Native Vegetation Solutions

DETAILED FLORA AND VEGETATION SURVEY OF THE HERMES SOUTH PROJECT AREA

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EXECUTIVE SUMMARY

Billabong Gold Pty Ltd (BG) is a subsidiary company of Superior Gold Incorporated (TSX-V: SGI) and is the operator of its Hermes South Project located to the southwest of the Plutonic Gold mine in Kumarina, Western Australia. BG provided Native Vegetation Solutions (NVS) with a survey area which encompasses the main mining areas as well as other infrastructure related to mining the Hermes South mineral resource. The location of this survey area is approximately 783 km Northwest of Kalgoorlie-Boulder, and approximately 171 km Northeast of Meekatharra in Western Australia (Figure 1).

The survey area, for the purposes of this report, encompasses an area totalling approximately 668 ha. The area encompasses Exploration Licenses E 52/1723, E 52/1668, E 52/3408, E 52/1852, E 52/1730, E 52/2361, Mining licences M 52/1049 and M 52/0737, and Miscellaneous Licences L 52/0208, L 52/0232, L 52/0231, L 52/0118 and L 52/0164. At this stage, the final footprint of mining related disturbances is yet to be finalised, however will be encompassed entirely within the survey area, and is expected to be approximately 278 hectares.

The project is located in the Augustus IBRA subregion. The vegetation of the Augustus botanical subregion consists of Mulga woodland with Triodia growing over stoney loams and rises, while mulga parklands are found on the plains (CALM, 2002).

The EPBC Protected Matters Search Tool revealed that the survey area may contain habitat for the invasive weed species *Cenchrus ciliaris* (Buffel Grass) (DAWE, 2021). The EPBC Protected Matters report indicated no TECs within the search area, however, the Hermes project is mostly located within the Doolgunna ex-pastoral lease, which is now unallocated crown land currently under management by the Department of Biodiversity, Conservation and Attractions (DBCA).

The DBCA database searches revealed a potential for one Threatened and 23 Priority Flora species to occur within a 50km radius of the survey area (DBCA, 2021a). The searches revealed three Priority Flora records within the survey area, *Eremophila prolata* (P1), *Maireana murrayana* (P3) and *Maireana prosthecochaeta* (P3). No known locations of Threatened Flora occur within the survey area.

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

The survey area does not lie within or contain any ESA's or Conservation Reserves (DWER, 2021).

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

The survey area lies south of the 26th parallel, however receives average annual rainfall of approximately 232.2 mm (BOM, 2021), below the 400 mm threshold mark. There is no record of *Phytophthora cinnamomi* establishing in natural ecosystems in regions receiving <400 mm 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.

Nine vegetation groups were identified during this survey, largely following topographical features and dominant species. Mapping of the 9 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 G.

Ninety-seven species were recorded within the survey area with 86 species recorded within quadrats. Eighteen families and 33 genera were found. These are listed in Appendix F, per Quadrat as well as per vegetation group. Of the native species, Fabaceae had the highest representation, with 28 species from 2 genera. Chenopodiaceae was the next best represented family with 16 species, followed by Scrophulariaceae with 15 species identified.

Of the 97 taxa recorded one of these was an introduced weed species. *Bidens bipinnata* (Bipinnate Beggartick) was captured in Quadrat Q14.

The most common and widespread species were *Acacia aneura* found in 20 quadrats, followed by *Ptilotus obovatus* found in 15 quadrats. *Acacia tetragonophylla* and *Aristida contorta* were both recorded within 13 quadrats.

There were 26 taxa recorded from within a single site, Q11. Of these, none were weed species.

No Threatened species were recorded during the survey.

Five priority species were recorded during the survey. *Eremophila congesta* (P1) with two records within the survey area, *Maireana murrayana* (P3) with one record within the Survey Area, *Sida picklesiana* (P3) observed in Q9 and at thirteen other locations, *Maireana prosthecochaeta* (P3) observed in Q9 and at eight other locations and *Eremophila prolata* (P1) found in quadrats Q1, Q10, Q11, Q12, Q13, Q15, Q17, Q18, Q19 and Q20 and at 209 other locations.

The proposed disturbance footprint is likely to affect less than 10% of the regional population of these species.

Two species of interest were detected in the survey. These species did not fit any currently described species and will require further investigation. The first is a potentially new *Acacia* species, found in quadrats Q15 and Q17 (a dominant species), and also detected at two other locations within the survey area. The second is a potentially new *Micromyrtus* species, found in the proposed haul road route. Better flowering and fruiting material is required in order to positively determine the identification of these taxa.

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

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 Augustus 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 the first stage of the detailed flora and vegetation survey, incorporating the Spring season of 2021.

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1 INTRODUCTION

1.1 BACKGROUND

Billabong Gold Pty Ltd (BG) is a subsidiary company to Superior Gold Incorporated (TSX-V: SGI) and is the operator of its Hermes South Project located to the southwest of the Plutonic Gold mine in Kumarina, Western Australia. BG provided Native Vegetation Solutions (NVS) with a survey area which encompasses the main mining areas as well as other infrastructure related to mining the Hermes South mineral resource. The location of this survey area is approximately 783 km Northwest of Kalgoorlie-Boulder, and approximately 171 km Northeast of Meekatharra in 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, encompasses an area totalling approximately 668 ha. The area encompasses Exploration Licenses E 52/1723, E 52/1668, E 52/3408, E 52/1852, E 52/1730, E 52/2361, Mining Licences M 52/1049 and M 52/0737, and Miscellaneous Licences L 52/0208, L 52/0232, L 52/0231, L 52/0118 and L 52/0164.

At this stage, the final footprint of mining related disturbances is yet to be finalised, however will be encompassed entirely within the survey area, and is expected to be approximately 278 hectares.

