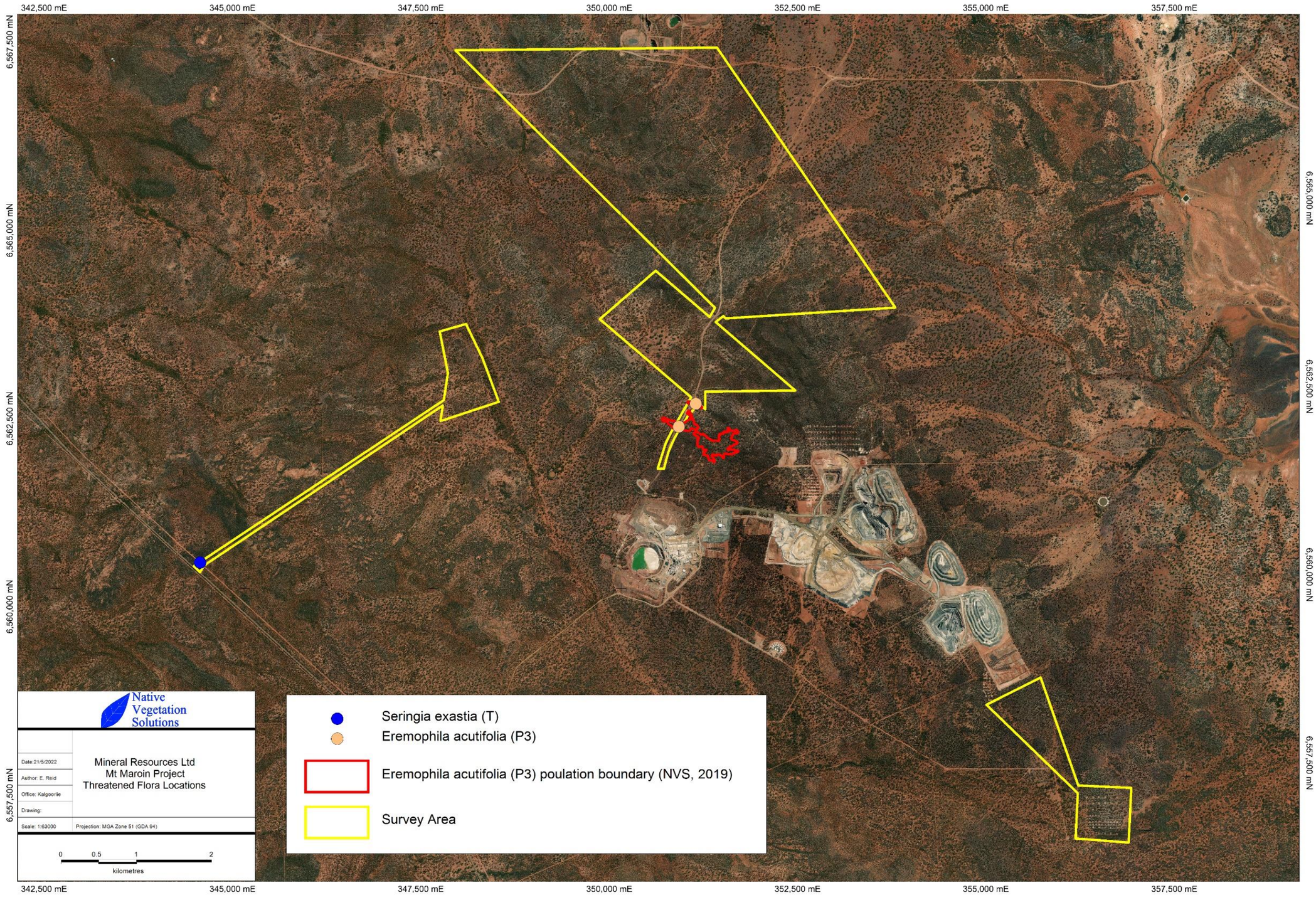
Map 4: Vegetation Groups for Mt Marion Project



Map 5: Vegetation Groups and Quadrat Locations for Mt Marion Project



Map 6: Vegetation Condition for Mt Marion Project



Map 7: Threatened Flora within Mt Marion Survey Area

Appendix D - Threatened Flora Database Search Results

TAXON	CONS_CODE	Likelihood of occurring in survey area- Comment post field work
Acacia crenulata	P3	Unlikely- possible habitat however survey area searched extensively
Acacia kerryana	P2	Unlikely- possible habitat however survey area searched extensively
Acacia websteri	P1	Unlikely- possible habitat however survey area searched extensively
Allocasuarina eriochlamys subsp. grossa	P3	Unlikely- possible habitat however survey area searched extensively
Alyxia tetanifolia	P3	Unlikely- no suitable habitat
Austrostipa blackii	P3	Unlikely- possible habitat however survey area searched extensively
Austrostipa turbinata	P3	Unlikely- possible habitat however survey area searched extensively
Calandrinia lefroyensis	P1	Unlikely- possible habitat however survey area searched extensively
Cratystylis centralis	P3	Unlikely- no suitable habitat
Cyathostemon divaricatus	P1	Unlikely- possible habitat however survey area searched extensively
Goodenia salina	P2	Unlikely- no suitable habitat
Isolepis australiensis	P3	Unlikely- no suitable habitat
Lepidosperma sp. Kambalda (A.A. Mitchell 5156)	P2	Unlikely- possible habitat however survey area searched extensively
Lepidosperma sp. Parker Range (N. Gibson & M. Lyons 2094)	P1	Unlikely- possible habitat however survey area searched extensively
Notisia intonsa	P3	Unlikely- no suitable habitat
Phebalium clavatum	P2	Unlikely- no suitable habitat
Pterostylis xerampelina	P1	Unlikely- possible habitat however survey area searched extensively
Ricinocarpos digynus	P1	Unlikely- possible habitat however survey area searched extensively
Stylidium choreanthum	P3	Unlikely- possible habitat however survey area searched extensively
Styphelia rectiloba	P3	Unlikely- no suitable habitat
Tetratheca spenceri	T	Unlikely- no suitable habitat
Thryptomene planiflora	P1	Unlikely- possible habitat however survey area searched extensively
Phlegmatospermum eremaeum	P3	Unlikely- no suitable habitat

Appendix E - Species Recorded During the October 2021 Survey

Species List per Quadrat

Family	Genus	Taxon	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33
Aizoaceae	*Disphyma*	*Disphyma crassifolium*			*																														
Aizoaceae	*Gunniopsis*	*Gunniopsis propinqua*																													*				
Amaranthaceae	*Ptilotus*	*Ptilotus aervoides*				*											*			*															
Amaranthaceae	*Ptilotus*	*Ptilotus exaltatus*				*								*	*	*	*						*			*		*			*		*		
Amaranthaceae	*Ptilotus*	*Ptilotus obovatus*	*	*	*	*		*	*	*		*		*	*		*	*	*	*	*	*	*	*		*	*	*	*	*	*			*	*
Apocynaceae	*Alyxia*	*Alyxia buxifolia*				*	*	*	*	*					*	*									*			*		*		*		*	
Apocynaceae	*Leichhardtia*	*Leichhardtia australis*				*				*		*	*	*	*				*			*	*	*		*	*		*					*	
Asparagaceae	*Thysanotus*	*Thysanotus manglesianus*							*	*																									*	*
Asteraceae	*Calotis*	*Calotis hispidula*																								*									
Asteraceae	*Chrysocephalum*	*Chrysocephalum puteale*								*	*																							*	
Asteraceae	*Cratystylis*	*Cratystylis conocephala*			*	*	*																	*								*		
Asteraceae	*Cratystylis*	*Cratystylis subspinescens*														*		*																	
Asteraceae	*Olearia*	*Olearia muelleri*	*			*	*	*	*				*			*			*	*			*	*	*	*		*	*	*	*		*	*	
Asteraceae	*Olearia*	*Olearia pimeleoides*																								*									*
Asteraceae	*Oncosiphon*	*Oncosiphon suffruticosum**												*																					
Asteraceae	*Waitzia*	*Waitzia acuminata var. acuminata*																																	*
Boraginaceae	*Halgania*	*Halgania andromedifolia*	*					*																						*					
Casuarinaceae	*Allocasuarina*	*Allocasuarina campestris*									*																							*	
Casuarinaceae	*Casuarina*	*Casuarina pauper*	*				*						*																						
Chenopodiaceae	*Atriplex*	*Atriplex codonocarpa*		*										*								*									*				
Chenopodiaceae	*Atriplex*	*Atriplex nummularia subsp. spathulata*	*		*		*					*	*	*	*	*	*	*		*			*	*		*						*			
Chenopodiaceae	*Atriplex*	*Atriplex stipitata*			*											*										*	*								
Chenopodiaceae	*Atriplex*	*Atriplex vesicaria*	*		*		*						*	*		*	*	*	*		*	*	*					*							
Chenopodiaceae	*Chenopodium*	*Chenopodium gaudichaudianum*																		*			*												
Chenopodiaceae	*Dissocarpus*	*Dissocarpus paradoxus*																																	*
Chenopodiaceae	*Enchylaena*	*Enchylaena tomentosa var. tomentosa*										*	*	*	*		*	*	2	*		*	*		*	*					*		*		
Chenopodiaceae	*Eriochiton*	*Eriochiton sclerolaenoides*				*											*	*	*										*		*				
Chenopodiaceae	*Maireana*	*Maireana georgei*										*	*	*	*	*	*	*	*	*		*		*	*	*	*				*		*		
Chenopodiaceae	*Maireana*	*Maireana pentatropis*														*				*				*											
Chenopodiaceae	*Maireana*	*Maireana planifolia*													*																				
Chenopodiaceae	*Maireana*	*Maireana pyramidata*												*	*			*					*												
Chenopodiaceae	*Maireana*	*Maireana sedifolia*	*													*	*																		
Chenopodiaceae	*Maireana*	*Maireana thesioides*											*			*																			
Chenopodiaceae	*Maireana*	*Maireana tomentosa*	*	*	*	*	*					*		*	*	*		*	*	*		*	*	*	*	*			*		*		*		
Chenopodiaceae	*Maireana*	*Maireana trichoptera*	*	*		*	*	*					*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
Chenopodiaceae	*Maireana*	*Maireana triptera*	*	*	*	*						*	*	*	*	*	*	*	*		*	*		*	*	*	*		*				*		
Chenopodiaceae	*Rhagodia*	*Rhagodia drummondii*	*	*	*	*							*		*	*	*	*		*		*	*			*	*	*							
Chenopodiaceae	*Rhagodia*	*Rhagodia eremaea*																							*										