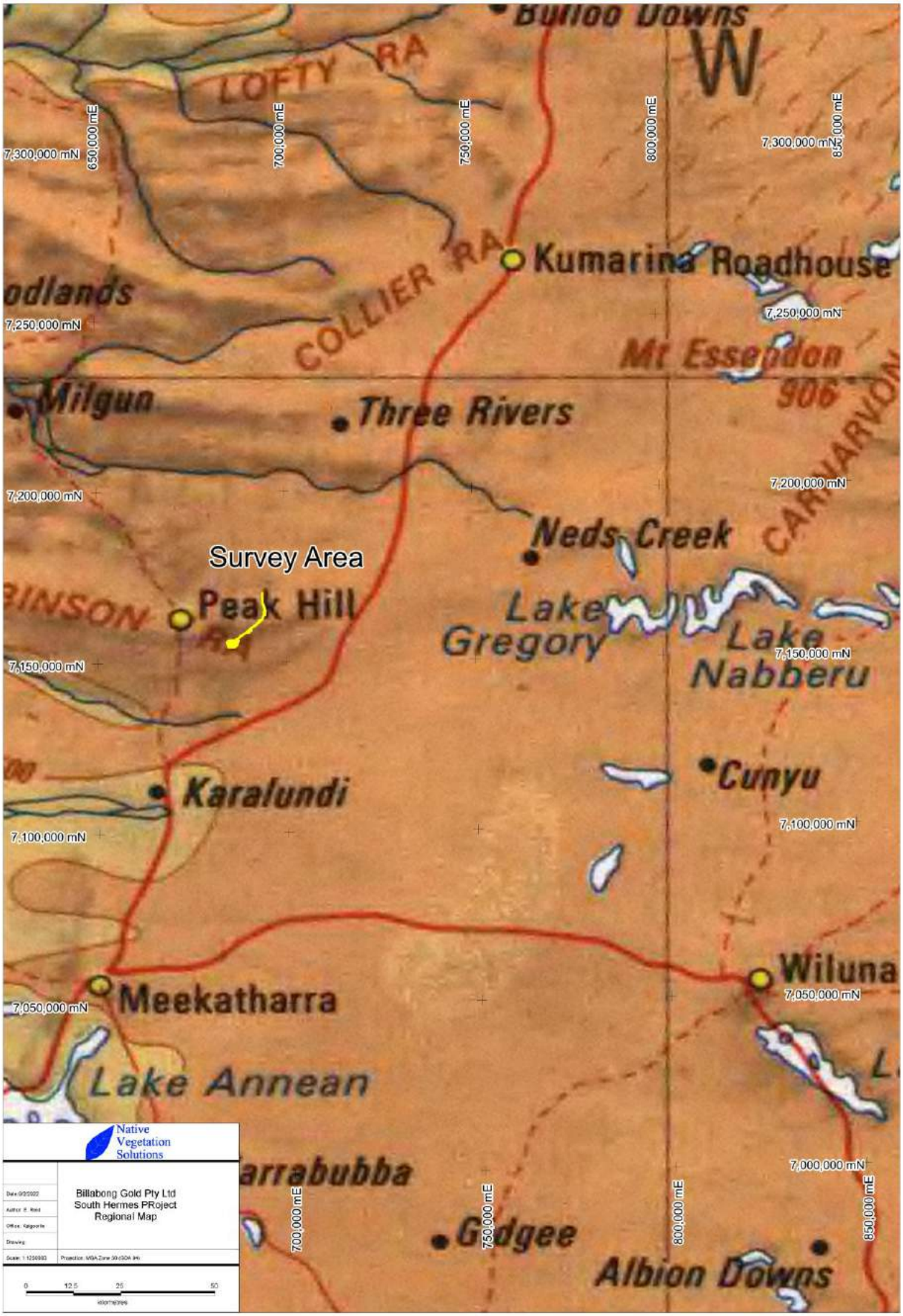

Figure 1: Regional Location of the South Hermes Project Area

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 (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 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:

- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- Western Australian *Wildlife Conservation Act 1950* (WC Act) (1950)
- Western Australian *Environmental Protection Act 1986* (EP Act) (1986)
- Western Australian *Biodiversity Conservation Act 2016* (BC Act), partly enacted (2016)
- Western Australian *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 are also protected under the Act and are categorised using the same criteria as threatened species.

1.3.2 Western Australian Environmental Protection Act 1986

The Western Australian *Environmental Protection 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 Commonwealth 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 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 outlined in Section 6. 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 6.

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

Typically, the climate of the general survey area is characterised as a desert climate with summer and winter rainfall. The area receives approximately 200-250 mm of rainfall per year (Beard, 1990; CALM, 2002). The nearest official meteorological weather station with the most complete and up to date information is Meekatharra Airport Meteorological Station (station number 007045), which is located approximately 109.9km southwest of the survey area.

2.1.1 Temperature

Mean annual minimum temperature at Meekatharra Airport is 16.0°C and mean annual maximum temperature is 29.1°C (BOM, 2022). The coldest temperatures occur in July (mean minimum temperature 7.5°C), the hottest is January (mean maximum temperature 38.3°C) and diurnal temperature variations are relatively consistent throughout the year (Figure 2).