Family	Genus	Taxon	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33
Chenopodiaceae	*Sclerolaena*	*Sclerolaena cuneata*				*							*		*	*									*				*		*		*		
Chenopodiaceae	*Sclerolaena*	*Sclerolaena densiflora*		*	*	*						*	*			*	*		*						*			*					*		
Chenopodiaceae	*Sclerolaena*	*Sclerolaena diacantha*	*	*	*	*							*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		*	*	*	*	*		
Chenopodiaceae	*Sclerolaena*	*Sclerolaena eriacantha*			*		*								*	*			*	*		*	*	*		*	*	*	*				*		
Chenopodiaceae	*Sclerolaena*	*Sclerolaena patenticuspis*													*	*						*							*						
Chenopodiaceae	*Tecticornia*	*Tecticornia disarticulata*			*											*																			
Convolvulaceae	*Wilsonia*	*Wilsonia humilis*																							*										
Euphorbiaceae	*Beyeria*	*Beyeria sulcata var. brevipes*																										*							
Euphorbiaceae	*Monotaxis*	*Monotaxis luteiflora*									*																								
Fabaceae	*Acacia*	*Acacia acuminata*									*	*												*			*							*	*
Fabaceae	*Acacia*	*Acacia eremophila var. eremophila*																																	*
Fabaceae	*Acacia*	*Acacia erinacea*	*	*			*	*	*				*									*		*				*	*	*	*	*			
Fabaceae	*Acacia*	*Acacia hemiteles*	*	*		*			*				*	*	*	*						*		*		*	*		*		*				
Fabaceae	*Acacia*	*Acacia heteroneura var. jutsonii*																																	*
Fabaceae	*Acacia*	*Acacia jennerae*																						*		*									
Fabaceae	*Acacia*	*Acacia ligulata*																						*											
Fabaceae	*Acacia*	*Acacia merrallii*																			*			*											
Fabaceae	*Acacia*	*Acacia quadrimarginea*								*	*																							*	
Fabaceae	*Acacia*	*Acacia tetragonophylla*				*				*		*	*																		*			*	
Fabaceae	*Daviesia*	*Daviesia aphylla*															*					*									*				
Fabaceae	*Senna*	*Senna artemisioides subsp. artemisioides*		*						*		*		*	*										*					*				
Fabaceae	*Senna*	*Senna artemisioides subsp. filifolia*	*	*			*	*				*		*	*	*			*	*				*	*	*	*	*	*	*	*	*		*	
Fabaceae	*Senna*	*Senna cardiosperma*				*																													
Fabaceae	*Swainsona*	*Swainsona canescens*																								*	*								
Frankeniaceae	*Frankenia*	*Frankenia pauciflora var. pauciflora*											*										*												
Frankeniaceae	*Frankenia*	*Frankenia setosa*			*											*																			
Goodeniaceae	*Goodenia*	*Goodenia berardiana*						*		*	*																								
Goodeniaceae	*Scaevola*	*Scaevola spinescens*	*			*	*		*	*	*		*	*		*		*	*	*		*	*	*				*	*	*		*		*	
Haloragaceae	*Haloragis*	*Haloragis trigonocarpa*				*					*	*												*											
Lamiaceae	*Prostanthera*	*Prostanthera althoferi subsp. althoferi*																																*	*
Lamiaceae	*Prostanthera*	*Prostanthera campbellii*								*	*																							*	
Lamiaceae	*Prostanthera*	*Prostanthera grylloana*																																	*
Lamiaceae	*Westringia*	*Westringia rigida*	*				*	*	*											*				*					*	*					*
Malvaceae	*Brachychiton*	*Brachychiton gregorii*																																*	
Myrtaceae	*Eucalyptus*	*Eucalyptus flocktoniae subsp. flocktoniae*	*	*																			*						*						
Myrtaceae	*Eucalyptus*	*Eucalyptus flocktoniae subsp. hebes*						*																											
Myrtaceae	*Eucalyptus*	*Eucalyptus gracilis*				*												*		*					*			*				*	*		
Myrtaceae	*Eucalyptus*	*Eucalyptus griffithsii*					*	*				*												*		*	*								*
Myrtaceae	*Eucalyptus*	*Eucalyptus lesouefii*			*	*	*	*										*		*	*									*					
Myrtaceae	*Eucalyptus*	*Eucalyptus oleosa subsp. oleosa*	*				*	*					*						*							*				*					

Family	Genus	Taxon	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33
Myrtaceae	*Eucalyptus*	*Eucalyptus ravida*		*													*					*	*		*			*			*		*		
Myrtaceae	*Eucalyptus*	*Eucalyptus salmonophloia*				*							*	*	*	*								*				*	*			*			
Myrtaceae	*Eucalyptus*	*Eucalyptus salubris*																										*							
Myrtaceae	*Eucalyptus*	*Eucalyptus stricklandii*							*																										
Myrtaceae	*Eucalyptus*	*Eucalyptus torquata*																												*					
Myrtaceae	*Eucalyptus*	*Eucalyptus transcontinentalis*		*																									*						
Myrtaceae	*Melaleuca*	*Melaleuca hamata*																																	*
Myrtaceae	*Melaleuca*	*Melaleuca sheathiana*						*											*	*	*									*		*			
Myrtaceae	*Thryptomene*	*Thryptomene australis subsp. brachyandra*																																	*
Poaceae	*Aristida*	*Aristida contorta*									*															*	*								
Poaceae	*Austrostipa*	*Austrostipa elegantissima*	*	*		*		*		*		*	*		*		*		*					*	*	2			*	*	*			*	*
Poaceae	*Austrostipa*	*Austrostipa nitida*		*															*					*		*					*				
Poaceae	*Austrostipa*	*Austrostipa scabra*				*				*	*	*			*		*		*					*	*	*	*		*				*	*	*
Poaceae	*Enneapogon*	*Enneapogon caerulescens*																								*	*				*				
Poaceae	*Eragrostis*	*Eragrostis dielsii*										*														*									
Poaceae	*Monachather*	*Monachather paradoxus*										*														*									
Poaceae	*Triodia*	*Triodia rigidissima*																									*								
Proteaceae	*Grevillea*	*Grevillea acuaria*							*																	*	*								
Pteridaceae	*Cheilanthes*	*Cheilanthes lasiophylla*									*																								
Pteridaceae	*Cheilanthes*	*Cheilanthes sieberi subsp. sieberi*									*																								
Rhamnaceae	*Trymalium*	*Trymalium myrtillus subsp. myrtillus*							*																					*					
Rutaceae	*Phebalium*	*Phebalium laevigatum*							*																										
Rutaceae	*Philotheca*	*Philotheca brucei subsp. brucei*									*																								
Santalaceae	*Exocarpos*	*Exocarpos aphyllus*	*	*	*	*	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		*		*
Santalaceae	*Santalum*	*Santalum acuminatum*				*		*		*								*					*					*							
Santalaceae	*Santalum*	*Santalum spicatum*								*																								*	
Sapindaceae	*Dodonaea*	*Dodonaea lobulata*	*			*		*	*	*									*					*					*				*	
Sapindaceae	*Dodonaea*	*Dodonaea microzyga subsp. acrolobata*																						*											
Sapindaceae	*Dodonaea*	*Dodonaea viscosa subsp. angustissima*																								*									
Scrophulariaceae	*Eremophila*	*Eremophila acutifolia (P3)*																														*	*		
Scrophulariaceae	*Eremophila*	*Eremophila alternifolia*								*																								*	
Scrophulariaceae	*Eremophila*	*Eremophila caerulea subsp. caerulea*				*		*										*				*			*				*					
Scrophulariaceae	*Eremophila*	*Eremophila caperata*			*		*																												
Scrophulariaceae	*Eremophila*	*Eremophila decipiens subsp. decipiens*		*	*	*						*	*			*	*	*				*	*			*	*		*		*	*			
Scrophulariaceae	*Eremophila*	*Eremophila dempsteri*		*													*	*				*	*												
Scrophulariaceae	*Eremophila*	*Eremophila georgei*								*																									
Scrophulariaceae	*Eremophila*	*Eremophila glabra subsp. glabra*											*																	*	*				
Scrophulariaceae	*Eremophila*	*Eremophila granitica*									*																							*	*
Scrophulariaceae	*Eremophila*	*Eremophila interstans subsp. virgata*	*	*	*	*	*															*		*	*			*			*				
Scrophulariaceae	*Eremophila*	*Eremophila ionantha*				*							*			*						*	*			*	*							

Family	Genus	Taxon	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33
Scrophulariaceae	*Eremophila*	*Eremophila maculata subsp. brevifolia*				*																													
Scrophulariaceae	*Eremophila*	*Eremophila oldfieldii subsp. angustifolia*	*	*				*	*	*	*		*	*	*			*	*			*	*	*					*	*		*		*	
Scrophulariaceae	*Eremophila*	*Eremophila oppositifolia subsp. angustifolia*						*	*				*					*	*										*						
Scrophulariaceae	*Eremophila*	*Eremophila parvifolia subsp. auricampa*	*				*	*												*	*									*		*			
Scrophulariaceae	*Eremophila*	*Eremophila scoparia*	*	*	*	*	*	*					*	*	*	*	*	*		*		*	*			*	*	*	*		*	*			
Scrophulariaceae	*Myoporum*	*Myoporum platycarpum*																		*	*														
Solanaceae	*Lycium*	*Lycium australe*		*									*		*	*		*				*					*				*				
Solanaceae	*Solanum*	*Solanum lasiophyllum*								*	*													*			*								
Solanaceae	*Solanum*	*Solanum nummularium*	*					*							*								*	*				*					*		
Solanaceae	*Solanum*	*Solanum plicatile*									*																								
Thymelaeaceae	*Pimelea*	*Pimelea microcephala subsp. microcephala*				*				*																					*			*	
Zygophyllaceae	*Roepera*	*Roepera eremaea*	*			*				*															*					*			*	*	

Species List per Vegetation Group (Quadrat data including opportunistic sampled species - Identified in Bold type)

Family	Genus	Taxon	a	b	x	c	d	i	g	h	n	r	k
Aizoaceae	*Disphyma*	*Disphyma crassifolium*	*										
Aizoaceae	*Gunniopsis*	*Gunniopsis propinqua*						*					
Amaranthaceae	*Ptilotus*	*Ptilotus aervoides*	*					*		*			
Amaranthaceae	*Ptilotus*	*Ptilotus exaltatus*	*	*			*	*				*	*
Amaranthaceae	*Ptilotus*	*Ptilotus obovatus*	*	*	*	*	*	*	*	*		*	
Apocynaceae	*Alyxia*	*Alyxia buxifolia*	*	*	*		*				*		*
Apocynaceae	*Leichhardtia*	*Leichhardtia australis*	*		*	*	*	*		*		*	
Asparagaceae	*Thysanotus*	*Thysanotus manglesianus*		*	*	*							
Asteraceae	*Calotis*	*Calotis hispidula*										*	
Asteraceae	*Chrysocephalum*	*Chrysocephalum puteale*			*								
Asteraceae	*Cratystylis*	*Cratystylis conocephala*	*	*									*
Asteraceae	***Cratystylis***	***Cratystylis microphylla***		*									
Asteraceae	*Cratystylis*	*Cratystylis subspinescens*					*		*				
Asteraceae	*Olearia*	*Olearia muelleri*	*	*	*		*	*		*	*	*	*
Asteraceae	*Olearia*	*Olearia pimeleoides*				*						*	
Asteraceae	*Oncosiphon*	*Oncosiphon suffruticosum**					*						
Asteraceae	*Waitzia*	*Waitzia acuminata var. acuminata*				*							
Boraginaceae	*Halgania*	*Halgania andromedifolia*	*	*									
Casuarinaceae	*Allocasuarina*	*Allocasuarina campestris*			*								
Casuarinaceae	*Casuarina*	*Casuarina pauper*	*	*			*						
Celastraceae	***Stackhousia***	***Stackhousia sp. Mt Keith***			*								
Chenopodiaceae	*Atriplex*	*Atriplex codonocarpa*	*				*	*					
Chenopodiaceae	***Atriplex***	***Atriplex holocarpa***						*					
Chenopodiaceae	*Atriplex*	*Atriplex nummularia subsp. spathulata*	*	*		*	*	*	*	*		*	*
Chenopodiaceae	*Atriplex*	*Atriplex stipitata*	*				*					*	
Chenopodiaceae	*Atriplex*	*Atriplex vesicaria*	*	*			*	*	*	*			
Chenopodiaceae	*Chenopodium*	*Chenopodium gaudichaudianum*						*		*			
Chenopodiaceae	*Dissocarpus*	*Dissocarpus paradoxus*				*							
Chenopodiaceae	*Enchylaena*	*Enchylaena tomentosa var. tomentosa*				*	*	*	*	*	*	*	*
Chenopodiaceae	*Eriochiton*	*Eriochiton sclerolaenoides*	*					*	*	*			
Chenopodiaceae	***Lepidosperma***	***Lepidosperma aff. fimbriatum***	*			*							
Chenopodiaceae	*Maireana*	*Maireana georgei*	*			*	*	*	*	*	*	*	*
Chenopodiaceae	*Maireana*	*Maireana pentatropis*	*				*			*			
Chenopodiaceae	*Maireana*	*Maireana planifolia*					*						
Chenopodiaceae	*Maireana*	*Maireana pyramidata*					*	*	*				
Chenopodiaceae	*Maireana*	*Maireana sedifolia*	*				*	*					
Chenopodiaceae	*Maireana*	*Maireana thesioides*					*						
Chenopodiaceae	*Maireana*	*Maireana tomentosa*	*	*		*	*	*	*	*	*	*	*
Chenopodiaceae	*Maireana*	*Maireana trichoptera*	*	*			*	*	*	*	*	*	*
Chenopodiaceae	*Maireana*	*Maireana triptera*	*			*	*	*	*	*	*	*	*
Chenopodiaceae	*Rhagodia*	*Rhagodia drummondii*	*	*			*	*	*	*		*	
Chenopodiaceae	*Rhagodia*	*Rhagodia eremaea*									*		
Chenopodiaceae	*Sclerolaena*	*Sclerolaena cuneata*	*				*	*			*		*
Chenopodiaceae	*Sclerolaena*	*Sclerolaena densiflora*	*	*		*	*	*		*	*		*
Chenopodiaceae	*Sclerolaena*	*Sclerolaena diacantha*	*	*			*	*	*	*	*	*	*
Chenopodiaceae	*Sclerolaena*	*Sclerolaena eriacantha*	*	*			*	*		*		*	*
Chenopodiaceae	*Sclerolaena*	*Sclerolaena patenticuspis*	*				*	*					
Chenopodiaceae	*Tecticornia*	*Tecticornia disarticulata*	*				*						
Convolvulaceae	*Wilsonia*	*Wilsonia humilis*									*		
Ericaceae	***Leucopogon***	***Leucopogon sp. Clyde Hill***		*									
Euphorbiaceae	*Beyeria*	*Beyeria sulcata var. brevipes*		*									
Euphorbiaceae	*Monotaxis*	*Monotaxis luteiflora*			*								
Fabaceae	*Acacia*	*Acacia acuminata*	*		*	*						*	
Fabaceae	*Acacia*	*Acacia eremophila var. eremophila*				*							
Fabaceae	*Acacia*	*Acacia erinacea*	*	*			*	*					*
Fabaceae	*Acacia*	*Acacia hemiteles*	*	*			*	*				*	

Family	Genus	Taxon	a	b	x	c	d	i	g	h	n	r	k
Fabaceae	*Acacia*	*Acacia heteroneura var. jutsonii*				*							
Fabaceae	*Acacia*	*Acacia jennerae*	*									*	
Fabaceae	*Acacia*	*Acacia ligulata*	*										
Fabaceae	*Acacia*	*Acacia merrallii*	*							*			
Fabaceae	***Acacia***	***Acacia multispicata***				*							
Fabaceae	*Acacia*	*Acacia quadrimarginea*			*								
Fabaceae	*Acacia*	*Acacia tetragonophylla*	*		*	*	*	*					
Fabaceae	*Daviesia*	*Daviesia aphylla*						*					
Fabaceae	*Senna*	*Senna artemisioides subsp. ×artemisioides*	*	*	*	*	*				*		
Fabaceae	*Senna*	*Senna artemisioides subsp. filifolia*	*	*	*	*	*	*		*	*	*	*
Fabaceae	*Senna*	*Senna cardiosperma*	*										
Fabaceae	*Swainsona*	*Swainsona canescens*										*	
Frankeniaceae	*Frankenia*	*Frankenia pauciflora var. pauciflora*					*	*					
Frankeniaceae	*Frankenia*	*Frankenia setosa*	*				*						
Goodeniaceae	***Dampiera***	***Dampiera latealata***			*								
Goodeniaceae	*Goodenia*	*Goodenia berardiana*		*	*								
Goodeniaceae	*Scaevola*	*Scaevola spinescens*	*	*	*		*	*	*	*			*
Haloragaceae	*Haloragis*	*Haloragis trigonocarpa*	*		*	*							
Hemerocallidaceae	***Dianella***	***Dianella revoluta var. divaricata***				*							
Lamiaceae	*Prostanthera*	*Prostanthera althoferi subsp. althoferi*			*	*							
Lamiaceae	*Prostanthera*	*Prostanthera campbellii*			*								
Lamiaceae	*Prostanthera*	*Prostanthera grylloana*				*							
Lamiaceae	***Teucrium***	***Teucrium disjunctum***										*	
Lamiaceae	*Westringia*	*Westringia rigida*	*	*		*				*			
Malvaceae	*Brachychiton*	*Brachychiton gregorii*			*								
Malvaceae	***Commersonia***	***Commersonia craurophylla***		*									
Malvaceae	***Hannafordia***	***Hannafordia bissillii subsp. latifolia***				*							
Malvaceae	***Seringia***	***Seringia exastia* (T)**				*							
Myrtaceae	*Eucalyptus*	*Eucalyptus flocktoniae subsp. flocktoniae*	*					*					
Myrtaceae	*Eucalyptus*	*Eucalyptus flocktoniae subsp. hebes*		*									
Myrtaceae	*Eucalyptus*	*Eucalyptus gracilis*	*	*					*	*	*		*
Myrtaceae	*Eucalyptus*	*Eucalyptus griffithsii*	*	*		*						*	
Myrtaceae	*Eucalyptus*	*Eucalyptus lesouefii*	*	*					*	*			
Myrtaceae	*Eucalyptus*	*Eucalyptus oleosa subsp. oleosa*	*	*			*			*		*	
Myrtaceae	*Eucalyptus*	*Eucalyptus ravida*	*	*				*			*		*
Myrtaceae	*Eucalyptus*	*Eucalyptus salmonophloia*	*	*			*						*
Myrtaceae	*Eucalyptus*	*Eucalyptus salubris*		*									
Myrtaceae	*Eucalyptus*	*Eucalyptus stricklandii*		*									
Myrtaceae	*Eucalyptus*	*Eucalyptus torquata*		*									
Myrtaceae	*Eucalyptus*	*Eucalyptus transcontinentalis*	*										
Myrtaceae	***Eucalyptus***	***Eucalyptus websteriana subsp. websteriana***			*								
Myrtaceae	***Homalocalyx***	***Homalocalyx thryptomenoides***				*							
Myrtaceae	***Leptospermum***	***Leptospermum erubescens***				*							
Myrtaceae	*Melaleuca*	*Melaleuca hamata*				*							
Myrtaceae	*Melaleuca*	*Melaleuca sheathiana*		*						*			*
Myrtaceae	*Thryptomene*	*Thryptomene australis subsp. brachyandra*				*							
Poaceae	*Aristida*	*Aristida contorta*			*							*	
Poaceae	*Austrostipa*	*Austrostipa elegantissima*	*	*	*	*	*	*		*	*	*	
Poaceae	*Austrostipa*	*Austrostipa nitida*	*					*		*		*	
Poaceae	*Austrostipa*	*Austrostipa scabra*	*		*	*	*	*		*	*	*	*
Poaceae	*Enneapogon*	*Enneapogon caerulescens*						*				*	
Poaceae	*Eragrostis*	*Eragrostis dielsii*				*						*	
Poaceae	*Monachather*	*Monachather paradoxus*				*						*	
Poaceae	*Triodia*	*Triodia rigidissima*										*	
Proteaceae	*Grevillea*	*Grevillea acuaria*		*								*	
Pteridaceae	*Cheilanthes*	*Cheilanthes lasiophylla*			*								
Pteridaceae	*Cheilanthes*	*Cheilanthes sieberi subsp. sieberi*			*								

Family	Genus	Taxon	a	b	x	c	d	i	g	h	n	r	k
Rhamnaceae	*Trymalium*	*Trymalium myrtillus subsp. myrtillus*		*									
Rutaceae	***Phebalium***	***Phebalium filifolium***				*							
Rutaceae	*Phebalium*	*Phebalium laevigatum*		*									
Rutaceae	*Philotheca*	*Philotheca brucei subsp. brucei*			*								
Santalaceae	*Exocarpos*	*Exocarpos aphyllus*	*	*	*	*	*	*	*	*	*	*	*
Santalaceae	*Santalum*	*Santalum acuminatum*	*	*	*			*	*				
Santalaceae	*Santalum*	*Santalum spicatum*			*								
Sapindaceae	*Dodonaea*	*Dodonaea lobulata*	*	*	*					*			
Sapindaceae	*Dodonaea*	*Dodonaea microzyga subsp. acrolobata*	*										
Sapindaceae	*Dodonaea*	*Dodonaea viscosa subsp. angustissima*										*	
Scrophulariaceae	*Eremophila*	*Eremophila acutifolia (P3)*											*
Scrophulariaceae	*Eremophila*	*Eremophila alternifolia*			*								
Scrophulariaceae	*Eremophila*	*Eremophila caerulea subsp. caerulea*	*	*				*	*		*		
Scrophulariaceae	*Eremophila*	*Eremophila caperata*	*	*									
Scrophulariaceae	*Eremophila*	*Eremophila decipiens subsp. decipiens*	*			*	*	*	*			*	*
Scrophulariaceae	*Eremophila*	*Eremophila dempsteri*	*					*	*				
Scrophulariaceae	*Eremophila*	*Eremophila georgei*			*								
Scrophulariaceae	*Eremophila*	*Eremophila glabra subsp. glabra*		*			*	*					
Scrophulariaceae	*Eremophila*	*Eremophila granitica*			*	*							
Scrophulariaceae	*Eremophila*	*Eremophila interstans subsp. virgata*	*	*				*			*		
Scrophulariaceae	*Eremophila*	*Eremophila ionantha*	*				*	*				*	
Scrophulariaceae	*Eremophila*	*Eremophila maculata subsp. brevifolia*	*										
Scrophulariaceae	***Eremophila***	***Eremophila oblonga***	*										
Scrophulariaceae	*Eremophila*	*Eremophila oldfieldii subsp. angustifolia*	*	*	*		*	*	*	*			*
Scrophulariaceae	*Eremophila*	*Eremophila oppositifolia subsp. angustifolia*	*	*			*		*	*			
Scrophulariaceae	*Eremophila*	*Eremophila parvifolia subsp. auricampa*	*	*						*			*
Scrophulariaceae	*Eremophila*	*Eremophila scoparia*	*	*			*	*	*	*		*	*
Scrophulariaceae	*Myoporum*	*Myoporum platycarpum*								*			
Solanaceae	*Lycium*	*Lycium australe*	*				*	*	*			*	
Solanaceae	***Solanum***	***Solanum hoplopetalum***			*								
Solanaceae	*Solanum*	*Solanum lasiophyllum*	*		*							*	
Solanaceae	*Solanum*	*Solanum nummularium*	*	*			*	*					*
Solanaceae	*Solanum*	*Solanum plicatile*			*								
Thymelaeaceae	*Pimelea*	*Pimelea microcephala subsp. microcephala*	*		*			*					
Zygophyllaceae	*Roepera*	*Roepera eremaea*	*	*	*						*		*

Appendix F - Site Descriptions

Project Name: Mt Marion Project Area - October 2021				
Date:	12/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.41846	-31.02502	**Quadrat:**	Q1
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	A			
Vegetation condition:	Good			
WP:	1			
Photo number:			4	
Landform:			Simple slope/Hillslope	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			Moderately; many/Cobbly; or cobbles/Subangular platy	
Rock outcrop (abundance/runoff):			No bedrock exposed/Moderately rapid	
Soil (profile/field texture/soil surface):			Uniform/Sandy clay loam/Firm	
% Cover leaf litter:			30	
% Cover bare ground:			65	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	M Tree Mallee (> 8m)	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	12-20m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	S 10-30	**Crown cover %:**	V <10	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus oleosa subsp. oleosa		Exocarpos aphyllus		Scaevola spinescens	
Eucalyptus flocktoniae subsp. flocktoniae		Senna artemisioides subsp. filifolia		Acacia erinacea	
		Eremophila scoparia		Westringia rigida	

ALL SPECIES
Eucalyptus oleosa subsp. oleosa
Eucalyptus flocktoniae subsp. flocktoniae
Exocarpos aphyllus
Senna artemisioides subsp. filifolia
Eremophila scoparia
Scaevola spinescens
Acacia erinacea
Westringia rigida
Olearia muelleri
Eremophila parvifolia subsp. auricampa
Maireana trichoptera
Ptilotus obovatus
Atriplex nummularia subsp. spathulata
Rhagodia drummondii
Maireana tomentosa
Dodonaea lobulata
Casuarina pauper
Eremophila oldfieldii subsp. angustifolia
Solanum nummularium
Maireana sedifolia
Roepera eremaea
Acacia hemiteles
Maireana triptera
Eremophila interstans subsp. virgata
Atriplex vesicaria
Sclerolaena diacantha
Halgania andromedifolia
Austrostipa elegantissima
Outside
Santalum spicatum
Eucalyptus lesouefii

Project Name: Mt Marion Project Area - October 2021				
Date:	12/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.44492	-31.03682	**Quadrat:**	Q2
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	A			
Vegetation condition:	Good			
WP:	2			

Photo number:	11
Landform:	Flat/Plain
Land surface/disturbance:	No effective disturbance
Fire history:	>30 years
Coarse fragments on the surface (abundance/size/shape):	No coarse fragments
Rock outcrop (abundance/runoff):	No bedrock exposed/Slow
Soil (profile/field texture/soil surface):	Uniform/Sandy clay loam/Firm
% Cover leaf litter:	60
% Cover bare ground:	60

Tallest stratum		**Mid-stratum**		**Lower stratum**	
Growth form:	T Tree	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	12-20m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	S 10-30	**Crown cover %:**	S 10-30	**Crown cover %:**	V <10
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus transcontinentalis		Eremophila dempsteri		Maireana triptera	
Eucalyptus ravida		Exocarpos aphyllus		Maireana tomentosa	
Eucalyptus flocktoniae subsp. flocktoniae		Eremophila scoparia		Eremophila decipiens subsp. decipiens	