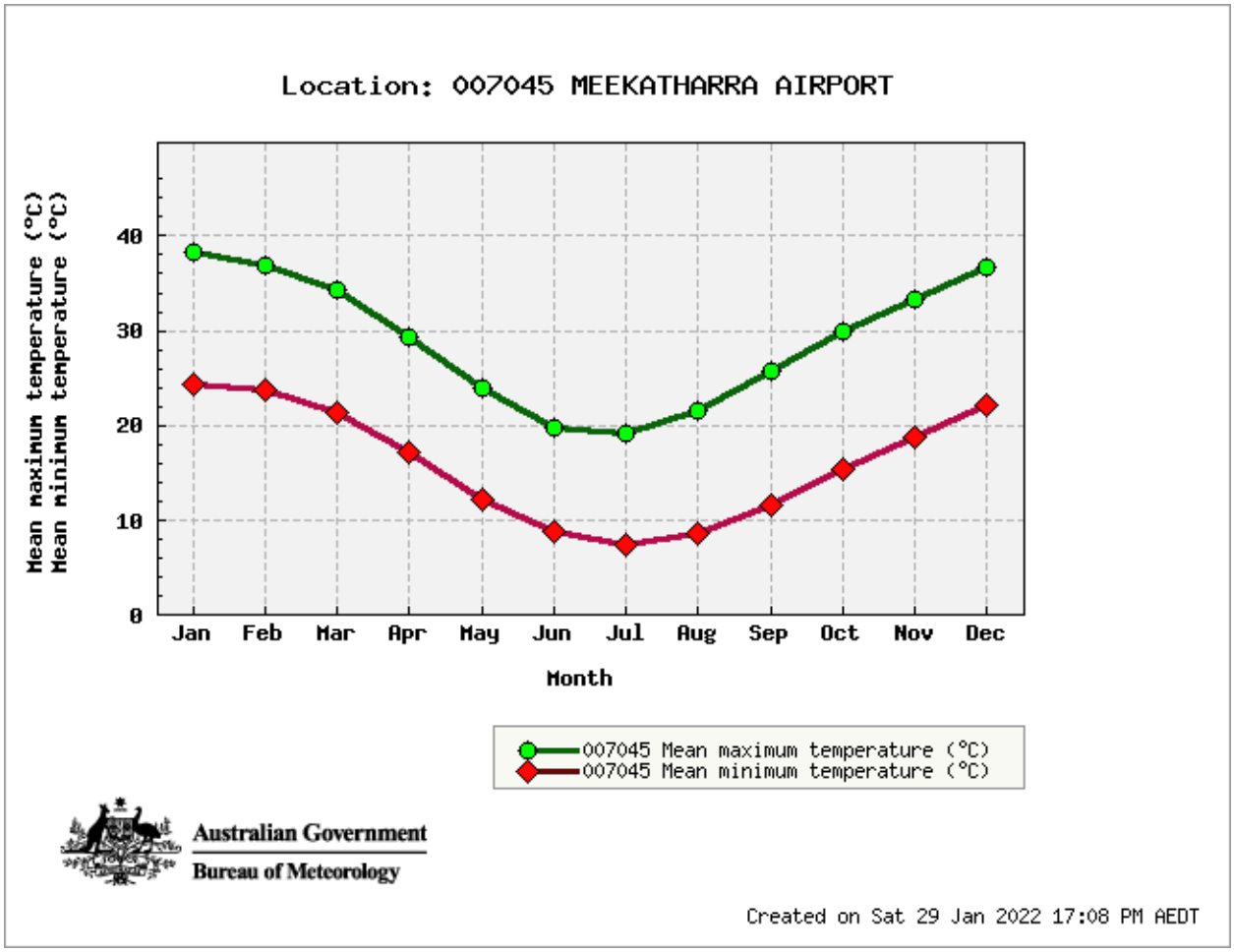

Figure 2: Mean temperature ranges for Meekatharra Airport Meteorological Station (BOM, 2022)

2.1.2 Rainfall

The annual average rainfall at Meekatharra Airport is 233.7 mm over an average of 28 rain days (BOM, 2022). Average rainfall varies across the months, with most rainfall in February, and the least in September. Rainfall for 2021 was above average for the months of March and May and November and below average for all other months prior to the survey.

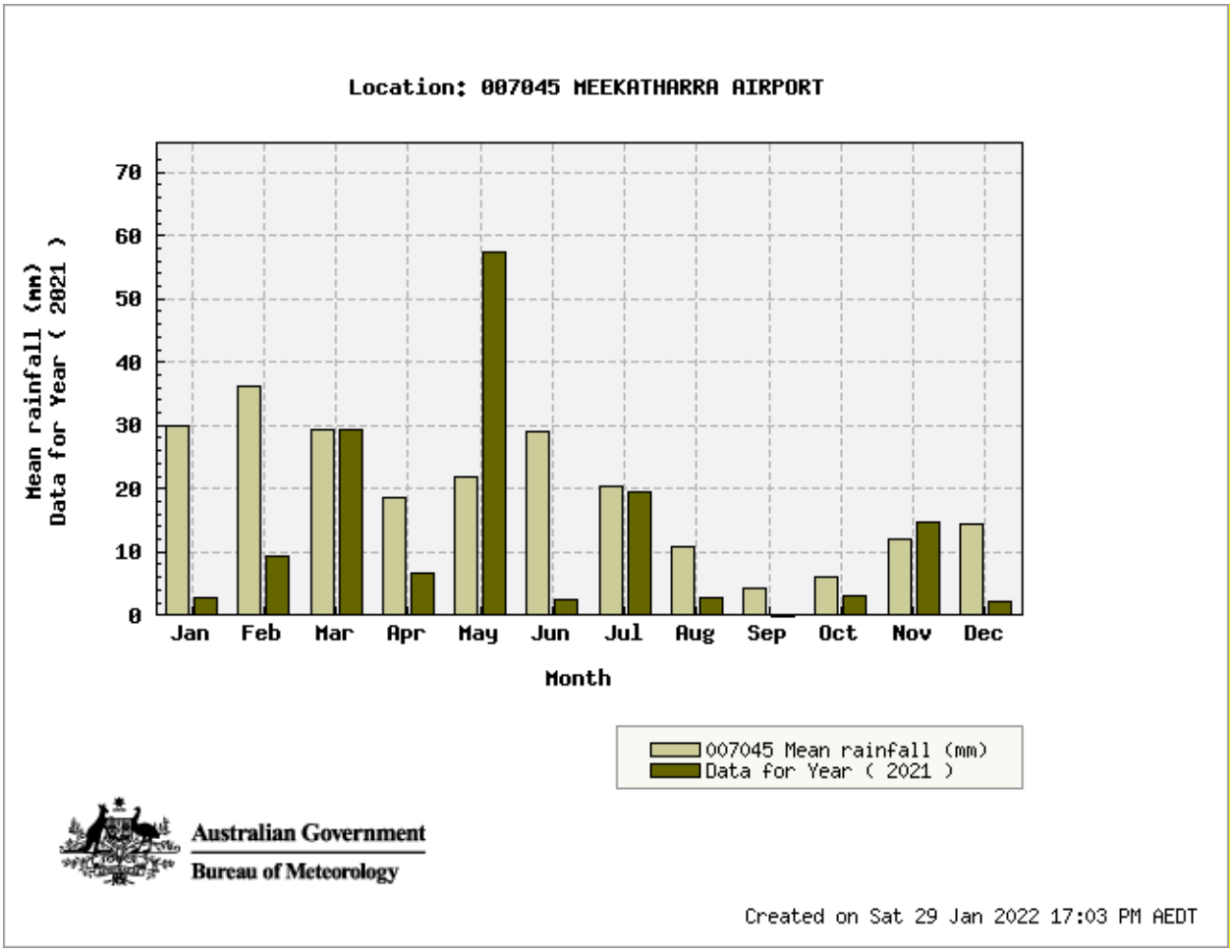

Figure 3: Rainfall data for the Meekatharra Airport Meteorological Station (BOM, 2022)

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 Augustus IBRA subregion (GAS3) which totals over 10 million hectares (CALM, 2002). The Augustus subregion is characterised by rugged low Proterozoic sedimentary and granite ranges divided by broad flat valleys. (CALM 2002).

2.3 LANDFORMS AND SOILS

The Augustus subregion comprises the Narryera Complex and Bryah Basin of the Proterozoic Capricorn Orogen (on northern margin of the Yilgarn Craton), as well as the Archaean Marymia and Sylvania Inliers. Although the Gascoyne River System provides the main drainage of this subregion, it is also the headwaters of the Ashburton and Fortescue Rivers. There are extensive areas of alluvial valley-fill deposits. Soils consist of stony loams on rises and shallow earthy loams over hardpan on the plains (CALM 2002).

2.4 BOTANICAL SUBREGION AND EXISTING VEGETATION

The vegetation of the Augustus botanical subregion consists of Mulga woodland with *Triodia* growing over stoney loams and rises, while mulga parklands are found on the plains (CALM, 2002).

3 METHODS

3.1 PERSONNEL AND REPORTING

The following personnel were involved in part 1 of the detailed flora and vegetation survey (October 2021):

- Mr Eren Reid (*BSc*- Biological Science), Principal Botanist, Native Vegetation Solutions (NVS), undertook field work of part 1 of the detailed survey in October 2021 and January 2022, 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), NVS, 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.

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 *Environment Protection and Biodiversity Conservation Act 1999 (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 1km buffer (DAWE, 2021a).
(http://www.environment.gov.au/arcgis-framework/apps/pmst/pmst-coordinate.jsf)

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 50 km radial area of the survey area shapefile (Reference: 18-1221FL).