ALL SPECIES
Eucalyptus transcontinentalis
Eucalyptus ravida
Eucalyptus flocktoniae subsp. flocktoniae
Eremophila dempsteri
Exocarpos aphyllus
Eremophila scoparia
Maireana triptera
Maireana tomentosa
Eremophila decipiens subsp. decipiens
Sclerolaena densiflora
Sclerolaena diacantha
Rhagodia drummondii
Maireana trichoptera
Acacia hemiteles
Senna artemisioides subsp. artemisioides
Ptilotus obovatus
Austrostipa elegantissima
Senna artemisioides subsp. filifolia
Eremophila oldfieldii subsp. angustifolia
Lycium australe
Eremophila interstans subsp. virgata
Acacia erinacea
Austrostipa nitida
Atriplex codonocarpa
Outside
Eucalyptus salmonophloia

Project Name: Mt Marion Project Area - October 2021				
Date:	15/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.49649	-31.11009	**Quadrat:**	Q3
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	A			
Vegetation condition:	Good			
WP:	3			
Photo number:			61	
Landform:			Flat/Plain	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			No coarse fragments	
Rock outcrop (abundance/runoff):			No bedrock exposed/No runoff	
Soil (profile/field texture/soil surface):			Uniform/Sandy clay loam/Loose	
% Cover leaf litter:			45	
% Cover bare ground:			65	

Tallest stratum		**Mid-stratum**		**Lower stratum**	
Growth form:	T Tree	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	12-20m	**Height:**	1-3m	**Height:**	0.25-0.5m
Crown cover %:	S 10-30	**Crown cover %:**	S 10-30	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus lesouefii		Eremophila scoparia		Tecticornia disarticulata	
		Atriplex nummularia subsp. spathulata		Atriplex vesicaria	
		Eremophila interstans subsp. virgata			

ALL SPECIES
Eucalyptus lesouefii
Eremophila scoparia
Atriplex nummularia subsp. spathulata
Eremophila interstans subsp. virgata
Tecticornia disarticulata
Atriplex vesicaria
Frankenia setosa
Atriplex stipitata
Sclerolaena diacantha
Sclerolaena eriacantha
Maireana triptera
Ptilotus obovatus
Disphyma crassifolium
Rhagodia drummondii
Maireana tomentosa
Sclerolaena densiflora
Cratystylis conocephala
Exocarpos aphyllus
Eremophila caperata
Eremophila decipiens subsp. decipiens
Outside
Eucalyptus transcontinentalis
Eucalyptus salubris
Cratystylis subspinescens
Santalum acuminatum

Project Name: Mt Marion Project Area - October 2021				
Date:	14/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.40565	-31.05952	**Quadrat:**	Q4
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	A			
Vegetation condition:	Good			
WP:	4			
Photo number:			33	
Landform:				
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			No coarse fragments	
Rock outcrop (abundance/runoff):			No bedrock exposed/Slow	
Soil (profile/field texture/soil surface):			Uniform/Sandy clay loam/Cracking	
% Cover leaf litter:			40	
% Cover bare ground:			60	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	M Tree Mallee (> 8m)	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	6-12m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	S 10-30	**Crown cover %:**	M 30-70	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus gracilis		Eremophila interstans subsp. virgata		Exocarpos aphyllus	
Eucalyptus salmonophloia		Eremophila scoparia		Senna cardiosperma	
Eucalyptus lesouefii		Cratystylis conocephala		Eremophila caerulea subsp. caerulea	

ALL SPECIES
Eucalyptus gracilis
Eucalyptus salmonophloia
Eucalyptus lesouefii
Eremophila interstans subsp. virgata
Eremophila scoparia
Cratystylis conocephala
Exocarpos aphyllus
Senna cardiosperma
Eremophila caerulea subsp. caerulea
Santalum acuminatum
Austrostipa elegantissima
Scaevola spinescens
Maireana triptera
Sclerolaena diacantha
Sclerolaena cuneata
Olearia muelleri
Maireana trichoptera
Ptilotus obovatus
Ptilotus exaltatus
Acacia hemiteles
Maireana tomentosa
Eriochiton sclerolaenoides
Sclerolaena densiflora
Acacia tetragonophylla
Leichhardtia australis
Ptilotus aervoides
Eremophila decipiens subsp. decipiens
Haloragis trigonocarpa
Rhagodia drummondii
Eremophila maculata subsp. brevifolia
Eremophila ionantha
Austrostipa scabra
Alyxia buxifolia
Dodonaea lobulata
Pimelea microcephala subsp. microcephala
Roepera eremaea
Outside
Eucalyptus salubris
Maireana sedifolia
Maireana pentatropis
Eucalyptus transcontinentalis

Project Name: Mt Marion Project Area - October 2021				
Date:	12/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.41615	-31.02184	**Quadrat:**	Q5
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	B			
Vegetation condition:	Very Good			
WP:	5			
Photo number:			2-3	
Landform:			Crest/Hill Crest	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			Very; abundant/Cobbly; or cobbles/Subangular tabular	
Rock outcrop (abundance/runoff):			No bedrock exposed/Rapid	
Soil (profile/field texture/soil surface):			Uniform/Sandy clay loam/Firm	
% Cover leaf litter:			50	
% Cover bare ground:			60	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	T Tree	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	6-12m	**Height:**	3-6m	**Height:**	0.5-1m
Crown cover %:	S 10-30	**Crown cover %:**	V <10	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus oleosa subsp. oleosa		Casuarina pauper		Eremophila scoparia	
Eucalyptus lesouefii		Eremophila interstans subsp. virgata		Scaevola spinescens	
Eucalyptus griffithsii				Acacia erinacea	

ALL SPECIES
Eucalyptus oleosa subsp. oleosa
Eucalyptus lesouefii
Eucalyptus griffithsii
Casuarina pauper
Eremophila interstans subsp. virgata
Eremophila scoparia
Scaevola spinescens
Acacia erinacea
Westringia rigida
Atriplex nummularia subsp. spathulata
Eremophila parvifolia subsp. auricampa
Olearia muelleri
Maireana trichoptera
Sclerolaena eriacantha
Maireana tomentosa
Senna artemisioides subsp. filifolia
Exocarpos aphyllus
Alyxia buxifolia
Cratystylis conocephala
Eremophila caperata
Atriplex vesicaria
Outside
Melaleuca sheathiana
Eremophila oldfieldii subsp. angustifolia
Acacia tetragonophylla
Ptilotus obovatus
Leichhardtia australis
Maireana pentatropis
Santalum spicatum
Dodonaea lobulata
Trymalium myrtillus subsp. myrtillus

Project Name: Mt Marion Project Area - October 2021				
Date:	12/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.43599	-31.02682	**Quadrat:**	Q6
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	B			
Vegetation condition:	Very Good			
WP:	6			
Photo number:			7	
Landform:			Flat/Valley flat	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			Moderately; many/Coarse gravelly; large pebbles/Subrounded platy	
Rock outcrop (abundance/runoff):			No bedrock exposed/Slow	
Soil (profile/field texture/soil surface):			Uniform/Sandy clay loam/Loose	
% Cover leaf litter:			80	
% Cover bare ground:			20	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	M Tree Mallee (> 8m)	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	12-20m	**Height:**	3-6m	**Height:**	0.5-1m
Crown cover %:	M 30-70	**Crown cover %:**	S 10-30	**Crown cover %:**	M 30-70
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus griffithsii		Melaleuca sheathiana		Senna artemisioides subsp. filifolia	
Eucalyptus oleosa subsp. oleosa		Exocarpos aphyllus		Acacia erinacea	
				Eremophila scoparia	

ALL SPECIES
Eucalyptus griffithsii
Eucalyptus oleosa subsp. oleosa
Melaleuca sheathiana
Exocarpos aphyllus
Senna artemisioides subsp. filifolia
Acacia erinacea
Eremophila scoparia
Eremophila parvifolia subsp. auricampa
Dodonaea lobulata
Westringia rigida
Solanum nummularium
Olearia muelleri
Eucalyptus lesouefii
Eremophila oppositifolia subsp. angustifolia
Eremophila oldfieldii subsp. angustifolia
Santalum acuminatum
Alyxia buxifolia
Halgania andromedifolia
Eremophila caerulea subsp. caerulea
Goodenia berardiana
Ptilotus obovatus
Maireana trichoptera
Eucalyptus flocktoniae subsp. hebes
Austrostipa elegantissima
Outside
Trymalium myrtillus subsp. myrtillus
Cratystylis microphylla

Project Name: Mt Marion Project Area – October 2021				
Date:	13/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.45802	-31.04804	**Quadrat:**	Q7
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	B			
Vegetation condition:	Very Good			
WP:	7			
Photo number:			17	
Landform:			Mid slope/Hillslope	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			Moderately; many/Cobbly; or cobbles/Subrounded	
Rock outcrop (abundance/runoff):			Very rocky/Rapid	
Soil (profile/field texture/soil surface):			Uniform/Sandy clay loam/Firm	
% Cover leaf litter:			80	
% Cover bare ground:			60	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	T Tree	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	6-12m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	S 10-30	**Crown cover %:**	S 10-30	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus stricklandii		Exocarpos aphyllus		Westringia rigida	
		Eremophila oldfieldii subsp. Angustifolia		Acacia erinacea	
		Scaevola spinescens		Olearia muelleri	

ALL SPECIES
Eucalyptus stricklandii
Exocarpos aphyllus
Eremophila oldfieldii subsp. Angustifolia
Scaevola spinescens
Westringia rigida
Acacia erinacea
Olearia muelleri
Dodonaea lobulata
Thysanotus manglesianus
Trymalium myrtillus subsp. Myrtillus
Eremophila oppositifolia subsp. Angustifolia
Acacia hemiteles
Grevillea acuaria
Phebalium laevigatum
Alyxia buxifolia
Ptilotus obovatus
Outside
Acacia quadrimarginea
Casuarina pauper
Senna artemisioides subsp. Filifolia
Leucopogon sp. Clyde Hill
Brachychiton gregorii

Project Name: Mt Marion Project Area – October 2021				
Date:	12/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.42902	-31.02607	**Quadrat:**	Q8
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	Ac quad shrubland on undulating hills			
Vegetation condition:	Very Good			
WP:	8			
Photo number:			6	
Landform:			Mid slope/Hillslope	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			Very; abundant/Cobbly; or cobbles/Subrounded platy	
Rock outcrop (abundance/runoff):			No bedrock exposed/Very rapid	
Soil (profile/field texture/soil surface):			Uniform/Sandy clay loam/Firm	
% Cover leaf litter:			20	
% Cover bare ground:			35	

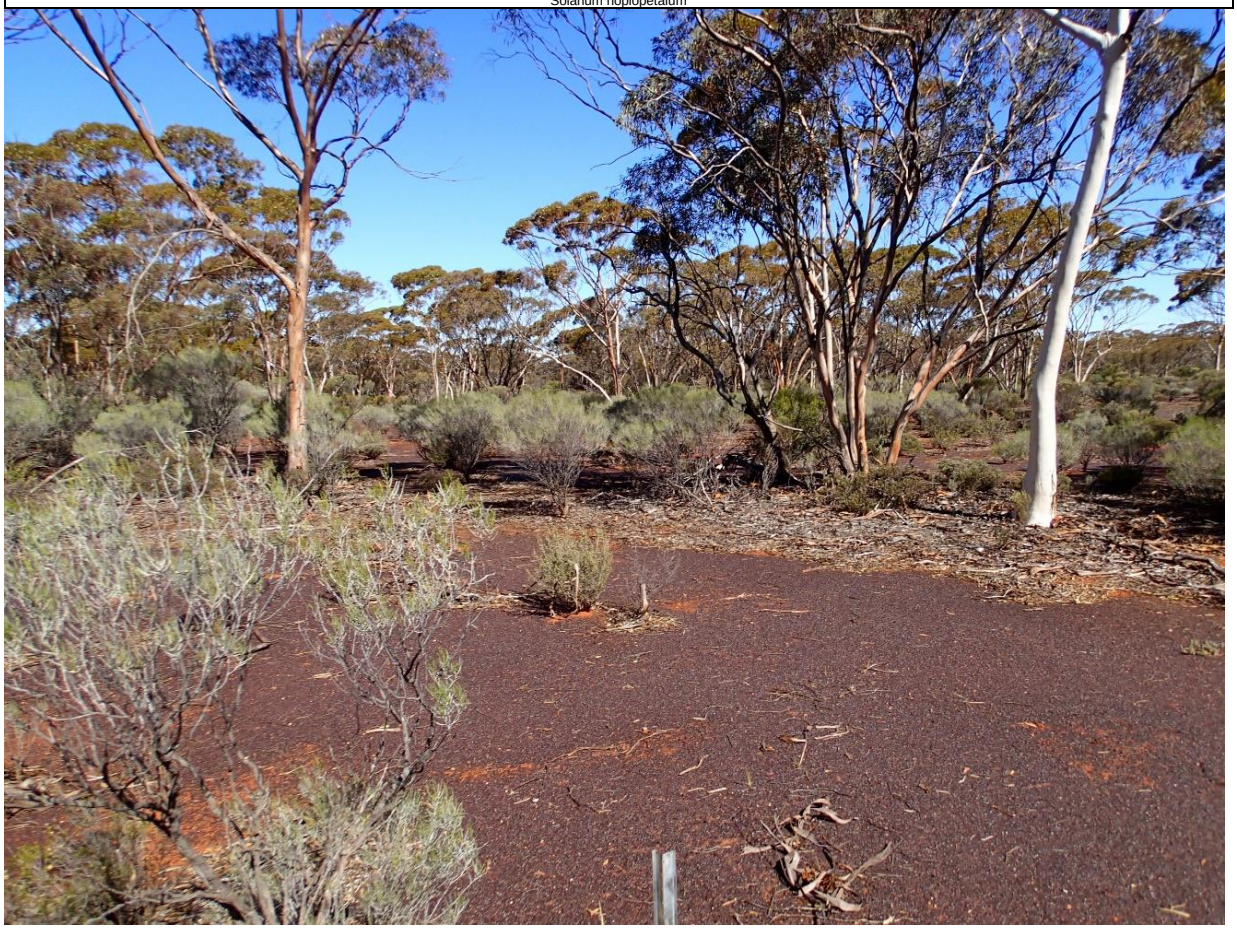
Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	S Shrub	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	3-6m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	M 30-70	**Crown cover %:**	M 30-70	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia quadrimarginea		Dodonaea lobulata		Ptilotus obovatus	
Eremophila oldfieldii subsp. Angustifolia		Eremophila alternifolia		Eremophila georgei	
		Alyxia buxifolia		Scaevola spinescens	

ALL SPECIES
Acacia quadrimarginea
Eremophila oldfieldii subsp. Angustifolia
Dodonaea lobulata
Eremophila alternifolia
Alyxia buxifolia
Ptilotus obovatus
Eremophila georgei
Scaevola spinescens
Roepera eremaea
Santalum spicatum
Acacia tetragonophylla
Leichhardtia australis
Senna artemisioides subsp. Artemisioides
Austrostipa elegantissima
Austrostipa scabra
Santalum acuminatum
Pimelea microcephala subsp. Microcephala
Thysanotus manglesianus
Goodenia berardiana
Exocarpos aphyllus
Chrysocephalum puteale
Solanum lasiophyllum
Prostanthera campbellii
Outside
Olearia muelleri
Eucalyptus griffithsii

Project Name: Mt Marion Project Area – October 2021				
Date:	13/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.44795	-31.05051	**Quadrat:**	Q9
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	Ac quad shrubland on undulating hills			
Vegetation condition:	Very Good			
WP:	9			
Photo number:			18	
Landform:			Mid slope/Hillslope	
Land surface/disturbance:			No effective disturbance	
Fire History:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			Extremely; very abundant/Cobbly; or cobbles/Subangular	
Rock outcrop (abundance/runoff):			Rocky/Moderately rapid	
Soil (profile/field texture/soil surface):			Uniform/Sandy clay loam/Firm	
% Cover leaf litter:			55	
% Cover bare ground:			40	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	S Shrub	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	3-6m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	M 30-70	**Crown cover %:**	S 10-30	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia quadrimarginea		Scaevola spinescens		Prostanthera campbellii	
Allocasuarina campestris		Eremophila oldfieldii subsp. Angustifolia		Chrysocephalum puteale	
Acacia acuminata		Eremophila granitica		Philotheca brucei subsp. brucei	

ALL SPECIES
Acacia quadrimarginea
Allocasuarina campestris
Acacia acuminata
Scaevola spinescens
Eremophila oldfieldii subsp. angustifolia
Eremophila granitica
Prostanthera campbellii
Chrysocephalum puteale
Philotheca brucei subsp. brucei
Cheilanthes lasiophylla
Exocarpos aphyllus
Solanum plicatile
Solanum lasiophyllum
Cheilanthes sieberi subsp. sieberi
Goodenia berardiana
Austrostipa scabra
Haloragis trigonocarpa
Monotaxis luteiflora
Aristida contorta
Outside
Eucalyptus websteriana subsp. websteriana
Brachychiton gregorii
Dampiera latealata
Stackhousia sp. Mt Keith
Thryptomene australis subsp. brachyandra
Solanum hoplopetalum



Project Name: Mt Marion Project Area - October 2021				
Date:	13/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.43539	-31.05695	**Quadrat:**	Q10
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	C			
Vegetation condition:	Very Good			
WP:	13			
Photo number:			23	
Landform:			Flat/Plain	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			Very slightly; very few/Medium gravelly; medium pebbles/Rounded	
Rock outcrop (abundance/runoff):			No bedrock exposed/Very slow	
Soil (profile/field texture/soil surface):			Uniform/Silty clay loam/Firm	
% Cover leaf litter:			25	
% Cover bare ground:			45	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	M Tree Mallee (> 8m)	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	6-12m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	S 10-30	**Crown cover %:**	M 30-70	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus griffithsii		Acacia acuminata		Acacia tetragonophylla	
				Ptilotus obovatus	
				Senna artemisioides subsp. filifolia	

ALL SPECIES
Eucalyptus griffithsii
Acacia acuminata
Acacia tetragonophylla
Ptilotus obovatus
Senna artemisioides subsp. filifolia
Eremophila decipiens subsp. decipiens
Senna artemisioides subsp. artemisioides
Leichhardtia australis
Maireana georgei
Haloragis trigonocarpa
Monachather paradoxus
Austrostipa scabra
Enchylaena tomentosa var. tomentosa
Maireana tomentosa
Sclerolaena densiflora
Atriplex nummularia subsp. spathulata
Eragrostis dielsii
Austrostipa elegantissima
Maireana triptera
Outside
Eremophila oldfieldii subsp. angustifolia
Brachychiton gregorii
Olearia muelleri
Acacia ligulata

Project Name: Mt Marion Project Area - October 2021				
Date:	12/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.41105	-31.02267	**Quadrat:**	Q11
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	D			
Vegetation condition:	Good			
WP:	11			
Photo number:			1	
Landform:			Flat/Plain	
Land surface/disturbance:			No effective disturbance except grazing by hoofed animals	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			No qualifier; common/Coarse gravelly; large pebbles/Subrounded	
Rock outcrop (abundance/runoff):			No bedrock exposed/Slow	
Soil (profile/field texture/soil surface):			Uniform/Sandy clay loam/Firm	
% Cover leaf litter:			30	
% Cover bare ground:			50	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	T Tree	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	12-20m	**Height:**	3-6m	**Height:**	1-3m
Crown cover %:	V <10	**Crown cover %:**	V <10	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus salmonophloia		Eremophila oppositifolia subsp. angustifolia		Eremophila scoparia	
Eucalyptus oleosa subsp. oleosa				Eremophila ionantha	
				Atriplex vesicaria	

ALL SPECIES
Eucalyptus salmonophloia
Eucalyptus oleosa subsp. oleosa
Eremophila oppositifolia subsp. angustifolia
Eremophila scoparia
Eremophila ionantha
Atriplex vesicaria
Eremophila glabra subsp. glabra
Atriplex nummularia subsp. spathulata
Enchylaena tomentosa var. tomentosa
Maireana triptera
Acacia hemiteles
Maireana georgei
Acacia erinacea
Exocarpos aphyllus
Frankenia pauciflora var. pauciflora
Maireana trichoptera
Scaevola spinescens
Sclerolaena diacantha
Casuarina pauper
Sclerolaena cuneata
Rhagodia drummondii
Lycium australe
Olearia muelleri
Sclerolaena densiflora
Eremophila decipiens subsp. decipiens
Eremophila oldfieldii subsp. angustifolia
Acacia tetragonophylla
Austrostipa elegantissima
Leichhardtia australis
Maireana thesioides
Outside
Cratystylis conocephala
Senna artemisioides subsp. filifolia

Project Name: Mt Marion Project Area - October 2021				
Date:	13/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.45602	-31.04127	**Quadrat:**	Q12
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	D			
Vegetation condition:	Good			
WP:	12			
Photo number:			14	
Landform:			Open depression (vale)/Drainage depression	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			No coarse fragments	
Rock outcrop (abundance/runoff):			No bedrock exposed/Slow	
Soil (profile/field texture/soil surface):			Uniform/Sandy clay loam/Loose	
% Cover leaf litter:			50	
% Cover bare ground:			60	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	T Tree	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	12-20m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	V <10	**Crown cover %:**	S 10-30	**Crown cover %:**	M 30-70
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus salmonophloia		Eremophila scoparia		Maireana pyramidata	
		Atriplex nummularia subsp. spathulata		Atriplex vesicaria	
		Acacia hemiteles		Exocarpos aphyllus	

ALL SPECIES
Eucalyptus salmonophloia
Eremophila scoparia
Atriplex nummularia subsp. spathulata
Acacia hemiteles
Maireana pyramidata
Atriplex vesicaria
Exocarpos aphyllus
Enchylaena tomentosa var. tomentosa
Ptilotus obovatus
Scaevola spinescens
Leichhardtia australis
Maireana triptera
Maireana trichoptera
Senna artemisioides subsp. filifolia
Senna artemisioides subsp. artemisioides
Sclerolaena diacantha
Eremophila oldfieldii subsp. angustifolia
Ptilotus exaltatus
Maireana georgei
Maireana tomentosa
Atriplex codonocarpa
Oncosiphon suffruticosum*
Outside
Lycium australe

a				
Date:	13/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.43214	-31.05402	**Quadrat:**	Q13
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	D			
Vegetation condition:	Good			
WP:	13			
Photo number:			22	
Landform:			Flat/Plain	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			Very slightly; very few/Coarse gravelly; large pebbles/Subrounded	
Rock outcrop (abundance/runoff):			No bedrock exposed/Very slow	
Soil (profile/field texture/soil surface):			Uniform/Sandy clay loam/Firm	
% Cover leaf litter:			70	
% Cover bare ground:			70	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	T Tree	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	12-20m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	S 10-30	**Crown cover %:**	V <10	**Crown cover %:**	V <10
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus salmonophloia		Exocarpos aphyllus		Acacia hemiteles	
		Eremophila scoparia		Senna artemisioides subsp. filifolia	
		Atriplex nummularia subsp. spathulata		Maireana georgei	

ALL SPECIES
Eucalyptus salmonophloia
Exocarpos aphyllus
Eremophila scoparia
Atriplex nummularia subsp. spathulata
Acacia hemiteles
Senna artemisioides subsp. filifolia
Maireana georgei
Eremophila oldfieldii subsp. angustifolia
Enchylaena tomentosa var. tomentosa
Maireana tomentosa
Sclerolaena diacantha
Sclerolaena eriacantha
Maireana triptera
Rhagodia drummondii
Ptilotus exaltatus
Maireana trichoptera
Sclerolaena patenticuspis
Sclerolaena cuneata
Maireana pyramidata
Maireana planifolia
Austrostipa elegantissima
Leichhardtia australis
Lycium australe
Alyxia buxifolia
Austrostipa scabra
Senna artemisioides subsp. artemisioides
Solanum nummularium
Ptilotus obovatus
Outside
Maireana pentatropis
Olearia muelleri

Project Name: Mt Marion Project Area - October 2021				
Date:	15/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.48674	-31.10576	**Quadrat:**	Q14
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	D			
Vegetation condition:	Good			
WP:	14			
Photo number:			62	
Landform:			Flat/Plain	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			No coarse fragments	
Rock outcrop (abundance/runoff):			No bedrock exposed/Slow	
Soil (profile/field texture/soil surface):			Uniform/Sandy clay loam/Loose	
% Cover leaf litter:			35	
% Cover bare ground:			75	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	T Tree	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	12-20m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	S 10-30	**Crown cover %:**	V <10	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus salmonophloia		Eremophila ionantha		Lycium australe	
		Maireana sedifolia		Cratystylis subspinescens	
		Atriplex nummularia subsp. spathulata		Tecticornia disarticulata	