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 (Reference: 04-1221EC).

3.2.3 Environmentally Sensitive Areas (ESAs) and Conservation Reserves

The Department of Water and Environmental Regulation (DWER) Clearing Permit System Map Viewer was used to determine the location of any ESAs and Conservation Reserves (https://cps.der.wa.gov.au/main.html).

3.2.4 Vegetation Type, Extent and Status

Vegetation extent and status data was sourced from the Department of Agriculture and Food (DAFWA) report "Land-Use and Vegetation in Western Australia- National Land and Water Resources Audit 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.

3.2.5 Wetlands

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

3.2.6 Dieback

Dieback is only considered a potential issue for the project if both the mean annual rainfall of the area is >400mm, and if the project area resides south of the 26th parallel.

3.3 SITE INVESTIGATION

The first stage of the field survey was conducted by Mr. Eren Reid, Botanist of Native Vegetation Solutions (NVS), on the 26th and 27th October 2021 and a follow up visit on the 25th and 26th of January 2022, to ensure a complete representation of the Flora was included. NVS initially established 16 quadrats in October, and on the second visit added an additional 6 quadrats, making a total of 22 quadrats within the survey area. NVS recorded ninety-seven vascular plant species within 9 vegetation groups.

A total of 26 hours was spent on site traversing the survey area in October 2021, and 16.5 hours in January 2022. While a vehicle was used to reach the site, all traverses were made via Yamaha Viking or on foot.

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 adequate.

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.

In the field, these sites were visited and 20 x 20m quadrats established in appropriate locations, taking into account representativeness of the site to 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 one corner was captured on a TwoNav Aventura

GPS at ±4m accuracy, using Universal Transverse Mercator location on GDA94 datum. Digital photographs were taken of each quadrat site.

Data collected at each of the 22 quadrats included:

- Species Present;
- Topography;
- Rock Type;
- Soil Colour and Type;
- Aspect;
- % Bare Ground and Litter;
- Disturbance Level; and
- 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).

Opportunistic sampling of plant taxa and vegetation group mapping was also utilised in the survey area between quadrat sampling points, via wandering traverses. Relevé sites were also utilised as opportunistic sample sites to collect flora specimens and assist in mapping vegetation groups.

All sample sites and GPS tracks are included in Appendix C.

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).

Species information was transferred into Microsoft Excel® worksheets in preparation for PATN analysis (Belbin, 1994), via Bray and Curtis Flexible UPGMA, as well as input into a computer program which generates a species accumulation curve (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 9 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. 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 and January 2022. Local rainfall was above average for the months of March, May and November in 2021, and below average for all other months prior to the survey. Timing was good as the survey coincided with flowering of many flora species, however the timing of the January visit was not ideal, however was mainly utilised for assessing population sizes of Priority Flora encountered in October.
Disturbance in survey area	No	Disturbance from historic mining and exploration activities was present in the survey area. These areas were avoided when establishing quadrat and Relevé locations, so as to not influence the floristic data analysis. Areas or disturbance were mapped as either degraded or completely degraded as deemed appropriate.
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 Augustus 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 *Cenchrus ciliaris* (Buffel Grass) (DAWE, 2021).

Cenchrus ciliaris is native to Africa and India, was widely planted in Western Australian pastoral regions as a pasture grass, and has become a widespread weed of roadsides, creeklines, river edges and most vegetation types from Geraldton to the Pilbara, Kimberley and adjacent desert (Hussey *etc*. 2007). In the Murchison region it often colonises roadside table drains, excluding native everlastings. It seriously alters the fire characteristics of invaded plant cover by generating highly flammable fuel that is prone to more frequent fires.

The EPBC Protected Matters report indicated no TECs within the search area, however, the South Hermes project is mostly located within the Doolgunna ex-pastoral lease, which is now unallocated crown land currently under management by the Department of Biodiversity, Conservation and Attractions (DBCA).

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

4.1.2 Threatened Flora and Communities

The DBCA databases search revealed a potential for one Threatened and 23 Priority Flora species to occur within a 50km radius of the survey area (DBCA, 2021a). The search revealed three known Priority Flora records within the survey area; *Eremophila prolata* (P1), *Maireana murrayana* (P3) and *Maireana prosthecochaeta* (P3). No known locations of Threatened Flora occur within the survey area.

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

The PEC/TEC search (DBCA, 2021) revealed no PEC/TECs within the survey area. However, the search identified 13 PECs within a 50 km radius, the closest being the Frederick Land System, approximately 2.5 km north of the survey area.

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).

4.1.4 Vegetation Type, Extent and Status

Two 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).

Information relating to known Beard (1990) vegetation units within the survey area has been summarised in Tables 2 and 3 below. This information has been compiled through both desktop assessments and the site visit.

Table 2: Summary of information regarding Pre-European and current vegetation extent of vegetation association 18 within the survey area

Factor	**Value**				
Beard Vegetation Association*	18				
Vegetation Association Description*	Low woodland; mulga (*Acacia aneura*)				
Pre-European Extent (ha)	**Scale**				
	By Association *(WA)*	***By Association*** *(WA)*	***By IBRA Region*** *(Gascoyne)*	***By IBRA Sub-region*** *(Augustus)*	***By LGA*** *(Shire of Meekatharra)*
	22,029,557*	19,892,306.46**	3,273,579.72**	2,425,858.38**	3,117,900.46**
% Pre-European Extent Remaining	*100.00%**	*99.75%***	*99.93%***	*99.94%***	*99.79%***
Surrounding Land Use***	Mining, Exploration, Pastoral Lease				
Weed prevalence***	Low				

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

Table 3: Summary of information regarding Pre-European and current vegetation extent of vegetation association 39 within the survey area

Factor	**Value**				
Beard Vegetation Association*	39				
Vegetation Association Description*	Shrublands; mulga scrub				
Pre-European Extent (ha)	**Scale**				
	By Association *(WA)*	***By Association*** *(WA)*	***By IBRA Region*** *(Gascoyne)*	***By IBRA Sub-region*** *(Augustus)*	***By LGA*** *(Shire of Meekatharra)*
	4,856,768*	6,613,567.48**	2,338,128.28**	1,404,073.25**	1,367,518.67**
% Pre-European Extent Remaining	*100.00%**	*99.83%***	*99.98%***	*99.96%***	*99.87%***
Surrounding Land Use***	Mining, Exploration, Pastoral Lease				
Weed prevalence***	Low				

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

4.1.5 Wetlands

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

4.1.6 Dieback

The survey area lies south of the 26th parallel, however receives average annual rainfall of approximately 233.7 mm (BOM, 2022), below the 400mm threshold mark. There is no record of *Phytophthora cinnamomi* 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 pose 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 22 sites/quadrats are presented in Appendix G. For each site 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

Nine vegetation groups were identified during this survey, largely following topographical features and dominant species. Mapping of the 9 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 G.