ALL SPECIES
Eucalyptus salmonophloia
Eremophila ionantha
Maireana sedifolia
Atriplex nummularia subsp. spathulata
Lycium australe
Cratystylis subspinescens
Tecticornia disarticulata
Eremophila decipiens subsp. decipiens
Maireana triptera
Acacia hemiteles
Atriplex vesicaria
Sclerolaena cuneata
Sclerolaena diacantha
Sclerolaena eriacantha
Rhagodia drummondii
Atriplex stipitata
Maireana thesioides
Exocarpos aphyllus
Maireana georgei
Eremophila scoparia
Sclerolaena densiflora
Maireana tomentosa
Frankenia setosa
Sclerolaena patenticuspis
Olearia muelleri
Alyxia buxifolia
Scaevola spinescens
Ptilotus exaltatus
Maireana pentatropis
Senna artemisioides subsp. filifolia
Maireana trichoptera
Outside
Eucalyptus lesouefii

Project Name: Mt Marion Project Area - October 2021				
Date:	13/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.45436	-31.03802	**Quadrat:**	Q15
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	I			
Vegetation condition:	Very Good			
WP:	15			
Photo number:			12	
Landform:			Flat/Plain	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			No coarse fragments	
Rock outcrop (abundance/runoff):			No bedrock exposed/Very slow	
Soil (profile/field texture/soil surface):			Uniform/Clay loam/Cracking	
% Cover leaf litter:			80	
% Cover bare ground:			40	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	T Tree	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	6-12m	**Height:**	1-3m	**Height:**	0.25-0.5m
Crown cover %:	M 30-70	**Crown cover %:**	M 30-70	**Crown cover %:**	V <10
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus ravida		Eremophila dempsteri		Sclerolaena diacantha	
		Eremophila scoparia		Ptilotus obovatus	
				Exocarpos aphyllus	

ALL SPECIES
Eucalyptus ravida
Eremophila dempsteri
Eremophila scoparia
Sclerolaena diacantha
Ptilotus obovatus
Exocarpos aphyllus
Sclerolaena densiflora
Eremophila decipiens subsp. decipiens
Eriochiton sclerolaenoides
Ptilotus exaltatus
Maireana triptera
Atriplex nummularia subsp. spathulata
Maireana georgei
Maireana trichoptera
Rhagodia drummondii
Enchylaena tomentosa var. tomentosa
Atriplex vesicaria
Austrostipa scabra
Austrostipa elegantissima
Daviesia aphylla
Maireana sedifolia
Ptilotus aervoides
Outside
Eucalyptus salmonophloia
Atriplex codonocarpa
Atriplex holocarpa

Project Name: Mt Marion Project Area - October 2021				
Date:	13/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.45411	-31.03970	**Quadrat:**	Q16
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	G			
Vegetation condition:	Good			
WP:	16			
Photo number:			13	
Landform:			Flat/Plain	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			No coarse fragments	
Rock outcrop (abundance/runoff):			No bedrock exposed/No runoff	
Soil (profile/field texture/soil surface):			Uniform/Clay loam/Cracking	
% Cover leaf litter:			80	
% Cover bare ground:			40	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	M Tree Mallee (> 8m)	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	6-12m	**Height:**	0.5-1m	**Height:**	0.25-0.5m
Crown cover %:	M 30-70	**Crown cover %:**	S 10-30	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus gracilis		Eremophila oldfieldii subsp. angustifolia		Eremophila caerulea subsp. caerulea	
Eucalyptus lesouefii		Eremophila oppositifolia subsp. angustifolia		Ptilotus obovatus	
				Atriplex vesicaria	

ALL SPECIES
Eucalyptus gracilis
Eucalyptus lesouefii
Eremophila oldfieldii subsp. angustifolia
Eremophila oppositifolia subsp. angustifolia
Eremophila caerulea subsp. caerulea
Ptilotus obovatus
Atriplex vesicaria
Scaevola spinescens
Lycium australe
Cratystylis subspinescens
Santalum acuminatum
Rhagodia drummondii
Enchylaena tomentosa var. tomentosa
Maireana tomentosa
Sclerolaena diacantha
Maireana triptera
Maireana georgei
Maireana trichoptera
Maireana pyramidata
Exocarpos aphyllus
Eremophila decipiens subsp. decipiens
Eremophila scoparia
Eremophila dempsteri
Atriplex nummularia subsp. spathulata
Eriochiton sclerolaenoides
Outside
Eucalyptus salmonophloia
Eucalyptus ravida
Maireana sedifolia

Project Name: Mt Marion Project Area - October 2021				
Date:	12/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.43997	-31.03297	**Quadrat:**	Q17
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	H			
Vegetation condition:	Very Good			
WP:	17			
Photo number:			9	
Landform:			Flat/Plain	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			Extremely; very abundant/Fine gravelly; small pebbles/Subrounded	
Rock outcrop (abundance/runoff):			No bedrock exposed/Very slow	
Soil (profile/field texture/soil surface):			Uniform/Sandy clay loam/Firm	
% Cover leaf litter:			50	
% Cover bare ground:			60	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	M Tree Mallee (> 8m)	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	12-20m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	S 10-30	**Crown cover %:**	M 30-70	**Crown cover %:**	V <10
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus oleosa subsp. oleosa		Melaleuca sheathiana		Ptilotus obovatus	
		Dodonaea lobulata		Exocarpos aphyllus	
		Senna artemisioides subsp. filifolia		Scaevola spinescens	

ALL SPECIES
Eucalyptus oleosa subsp. oleosa
Melaleuca sheathiana
Dodonaea lobulata
Senna artemisioides subsp. filifolia
Ptilotus obovatus
Exocarpos aphyllus
Scaevola spinescens
Maireana trichoptera
Maireana triptera
Eremophila oldfieldii subsp. angustifolia
Eremophila oppositifolia subsp. angustifolia
Sclerolaena eriacantha
Sclerolaena diacantha
Olearia muelleri
Enchylaena tomentosa var. tomentosa
Maireana tomentosa
Leichhardtia australis
Eriochiton sclerolaenoides
Maireana georgei
Austrostipa elegantissima
Austrostipa scabra
Austrostipa nitida
Sclerolaena densiflora
Atriplex vesicaria
Enchylaena tomentosa var. tomentosa
Outside
Casuarina pauper
Eremophila interstans subsp. virgata
Maireana pentatropis
Eremophila parvifolia subsp. auricampa

Project Name: Mt Marion Project Area - October 2021				
Date:	15/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.48602	-31.10121	**Quadrat:**	Q18
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	H			
Vegetation condition:	Very Good			
WP:	18			
Photo number:			63	
Landform:			Flat/Plain	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			No coarse fragments	
Rock outcrop (abundance/runoff):			No bedrock exposed/Very slow	
Soil (profile/field texture/soil surface):			Uniform/Sandy clay loam/Firm	
% Cover leaf litter:			20	
% Cover bare ground:			40	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	T Tree	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	6-12m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	S 10-30	**Crown cover %:**	M 30-70	**Crown cover %:**	I <1
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus lesouefii		Melaleuca sheathiana		Atriplex nummularia subsp. spathulata	
Eucalyptus gracilis					

ALL SPECIES
Eucalyptus lesouefii
Eucalyptus gracilis
Melaleuca sheathiana
Atriplex nummularia subsp. spathulata
Ptilotus obovatus
Maireana trichoptera
Scaevola spinescens
Maireana tomentosa
Sclerolaena eriacantha
Sclerolaena diacantha
Maireana georgei
Olearia muelleri
Exocarpos aphyllus
Eremophila parvifolia subsp. auricampa
Maireana pentatropis
Senna artemisioides subsp. filifolia
Myoporum platycarpum
Westringia rigida
Enchylaena tomentosa var. tomentosa
Rhagodia drummondii
Chenopodium gaudichaudianum
Eremophila scoparia
Ptilotus aervoides
Outside
Acacia merrallii

Project Name: Mt Marion Project Area - October 2021				
Date:	15/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.49380	-31.11026	**Quadrat:**	Q19
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	H			
Vegetation condition:	Very Good			
WP:	19			
Photo number:			60	
Landform:			Crest/Hill Crest	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			Extremely; very abundant/Coarse gravelly; large pebbles/Rounded	
Rock outcrop (abundance/runoff):			No bedrock exposed/Moderately rapid	
Soil (profile/field texture/soil surface):			Uniform/Sandy clay loam/Firm	
% Cover leaf litter:			20	
% Cover bare ground:			50	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	T Tree	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	6-12m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	S 10-30	**Crown cover %:**	M 30-70	**Crown cover %:**	I <1
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus lesouefii		Melaleuca sheathiana		Exocarpos aphyllus	

ALL SPECIES
Eucalyptus lesouefii
Melaleuca sheathiana
Exocarpos aphyllus
Acacia merrallii
Sclerolaena diacantha
Ptilotus obovatus
Maireana triptera
Atriplex vesicaria
Maireana trichoptera
Eremophila parvifolia subsp. auricampa
Myoporum platycarpum
Outside
Atriplex nummularia subsp. spathulata

Project Name: Mt Marion Project Area - October 2021				
Date:	13/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.45642	-31.04284	**Quadrat:**	Q20
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	I			
Vegetation condition:	Very good			
WP:	20			
Photo number:			15	
Landform:			Flat/Plain	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			No coarse fragments	
Rock outcrop (abundance/runoff):			No bedrock exposed/Slow	
Soil (profile/field texture/soil surface):			Uniform/Clay loam/Cracking	
% Cover leaf litter:			70	
% Cover bare ground:			40	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	M Tree Mallee (> 8m)	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	6-12m	**Height:**	1-3m	**Height:**	0.25-0.5m
Crown cover %:	M 30-70	**Crown cover %:**	M 30-70	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus ravida		Eremophila interstans subsp. virgata		Eremophila ionantha	
		Eremophila dempsteri		Rhagodia drummondii	
		Eremophila scoparia		Exocarpos aphyllus	

ALL SPECIES
Eucalyptus ravida
Eremophila interstans subsp. virgata
Eremophila dempsteri
Eremophila scoparia
Eremophila ionantha
Rhagodia drummondii
Exocarpos aphyllus
Daviesia aphylla
Maireana tomentosa
Enchylaena tomentosa var. tomentosa
Maireana trichoptera
Acacia hemiteles
Maireana triptera
Maireana georgei
Eremophila decipiens subsp. decipiens
Ptilotus obovatus
Sclerolaena eriacantha
Sclerolaena diacantha
Leichhardtia australis
Lycium australe
Eremophila oldfieldii subsp. angustifolia
Scaevola spinescens
Acacia erinacea
Eremophila caerulea subsp. caerulea
Atriplex codonocarpa
Sclerolaena patenticuspis
Atriplex vesicaria
Outside
Eucalyptus salmonophloia
Eucalyptus gracilis
Eremophila glabra subsp. glabra
Maireana pyramidata

Project Name: Mt Marion Project Area - October 2021				
Date:	13/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.45914	-31.04328	**Quadrat:**	Q21
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	I			
Vegetation condition:	Very Good			
WP:	21			
Photo number:			16	
Landform:			Open depression (vale)/Drainage depression	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			No coarse fragments	
Rock outcrop (abundance/runoff):			No bedrock exposed/Slow	
Soil (profile/field texture/soil surface):			Uniform/Clay loam/Cracking	
% Cover leaf litter:			80	
% Cover bare ground:			40	

Tallest stratum		**Mid-stratum**		**Lower stratum**	
Growth form:	M Tree Mallee (> 8m)	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	6-12m	**Height:**	1-3m	**Height:**	0.25-0.5m
Crown cover %:	M 30-70	**Crown cover %:**	M 30-70	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus ravida		Eremophila dempsteri		Atriplex vesicaria	
		Exocarpos aphyllus		Ptilotus obovatus	
		Eremophila scoparia		Eremophila ionantha	

ALL SPECIES
Eucalyptus ravida
Eremophila dempsteri
Exocarpos aphyllus
Eremophila scoparia
Atriplex vesicaria
Ptilotus obovatus
Eremophila ionantha
Rhagodia drummondii
Sclerolaena diacantha
Enchylaena tomentosa var. tomentosa
Maireana tomentosa
Maireana trichoptera
Eremophila decipiens subsp. decipiens
Eremophila oldfieldii subsp. angustifolia
Ptilotus exaltatus
Scaevola spinescens
Eucalyptus flocktoniae subsp. flocktoniae
Frankenia pauciflora var. pauciflora
Maireana pyramidata
Leichhardtia australis
Olearia muelleri
Solanum nummularium
Atriplex nummularia subsp. spathulata
Santalum acuminatum
Sclerolaena eriacantha
Chenopodium gaudichaudianum
Outside
Atriplex codonocarpa
Sclerolaena cuneata
Sclerolaena patenticuspis
Eucalyptus gracilis
Maireana sedifolia