A. Mulga shrubland over Quartz and Ironstone rises

Quadrats: 1, 11, 12, and 18

B. Mulga creekline vegetation

Quadrats: 2, 4, 10, 14 and 16

C. *Acacia cuspidifolia* over *Maireana pyramidata* shrubland

Quadrats: 3 and 20

D. *Acacia pruinocarpa* over *Acacia aneura* shrubland

Quadrat: 5, 8 and 22

E. Mulga over *Eremophila forrestii shrubland*

Quadrat: 6

F. *Acacia citrinoviridis* over *Thryptomene decussata* and *Dodonaea pachyneura* shrubland

Quadrat: 7

G. Mulga over *Senna* shrublands

Quadrat: 9

H. Open mulga shrubland over *Eremophila pterocarpa* and occasional *Eremophila glutinosa*

Quadrats: 13, 19 and 21

I. Mulga over *Acacia* sp. (Possible new species) over *Senna pleurocarpa* and *Eremophila prolata* (P1) shrubland

Quadrats: 15 and 17

J. Existing Disturbance

Table 4: Vegetation Group Extent within Survey Area

Vegetation Group	Vegetation Group Code	Quadrats	Family	Genus	Species	Area (ha)	Percentage of Survey Area (%)
Mulga shrubland over Quarts and Ironstone rises	a	Q1, Q11, Q12, Q18	16	22	54	372.71	55.77
Mulga creekline vegetation	b	Q2, Q4, Q10, Q14, Q16	13	24	49	78.87	11.80
Acacia cuspidifolia over *Maireana pyramidata* shrubland	c	Q3, Q20	5	9	11	13.22	1.98
Acacia pruinocarpa over *Acacia aneura* shrubland	d	Q5, Q8, Q22	9	14	27	46.18	6.91
Mulga over *Eremophila forrestii* shrubland	e	Q6	6	7	11	17.35	2.60
Acacia citrinoviridis over *Thryptomene decussata* and *Dodonaea pachyneura* shrubland	f	Q7	6	7	9	0.92	0.14
Mulga over Senna shrublands	g	Q9	10	12	16	1.07	0.16
Open mulga shrubland over *Eremophila pterocarpa* and occasional *Eremophila glutinosa*	h	Q13, Q19, Q21	5	8	18	102.97	15.41
Mulga over *Acacia* sp. (possible new species) over *Senna pleurocarpa* and *Eremophila prolata* (P1) shrubland	i	Q15, Q17	5	7	17	7.84	1.17
Existing Disturbance	j	NA	NA	NA	NA	27.19	4.07
		Total	**18***	**33***	**97***	**668.32**	**100.00**

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

4.2.2 PATN Analysis of Quadrat Data

PATN Analysis was completed on both the dominant species and all species recorded within each quadrat. The results are supplied below in Figure 4 and Figure 5.

The PATN analysis dendrogram of the dominant species in Figure 4, displays each quadrat with like symbols representing 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).

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 well represented via dominant species with Q1 and Q12 grouped together in the PATN Analysis. Q10 was an outlier and compared more similarly to Q1. When all species were analysed via PATN, only Q11 and Q12 were significantly grouped together.

Vegetation Group B was well represented via dominant species with Q2, Q4, Q14 and Q16 grouped together in the dominant species PATN analysis. When all species were analysed via PATN, all five quadrats were significantly grouped together.

Vegetation Group C was represented by the grouping of Q3 and Q20 via the dominant species and all species PATN analysis.

Vegetation Group D was well represented with the grouping of Q5 and Q22 via all species and dominant species PATN analysis, with Q8 an outlier more closely grouped with Q11.

Vegetation Group E was represented with the separation of Q6 from all other quadrats considering all species in the PATN analysis. Q6 was grouped with Q9 via the dominant species PATN analysis.

Vegetation Group F was well represented via both all species and dominant species PATN analysis, with it separated from all other quadrats in both instances.

Vegetation Group G was not well represented via either analysis with it being grouped withQ6 via dominant species PATN analysis and grouped with Q1 and Q15 via all species PATN analysis.

Vegetation Group H was well represented via both PATN analysis with the grouping of Q13, Q19 and Q21.

Vegetation Group I was well represented by dominant species PATN analysis with the grouping of Q15 and Q17, however Q18 was also grouped with these two and considered an outlier.