Project Name: Mt Marion Project Area - October 2021				
Date:	13/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.43939	-31.05482	**Quadrat:**	Q22
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	A			
Vegetation condition:	Good			
WP:	22			
Photo number:			24	
Landform:			Flat/Plain	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			No coarse fragments	
Rock outcrop (abundance/runoff):			No bedrock exposed/Very slow	
Soil (profile/field texture/soil surface):			Uniform/Sandy clay loam/Firm	
% Cover leaf litter:			45	
% Cover bare ground:			60	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	M Tree Mallee (> 8m)	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	6-12m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	S 10-30	**Crown cover %:**	S 10-30	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus griffithsii		Eremophila interstans subsp. virgata		Olearia muelleri	
Eucalyptus salmonophloia		Eremophila oldfieldii subsp. angustifolia		Senna artemisioides subsp. filifolia	
		Exocarpos aphyllus		Ptilotus obovatus	

ALL SPECIES
Eucalyptus griffithsii
Eucalyptus salmonophloia
Eremophila interstans subsp. virgata
Eremophila oldfieldii subsp. angustifolia
Exocarpos aphyllus
Olearia muelleri
Senna artemisioides subsp. filifolia
Ptilotus obovatus
Sclerolaena diacantha
Sclerolaena eriacantha
Austrostipa nitida
Austrostipa scabra
Maireana trichoptera
Atriplex nummularia subsp. spathulata
Acacia merrallii
Maireana georgei
Maireana triptera
Acacia acuminata
Solanum nummularium
Austrostipa elegantissima
Acacia hemiteles
Westringia rigida
Acacia erinacea
Leichhardtia australis
Maireana tomentosa
Solanum lasiophyllum
Maireana pentatropis
Acacia ligulata
Dodonaea microzyga subsp. acrolobata
Haloragis trigonocarpa
Scaevola spinescens
Cratystylis conocephala
Dodonaea lobulata
Acacia jennerae
Outside
Eucalyptus oleosa subsp. oleosa

Project Name: Mt Marion Project Area - October 2021				
Date:	14/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.40377	-31.05830	**Quadrat:**	Q23
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	N			
Vegetation condition:	Good			
WP:	23			
Photo number:			34	
Landform:			Flat/Plain	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			No coarse fragments	
Rock outcrop (abundance/runoff):			No bedrock exposed/Slow	
Soil (profile/field texture/soil surface):			Uniform/Sandy clay loam/Loose	
% Cover leaf litter:			60	
% Cover bare ground:			60	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	M Tree Mallee (> 8m)	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	6-12m	**Height:**	1-3m	**Height:**	0.25-0.5m
Crown cover %:	S 10-30	**Crown cover %:**	S 10-30	**Crown cover %:**	M 30-70
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus gracilis		Eremophila interstans subsp. virgata		Eremophila caerulea subsp. caerulea	
		Exocarpos aphyllus			

ALL SPECIES
Eucalyptus gracilis
Eremophila interstans subsp. virgata
Exocarpos aphyllus
Eremophila caerulea subsp. caerulea
Maireana trichoptera
Sclerolaena diacantha
Sclerolaena densiflora
Maireana tomentosa
Enchylaena tomentosa var. tomentosa
Olearia muelleri
Roepera eremaea
Maireana georgei
Senna artemisioides subsp. filifolia
Rhagodia eremaea
Eucalyptus ravida
Wilsonia humilis
Sclerolaena cuneata
Maireana triptera
Senna artemisioides subsp. artemisioides
Austrostipa scabra
Alyxia buxifolia
Austrostipa elegantissima
Outside
Santalum spicatum
Eucalyptus griffithsii
Grevillea acuaria

Project Name: Mt Marion Project Area - October 2021				
Date:	15/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.49103	-31.11255	**Quadrat:**	Q24
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	R			
Vegetation condition:	Very Good			
WP:	24			
Photo number:			59	
Landform:			Flat/Plain	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			No coarse fragments	
Rock outcrop (abundance/runoff):			No bedrock exposed/Very slow	
Soil (profile/field texture/soil surface):			Uniform/Sandy clay loam/Loose	
% Cover leaf litter:			65	
% Cover bare ground:			60	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	M Tree Mallee (> 8m)	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	6-12m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	S 10-30	**Crown cover %:**	S 10-30	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus griffithsii		Exocarpos aphyllus		Olearia pimeleoides	
Eucalyptus oleosa subsp. oleosa		Eremophila scoparia		Olearia muelleri	
		Acacia hemiteles		Senna artemisioides subsp. filifolia	

ALL SPECIES
Eucalyptus griffithsii
Eucalyptus oleosa subsp. oleosa
Exocarpos aphyllus
Eremophila scoparia
Acacia hemiteles
Olearia pimeleoides
Olearia muelleri
Senna artemisioides subsp. filifolia
Austrostipa nitida
Austrostipa scabra
Dodonaea viscosa subsp. angustissima
Eremophila ionantha
Eremophila decipiens subsp. decipiens
Maireana triptera
Aristida contorta
Austrostipa elegantissima
Monachather paradoxus
Sclerolaena diacantha
Sclerolaena eriacantha
Enchylaena tomentosa var. tomentosa
Ptilotus exaltatus
Acacia jennerae
Grevillea acuaria
Atriplex nummularia subsp. spathulata
Enneapogon caerulescens
Maireana georgei
Maireana trichoptera
Calotis hispidula
Maireana tomentosa
Ptilotus obovatus
Leichhardtia australis
Rhagodia drummondii
Atriplex stipitata
Swainsona canescens
Eragrostis dielsii
Outside
Eucalyptus salmonophloia
Eucalyptus transcontinentalis
Acacia merrallii

Project Name: Mt Marion Project Area - October 2021				
Date:	15/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.49751	-31.11382	**Quadrat:**	Q25
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	R			
Vegetation condition:	Very Good			
WP:	25			
Photo number:			53	
Landform:			Flat/Plain	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			No coarse fragments	
Rock outcrop (abundance/runoff):			No bedrock exposed/Very slow	
Soil (profile/field texture/soil surface):			Uniform/Sandy clay loam/Firm	
% Cover leaf litter:			40	
% Cover bare ground:			60	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	M Tree Mallee (> 8m)	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	6-12m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	S 10-30	**Crown cover %:**	S 10-30	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus griffithsii		Exocarpos aphyllus		Ptilotus obovatus	
		Eremophila ionantha		Senna artemisioides subsp. filifolia	
		Acacia hemiteles		Eremophila scoparia	

ALL SPECIES
Eucalyptus griffithsii
Exocarpos aphyllus
Eremophila ionantha
Acacia hemiteles
Ptilotus obovatus
Senna artemisioides subsp. filifolia
Eremophila scoparia
Rhagodia drummondii
Austrostipa scabra
Grevillea acuaria
Aristida contorta
Leichhardtia australis
Maireana triptera
Sclerolaena diacantha
Sclerolaena eriacantha
Maireana georgei
Maireana trichoptera
Eremophila decipiens subsp. decipiens
Acacia acuminata
Swainsona canescens
Triodia rigidissima
Enneapogon caerulescens
Lycium australe
Solanum lasiophyllum
Atriplex stipitata
Outside
Alyxia buxifolia
Olearia pimeleoides
Maireana tomentosa
Teucrium disjunctum
Austrostipa elegantissima
Acacia merrallii

Project Name: Mt Marion Project Area - October 2021				
Date:	13/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.43425	-31.05059	**Quadrat:**	Q26
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	B			
Vegetation condition:	Very Good			
WP:	26			
Photo number:			21	
Landform:			Simple slope/Hillslope	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			Very; abundant/Cobbly; or cobbles/Subrounded platy	
Rock outcrop (abundance/runoff):			Rocky/Rapid	
Soil (profile/field texture/soil surface):			Uniform/Sandy clay loam/Firm	
% Cover leaf litter:			55	
% Cover bare ground:			60	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	T Tree	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	12-20m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	S 10-30	**Crown cover %:**	S 10-30	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus ravida		Eremophila interstans subsp. virgata		Olearia muelleri	
Eucalyptus salmonophloia		Eremophila scoparia		Scaevola spinescens	
Eucalyptus gracilis		Beyeria sulcata var. brevipes		Alyxia buxifolia	

ALL SPECIES
Eucalyptus ravida
Eucalyptus salmonophloia
Eucalyptus gracilis
Eremophila interstans subsp. virgata
Eremophila scoparia
Beyeria sulcata var. brevipes
Olearia muelleri
Scaevola spinescens
Alyxia buxifolia
Eucalyptus salubris
Solanum nummularium
Ptilotus exaltatus
Ptilotus obovatus
Exocarpos aphyllus
Acacia erinacea
Santalum acuminatum
Atriplex vesicaria
Sclerolaena densiflora
Sclerolaena eriacantha
Senna artemisioides subsp. filifolia
Maireana trichoptera
Rhagodia drummondii

Outside

Project Name: Mt Marion Project Area - October 2021				
Date:	12/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.42810	-31.03685	**Quadrat:**	Q27
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	A			
Vegetation condition:	Good			
WP:	27			
Photo number:			8	
Landform:			Flat/Plain	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			Extremely; very abundant/Fine gravelly; small pebbles/Rounded	
Rock outcrop (abundance/runoff):			No bedrock exposed/Slow	
Soil (profile/field texture/soil surface):			Uniform/Sandy clay loam/Loose	
% Cover leaf litter:			50	
% Cover bare ground:			60	

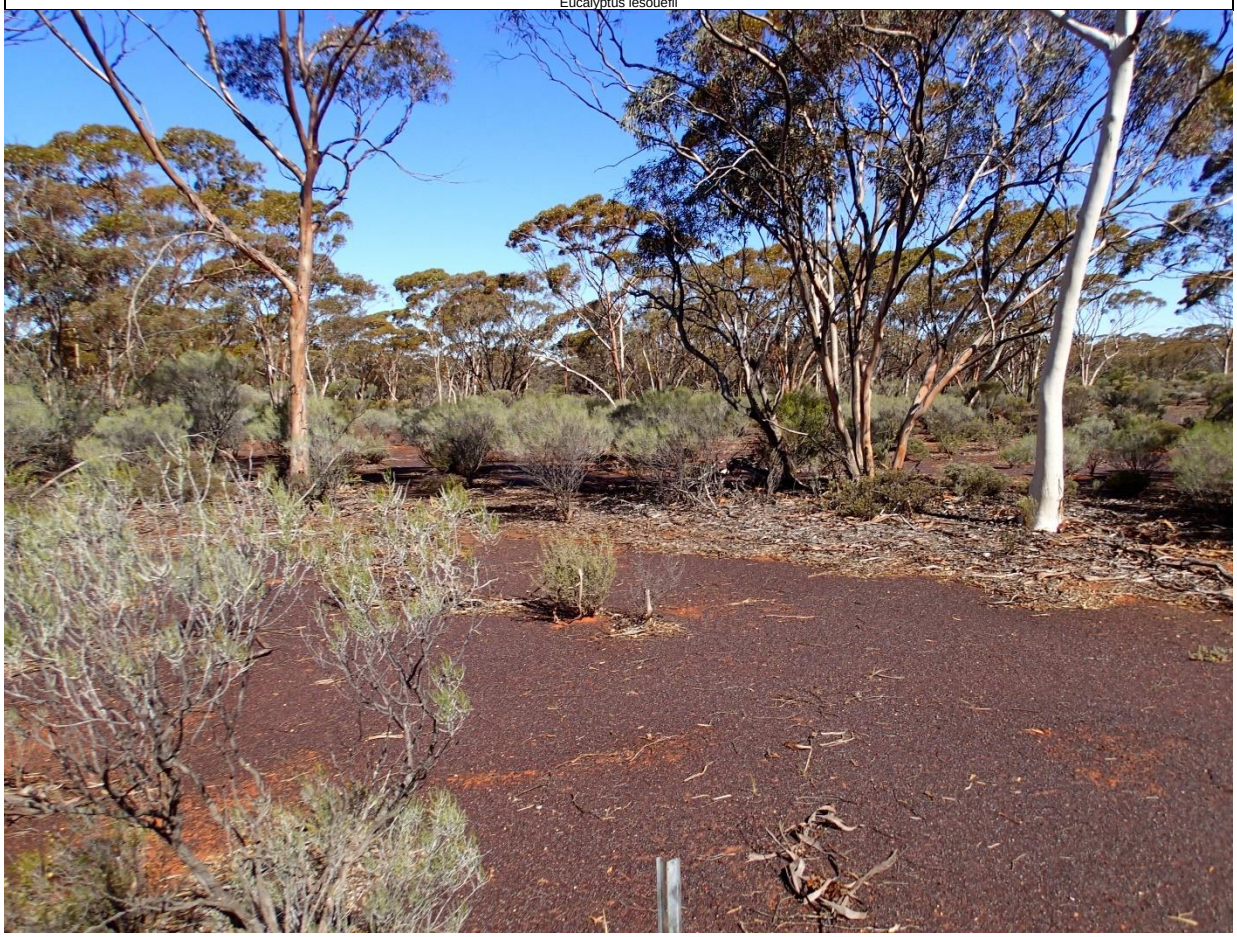
Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	T Tree	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	12-20m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	S 10-30	**Crown cover %:**	S 10-30	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus salmonophloia		Senna artemisioides subsp. filifolia		Scaevola spinescens	
Eucalyptus transcontinentalis		Exocarpos aphyllus		Eremophila caerulea subsp. caerulea	
Eucalyptus flocktoniae subsp. flocktoniae		Eremophila oldfieldii subsp. angustifolia		Olearia muelleri	

ALL SPECIES

Eucalyptus salmonophloia
Eucalyptus transcontinentalis
Eucalyptus flocktoniae subsp. flocktoniae
Senna artemisioides subsp. filifolia
Exocarpos aphyllus
Eremophila oldfieldii subsp. angustifolia
Scaevola spinescens
Eremophila caerulea subsp. caerulea
Olearia muelleri
Austrostipa elegantissima
Austrostipa scabra
Acacia hemiteles
Sclerolaena diacantha
Ptilotus obovatus
Dodonaea lobulata
Westringia rigida
Eremophila decipiens subsp. decipiens
Acacia erinacea
Eremophila oppositifolia subsp. angustifolia
Leichhardtia australis
Eremophila scoparia
Maireana trichoptera
Sclerolaena patenticuspis
Sclerolaena cuneata
Eriochiton sclerolaenoides
Maireana triptera
Maireana tomentosa
Sclerolaena eriacantha

Outside

Eucalyptus lesouefii



Project Name: Mt Marion Project Area - October 2021				
Date:	13/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.44434	-31.04481	**Quadrat:**	Q28
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	B			
Vegetation condition:	Very Good			
WP:	28			
Photo number:			19	
Landform:			Simple slope/Hillslope	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			Moderately; many/Cobbly; or cobbles/Subrounded	
Rock outcrop (abundance/runoff):			Slightly rocky/Moderately rapid	
Soil (profile/field texture/soil surface):			Uniform/Clay loam sandy/Firm	
% Cover leaf litter:			30	
% Cover bare ground:			60	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	M Tree Mallee (> 8m)	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	12-20m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	S 10-30	**Crown cover %:**	V <10	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus oleosa subsp. oleosa		Exocarpos aphyllus		Halgania andromedifolia	
Eucalyptus lesouefii		Senna artemisioides subsp. filifolia		Scaevola spinescens	
Eucalyptus torquata		Melaleuca sheathiana		Westringia rigida	

ALL SPECIES
Eucalyptus oleosa subsp. oleosa
Eucalyptus lesouefii
Eucalyptus torquata
Exocarpos aphyllus
Senna artemisioides subsp. filifolia
Melaleuca sheathiana
Halgania andromedifolia
Scaevola spinescens
Westringia rigida
Trymalium myrtillus subsp. myrtillus
Eremophila glabra subsp. glabra
Austrostipa elegantissima
Olearia muelleri
Acacia erinacea
Alyxia buxifolia
Eremophila parvifolia subsp. auricampa
Maireana trichoptera
Sclerolaena diacantha
Senna artemisioides subsp. artemisioides
Ptilotus obovatus
Eremophila oldfieldii subsp. angustifolia
Roepera eremaea

Outside

Project Name: Mt Marion Project Area - October 2021				
Date:	12/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.44486	-31.03431	**Quadrat:**	Q29
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	I			
Vegetation condition:	Very Good			
WP:	29			
Photo number:			10	
Landform:			Flat/Plain	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			No coarse fragments	
Rock outcrop (abundance/runoff):			No bedrock exposed/Very slow	
Soil (profile/field texture/soil surface):			Uniform/Clay loam/Cracking	
% Cover leaf litter:			90	
% Cover bare ground:			70	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	M Tree Mallee (> 8m)	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	6-12m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	M 30-70	**Crown cover %:**	V <10	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus ravida		Eremophila interstans subsp. virgata		Ptilotus obovatus	
				Eremophila scoparia	

ALL SPECIES
Eucalyptus ravida
Eremophila interstans subsp. virgata
Ptilotus obovatus
Eremophila scoparia
Maireana georgei
Sclerolaena diacantha
Maireana tomentosa
Atriplex codonocarpa
Maireana trichoptera
Senna artemisioides subsp. filifolia
Olearia muelleri
Lycium australe
Acacia tetragonophylla
Exocarpos aphyllus
Enneapogon caerulescens
Eriochiton sclerolaenoides
Enchylaena tomentosa var. tomentosa
Pimelea microcephala subsp. microcephala
Sclerolaena cuneata
Ptilotus exaltatus
Eremophila glabra subsp. glabra
Eremophila decipiens subsp. decipiens
Austrostipa nitida
Acacia erinacea
Austrostipa elegantissima
Acacia hemiteles
Daviesia aphylla
Gunniopsis propinqua
Outside
Eucalyptus salmonophloia
Alyxia buxifolia

Project Name: Mt Marion Project Area - October 2021				
Date:	14/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.43819	-31.06226	**Quadrat:**	Q30
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	K			
Vegetation condition:	Very Good			
WP:	30			
Photo number:			25-30	
Landform:			Simple slope/Hillslope	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			No qualifier; common/Coarse gravelly; large pebbles/Rounded	
Rock outcrop (abundance/runoff):			No bedrock exposed/Slow	
Soil (profile/field texture/soil surface):			Uniform/Sandy clay loam/Firm	
% Cover leaf litter:			85	
% Cover bare ground:			50	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	T Tree	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	12-20m	**Height:**	1-3m	**Height:**	0.25-0.5m
Crown cover %:	S 10-30	**Crown cover %:**	S 10-30	**Crown cover %:**	M 30-70
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus salmonophloia		Melaleuca sheathiana		Eremophila acutifolia (P3)	
Eucalyptus gracilis		Eremophila oldfieldii subsp. angustifolia		Acacia erinacea	
		Atriplex nummularia subsp. spathulata		Eremophila scoparia	

ALL SPECIES
Eucalyptus salmonophloia
Eucalyptus gracilis
Melaleuca sheathiana
Eremophila oldfieldii subsp. angustifolia
Atriplex nummularia subsp. spathulata
Eremophila acutifolia (P3)
Acacia erinacea
Eremophila scoparia
Cratystylis conocephala
Scaevola spinescens
Senna artemisioides subsp. filifolia
Eremophila decipiens subsp. decipiens
Alyxia buxifolia
Eremophila parvifolia subsp. auricampa
Maireana trichoptera
Sclerolaena diacantha
Outside
Exocarpos aphyllus
Eucalyptus lesouefii
Eucalyptus oleosa subsp. oleosa
Eremophila interstans subsp. virgata
Maireana pentatropis

Project Name: Mt Marion Project Area - October 2021				
Date:	14/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.43580	-31.06497	**Quadrat:**	Q31
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	K			
Vegetation condition:	Very Good			
WP:	31			
Photo number:			31-32	
Landform:			Simple slope/Hillslope	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			Moderately; many/Medium gravelly; medium pebbles/Subrounded	
Rock outcrop (abundance/runoff):			Slightly rocky/Slow	
Soil (profile/field texture/soil surface):			Uniform/Sandy clay loam/Cracking	
% Cover leaf litter:			55	
% Cover bare ground:			30	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	M Tree Mallee (> 8m)	**Growth form:**		**Growth form:**	S Shrub
Height:	6-12m	**Height:**		**Height:**	0.25-0.5m
Crown cover %:	S 10-30	**Crown cover %:**		**Crown cover %:**	M 30-70
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus ravida				Eremophila acutifolia (P3)	
Eucalyptus gracilis					

ALL SPECIES
Eucalyptus ravida
Eucalyptus gracilis
Eremophila acutifolia (P3)
Olearia muelleri
Exocarpos aphyllus
Solanum nummularium
Ptilotus exaltatus
Maireana triptera
Maireana georgei
Maireana trichoptera
Sclerolaena diacantha
Enchylaena tomentosa var. tomentosa
Roepera eremaea
Maireana tomentosa
Sclerolaena cuneata
Sclerolaena densiflora
Sclerolaena eriacantha
Austrostipa scabra
Outside
Melaleuca sheathiana
Eremophila interstans subsp. virgata
Beyeria sulcata var. brevipes
Eremophila scoparia
Eucalyptus salmonophloia
Eremophila oldfieldii subsp. angustifolia

Project Name: Mt Marion Project Area - October 2021				
Date:	12/11/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.42642	-31.02584	**Quadrat:**	Q32
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	Ac quad shrubland on undulating hills			
Vegetation condition:	Very Good			
WP:	32			
Photo number:			5	
Landform:			Crest/Hill Crest	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			Very; abundant/Cobbly; or cobbles/Subangular platy	
Rock outcrop (abundance/runoff):			No bedrock exposed/Rapid	
Soil (profile/field texture/soil surface):			Uniform/Silty clay loam/Firm	
% Cover leaf litter:			30	
% Cover bare ground:			30	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	S Shrub	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	3-6m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	M 30-70	**Crown cover %:**	S 10-30	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia quadrimarginea		Allocasuarina campestris		Ptilotus obovatus	
Eremophila oldfieldii subsp. angustifolia		Eremophila alternifolia		Scaevola spinescens	
		Dodonaea lobulata		Eremophila granitica	

ALL SPECIES
Acacia quadrimarginea
Eremophila oldfieldii subsp. angustifolia
Allocasuarina campestris
Eremophila alternifolia
Dodonaea lobulata
Ptilotus obovatus
Scaevola spinescens
Eremophila granitica
Acacia acuminata
Alyxia buxifolia
Chrysocephalum puteale
Acacia tetragonophylla
Brachychiton gregorii
Santalum spicatum
Roepera eremaea
Olearia muelleri
Leichhardtia australis
Prostanthera althoferi subsp. althoferi
Senna artemisioides subsp. filifolia
Thysanotus manglesianus
Austrostipa scabra
Pimelea microcephala subsp. microcephala
Prostanthera campbellii
Austrostipa elegantissima
Outside

Project Name: Mt Marion Project Area - October 2021				
Date:	14/10/2021		**Botanist:**	Eren Reid
Location (Longitude/Latitude):	121.38935	-31.06941	**Quadrat:**	Q33
Quadrat size:	20x20 m			
Quadrat marking method:	Fence dropper at each corner. TwoNav Aventura GPS waypoint @ NE corner (±4 m accuracy). Using GDA2020 datum			
Vegetation group:	C			
Vegetation condition:	Very Good			
WP:	33			
Photo number:			36	
Landform:			Flat/Plain	
Land surface/disturbance:			No effective disturbance	
Fire history:			>30 years	
Coarse fragments on the surface (abundance/size/shape):			No coarse fragments	
Rock outcrop (abundance/runoff):			No bedrock exposed/Very slow	
Soil (profile/field texture/soil surface):			Uniform/Sandy loam/Hard setting	
% Cover leaf litter:			70	
% Cover bare ground:			25	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	M Tree Mallee (> 8m)	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	6-12m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	V <10	**Crown cover %:**	M 30-70	**Crown cover %:**	M 30-70
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus griffithsii		Acacia acuminata		Eremophila granitica	
		Melaleuca hamata		Prostanthera grylloana	
				Prostanthera althoferi subsp. althoferi	

ALL SPECIES
Eucalyptus griffithsii
Acacia acuminata
Melaleuca hamata
Eremophila granitica
Prostanthera grylloana
Prostanthera althoferi subsp. althoferi
Waitzia acuminata var. acuminata
Austrostipa scabra
Olearia pimeleoides
Westringia rigida
Exocarpos aphyllus
Austrostipa elegantissima
Thysanotus manglesianus
Thryptomene australis subsp. brachyandra
Dissocarpus paradoxus
Ptilotus obovatus
Acacia eremophila var. eremophila
Acacia heteroneura var. jutsonii
Outside
Senna artemisioides subsp. filifolia
Acacia multispicata
Dianella revoluta var. divaricata
Leptospermum erubescens