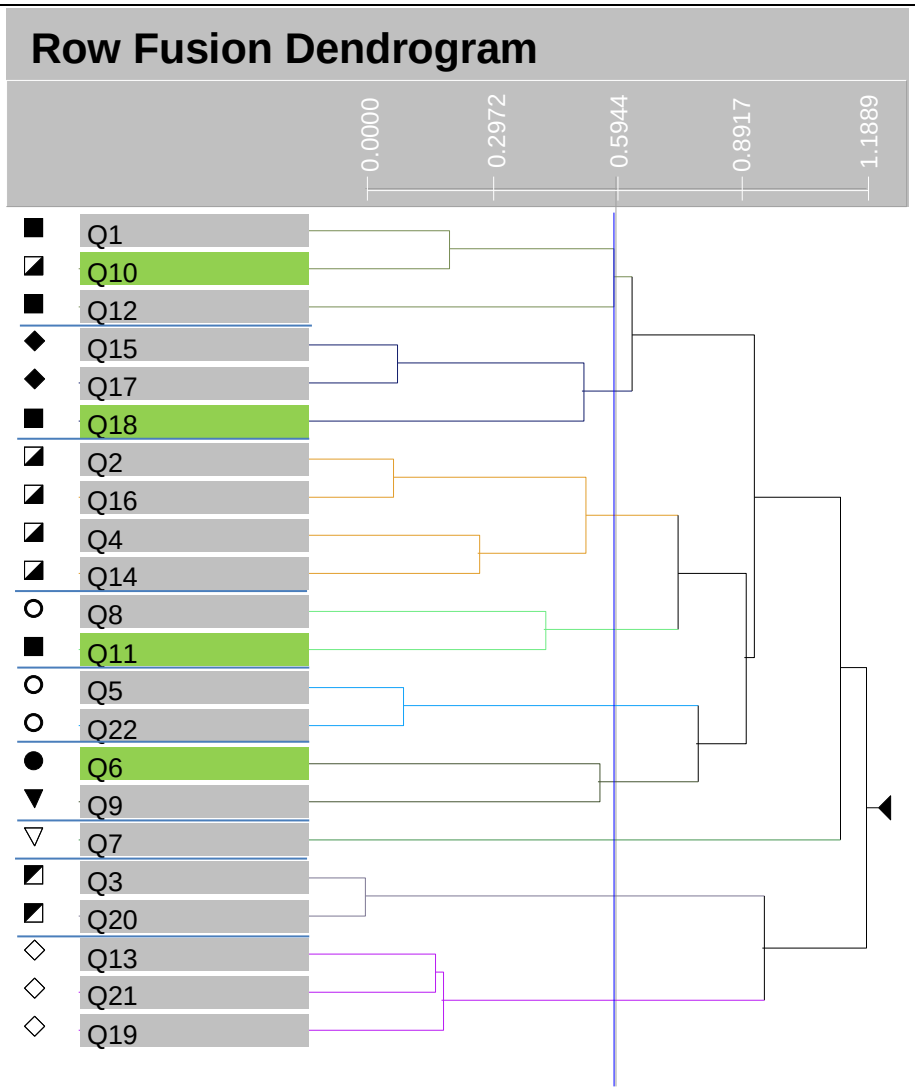

Figure 4: PATN Analysis of Dominant Species into 9 groups

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). Most of the quadrats depicted as outliers are representative of similar vegetation groups, which have been segregated by NVS based on differing plant density, topographical features or lithology. The PATN analysis (off all species present) demonstrates that some of these quadrats are very similar in species composition, and not necessarily distinct, when predetermined by topographical/lithological variations.

When comparing outliers of the PATN analysis of all species versus dominant species, there are greater outliers in the later. Therefore, the vegetation groups mapped by NVS demonstrate a reliance on all species within the quadrat as opposed to dominants, suggesting some variation of dominant species between quadrats of similar vegetation groups.

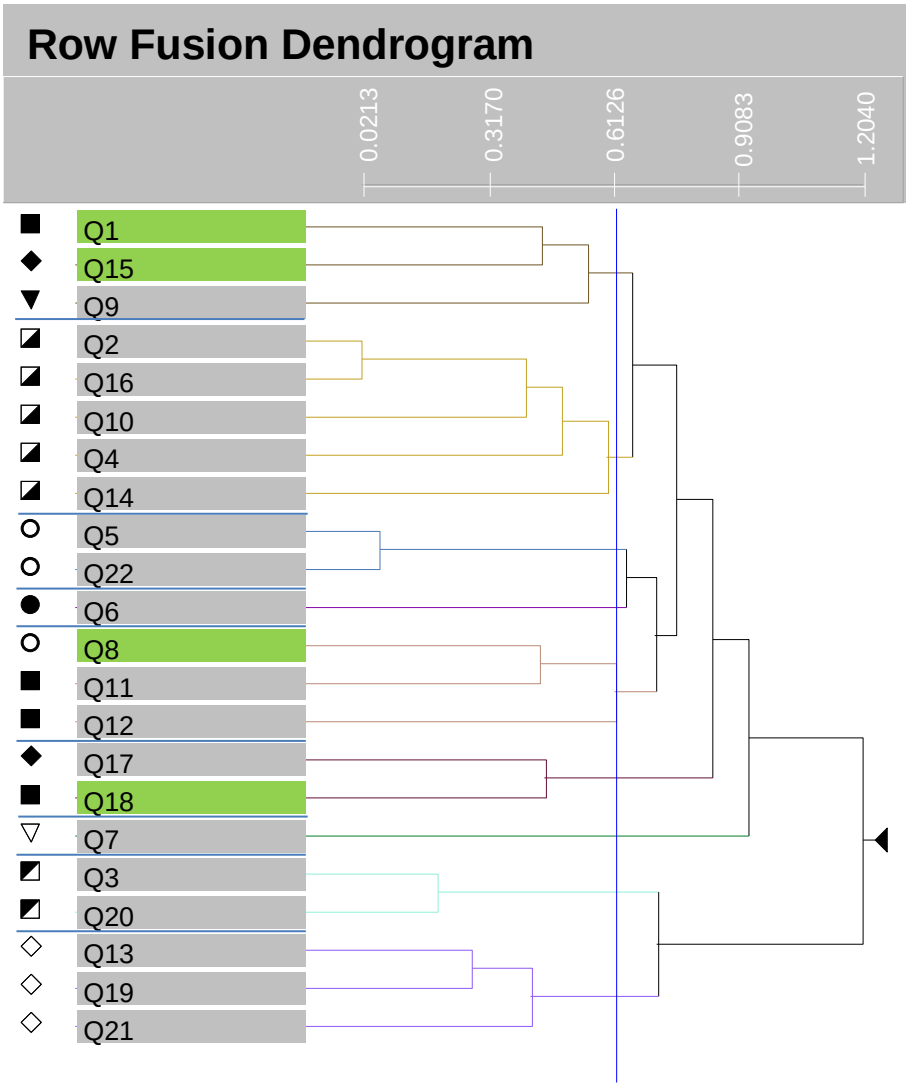

Figure 5: PATN Analysis of All Species into 9 groups

4.2.3 Vegetation Condition

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

According to Keighery (1994), most of the sites/quadrats inspected were in Good to Very Good condition (Appendix G). There were existing vehicle tracks in some areas, due to mine 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, with no other non-native species recorded elsewhere within the survey area.

4.2.4 Flora of the Survey Area

4.2.4.1 General

Ninety-seven species were recorded within the survey area with 86 species recorded within quadrats. Eighteen families and 33 genera were found. These are listed in Appendix F, per Quadrat as well as per vegetation group. Of the native species, Fabaceae had the highest representation, with 28 species from 2 genera. Chenopodiaceae was the next best represented family with 16 species, followed by Scrophulariaceae with 13 species identified.

Of the 97 taxa recorded one of these was an introduced weed species. *Bidens bipinnata* (Bipinnate Beggartick) was captured in Quadrat Q14.

Two species of interest were detected in the survey. These species did not fit any currently described species and will require further investigation. The first is a potentially new *Acacia* species, found in quadrats Q15 and Q17 (a dominant species), and also detected at two other locations within the survey area. The second is a potentially new *Micromyrtus* species, found in the proposed haul road route. Better flowering and fruiting material is required in order to positively determine the identification of these taxa.

The most common and widespread species were *Acacia aneura* found in 20 quadrats, followed by *Ptilotus obovatus* found in 15 quadrats. *Acacia tetragonophylla* and *Aristida contorta* were both recorded within 13 quadrats.

There were 26 taxa recorded from within a single site, Q11. Of these, none were weed species.

4.2.4.2 Species Accumulation Curve

A Species Accumulation Curve was generated using the computer programme **Species Diversity and Richness Version 4.1.2** (Seaby & Henderson, 2006). This curve was then fitted to a logarithmic curve in **Excel®**, which is plotted in Figure 6 below. According to the Species Accumulation Curve below, the R^2 value (0.993) 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). The logarithmic trend line and R^2 values were generated in **Excel®**. From this fitted logarithmic curve formula, the asymptote was calculated where the gain of new species was less than 1% for every new quadrat established. Based on this reasoning, the asymptote was reached at 28 quadrats, at which the extrapolated total accumulated number of species is 90. Therefore the 86 species collected within the 22 quadrats represents 94.53% of the projected asymptote.

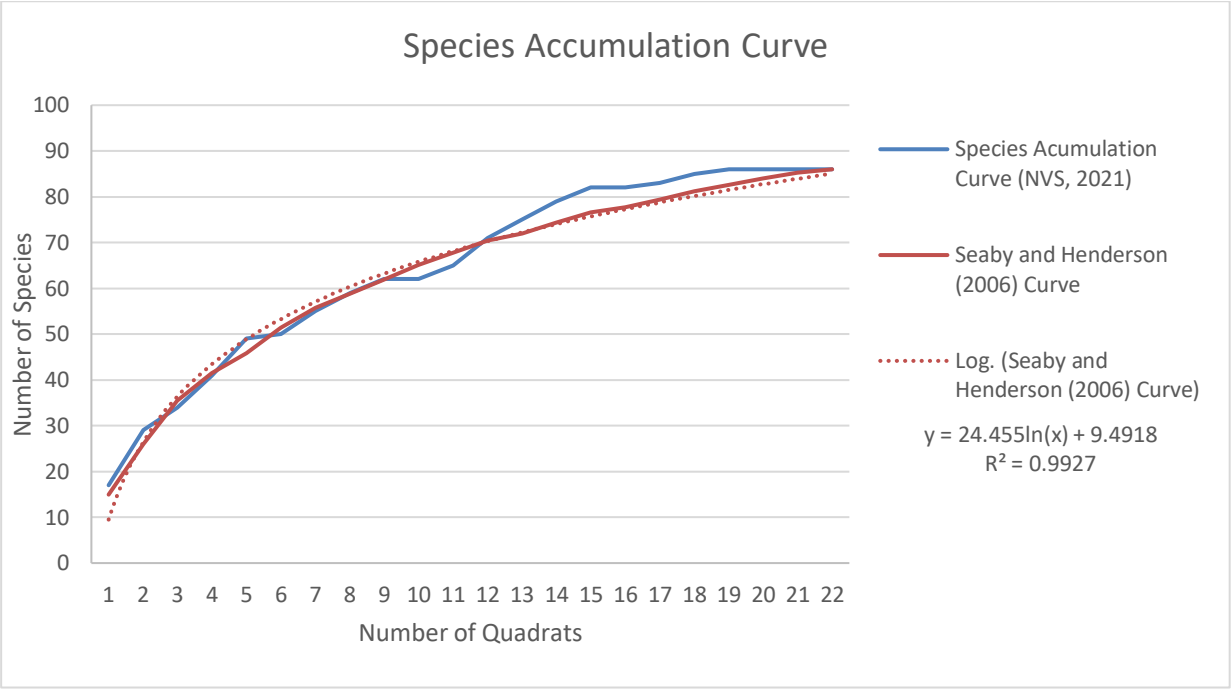

Figure 6: Species Accumulation Curve for the 22 sampled quadrats

4.2.4.3 Conservation significant species

No Threatened species were recorded during the survey.

Results from the DBCA Threatened and Priority Flora Database Search showed one record each for *Eremophila prolata* (P1), *Maireana murrayana* (P3) and *Maireana prosthecochaeta* (P3) occurring within the survey area. The records for *Eremophila prolata* (P1) and *Maireana prosthecochaeta* (P3) were captured in the field survey, while *Maireana murrayana* (P3) was captured at a different location within the survey area. The known location of *Maireana murrayana* (P3) was searched, however could not be confirmed at this location. There were no known records of *Eremophila congesta* (P1) or *Sida picklesiana* (P3) detected in the DBCA search (DBCA, 2021a). The locations of *Eremophila congesta* (P1) and *Sida picklesiana* (P3) are considered significant range extensions according to available databases, as these population are 160 kilometres northwest and 60km west respectively of known locations to the DBCA. Results of the threatened flora database search are included in Appendix D

The proposed disturbance footprint is likely to affect less than 10% of the regional population of these species.

The general locations of Priority species recorded during the survey are listed below:

- *Eremophila congesta* (P1) found within the survey area at two locations, and considered range extensions for this species population, was not recorded inside the proposed disturbance footprint
- *Eremophila prolata* (P1) found in quadrats Q1, Q10, Q11, Q12, Q13, Q15, Q17, Q18, Q19 and Q20 and 209 additional locations within the survey area
- *Maireana murrayana* (P3) found within the survey area
- *Maireana prosthecochaeta* (P3) found in Q9 and 8 additional locations within the survey area
- *Sida picklesiana* (P3) found in Q9 and 13 additional locations within the survey area, and considered range extensions for this species population
- *Acacia* sp. (possible new species) found in Q15 and Q17 (a dominant species), and also detected at two other locations within the survey area, better flowering and fruiting material is required in order to positively determine the identification of these taxa

- *Micromyrtus* species, found in the proposed haul road route, better flowering and fruiting material is required in order to positively determine the identification of these taxa

A summary of Priority Flora recorded by NVS is included below in Table 5. Population numbers and GPS locations of priority Flora records can be found in Appendix E.

Table 5: Priority flora recorded during the survey

Taxon	Local population total observed within proposed footprint (no. of plants)	Local population total observed within and outside of proposed footprint (no. of plants)	Percentage of local population within footprint (%)	Regional Numbers	Percentage of Regional population within footprint (%)	Considered significant impact
Eremophila congesta (P1)	0	15	0%	N/A		No
Eremophila prolata (P1)	1512	8543	17.7%	20000*	7.56%	Potentially low impact to local population, however not significant on a regional scale.
Maireana murrayana (P3)	1	1	100%	N/A	N/A	No- only one plant recorded within survey area. Other known locations and preferred habitat occur outside of the proposed footprint as well as the survey area
Maireana prosthecochaeta (P3)	17	37	45.95%	2000*	0.85%	Potentially moderate impact to local population, however not significant on a regional scale.
Sida picklesiana (P3)	29	1331	2.18%	N/A	N/A	No
Acacia sp. (possible new species)	100	1100	9.09%	N/A	N/A	No
Micromyrtus sp. (possible new species)	1	0	N/A	N/A	N/A	No- only one single plant recorded within survey area.

Note: * Refers to conservative estimate based on NVS experience with each species

4.2.4.4 Introduced species

One introduced species recorded in the survey area; *Bidens bipinnata* (Bipinnate Beggartick) was captured in Quadrat Q14. This species is not a declared pest in the state of Western Australia.

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.

The application area occurs within the Augustus subregion of the Gascoyne bioregion according to the Biogeographic Regionalisation of Australia (IBRA). This subregion is characterised by the vegetation of Mulga woodlands with *Triodia* growing over shallow stony loams and rises, while mulga parklands are found on the shallow earthy loams over hardpan on the plains (CALM, 2002).

Ninety-seven species were recorded within the survey area with 86 species recorded within quadrats. Eighteen families and 33 genera were found. These are listed in Appendix F, per Quadrat as well as per vegetation group. Of the native species, Fabaceae had the highest representation, with 28 species from 2 genera. Chenopodiaceae was the next best represented family with 16 species, followed by Scrophulariaceae with 15 species identified. Species composition and vegetation types within the application area are typical of the local region and not considered to be unusually diverse. The area proposed to be cleared is not considered to be remnant vegetation.

The DBCA database searches revealed a potential for one Threatened and 23 Priority Flora species to occur within a 50km radius of the survey area (DBCA, 2021a). The searches revealed three Priority Flora records within the survey area; *Eremophila prolata* (P1), *Maireana murrayana* (P3) and *Maireana prosthecochaeta* (P3). No known locations of Threatened Flora occur within the survey area.

NVS recorded numerous locations of five Priority Flora within the application area. These species were *Eremophila prolata* (P1), *Maireana murrayana* (P1), *Maireana prosthecochaeta* (P3), *Eremophila congesta* (P1) and *Sida picklesiana* (P3). The locations of *Eremophila congesta* (P1) and *Sida picklesiana* (P3) are considered significant range extensions according to available databases, as these population are 160 kilometres northwest and 60km west respectively of known locations to the DBCA. The proposed disturbance footprint is likely to affect less than 10% of the regional population of these species.

Two species of interest were detected in the survey. These species did not fit any currently described species and will require further investigation. The first is a potentially new *Acacia* species, found in quadrats Q15 and Q17 (a dominant species), and also detected at two other locations within the survey area. The second is a potentially new *Micromyrtus* species, found in the proposed haul road route. Better flowering and fruiting material is required in order to positively determine the identification of these taxa.

Potential impacts of the proposed clearing may be minimised by the implementation of BG's clearing management procedures to ensure compliance with any clearing permit requirements.

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

One weed species was identified within the survey area. Weeds have the potential to significantly change the dynamics of a natural ecosystem and lower the biodiversity of an area. Potential impacts to the biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

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

No DRF or Threatened Flora were located within the survey area.

The DBCA database searches revealed a potential for one Threatened and 23 Priority Flora species to occur within a 50km radius of the survey area (DBCA, 2021a). The searches revealed three Priority Flora records within the survey area; *Eremophila prolata* (P1), *Maireana murrayana* (P3) and *Maireana prosthecochaeta* (P3). No known locations of Threatened Flora occur within the survey area.

NVS recorded numerous locations of five Priority Flora within the application area. These species were *Eremophila prolata* (P1), *Maireana murrayana* (P1), *Maireana prosthecochaeta* (P3), *Eremophila congesta* (P1) and *Sida picklesiana* (P3). The locations of *Eremophila congesta* (P1) and *Sida picklesiana* (P3) are considered significant range extensions according to available databases, as these populations are 160 kilometres northwest and 60km west respectively of known locations to the DBCA. The proposed disturbance footprint is likely to affect less than 10% of the regional population of these species.

Two other species of interest were detected in the survey. These species did not fit any currently described species and will require further investigation. The first is a potentially new *Acacia* species, found in quadrats Q15 and Q17 (a dominant species), and also detected at two other locations within the survey area. The second is a potentially new *Micromyrtus* species, found in the proposed haul road route. Better flowering and fruiting material is required in order to positively determine the identification of these taxa.

Potential impacts of the proposed clearing may be minimised by the implementation of BG's clearing management procedures to ensure compliance with any clearing permit requirements.

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 recorded in the survey area, and no vegetation groups recorded in the survey area are regarded as such.

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, both Beard vegetation associations which occur within the survey area are considered to have greater than 99% of their known spatial area remaining post European settlement and are not adversely affected by extensive clearing. Therefore the areas proposed to be cleared are not considered a significant remnant of native vegetation.

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 wetlands. Broad ephemeral drainage lines are present in the survey area however these only channel water after long lasting rainfall periods.

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.

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 Augustus subregion (CALM, 2002). This survey established that mostly, the flora within the project area is not unique, and is in fact common throughout the Augustus subregion and adjoining regions.

Ninety-seven species were recorded within the survey area with 86 species recorded within quadrats. Eighteen families and 33 genera were found. These are listed in Appendix F, per Quadrat as well as per vegetation group. Of the native species, Fabaceae had the highest representation, with 28 species from 2 genera. Chenopodiaceae was the next best represented family with 16 species, followed by Scrophulariaceae with 15 species identified.

Of the 97 taxa recorded one of these was an introduced weed species. *Bidens bipinnata* (Bipinnate Beggartick) was captured in Quadrat Q14.

Two species of interest were detected in the survey. These species did not fit any currently described species and will require further investigation. The first is a potentially new *Acacia* species, found in quadrats Q15 and Q17 (a dominant species), and also detected at two other locations within the survey area. The second is a potentially new *Micromyrtus* species, found in the proposed haul road route. Better flowering and fruiting material is required in order to positively determine the identification of these taxa.

The most common and widespread species were Acacia aneura found in 20 quadrats, followed by Ptilotus obovatus found in 15 quadrats *Acacia tetragonophylla* and *Aristida contorta* were both recorded within 13 quadrats.

There were 26 taxa recorded from within a single site, Q11. Of these, none were weed species.

No Threatened Flora were recorded in the survey area.

Five priority species were recorded during the survey. *Eremophila congesta* (P1) with two records within the survey area, *Maireana murrayana* (P3) with one record within the survey area, *Sida picklesiana* (P3) observed in Q9 and at thirteen other locations, *Maireana prosthecochaeta* (P3) observed in Q9 and at eight other locations, and *Eremophila prolata* (P1) found in quadrats Q1, Q10, Q11, Q12, Q13, Q15, Q17, Q18, Q19 and Q20 and at 209 other locations.

Results from the DBCA Threatened and Priority Flora Database Search showed one record each for *Eremophila prolata* (P1), *Maireana murrayana* (P3) and *Maireana prosthecochaeta* (P3) occurring within the survey area. The records for *Eremophila prolata* (P1) and *Maireana prosthecochaeta* (P3) were captured in the field survey, while *Maireana murrayana* (P3) was captured at a different location within the survey area. The known location of *Maireana murrayana* (P3) was searched, however could not be confirmed at this location. There were no known records of *Eremophila congesta* (P1) or *Sida picklesiana* (P3) detected in the DBCA search (DBCA, 2021a). The locations of *Eremophila congesta* (P1) and *Sida picklesiana* (P3) within the survey area are considered significant range extensions according to available databases, as these population are 160 kilometres northwest and 60km west respectively of known locations to the DBCA.

The proposed disturbance footprint is likely to affect less than 10% of the regional population of these species.

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

Vegetation condition was generally ‘Good’ to ‘Very Good’ (Keighery 1994). Disturbance was present within the survey area mostly attributed to historic mining activities, access tracks, exploration related activities, and also grazing. Areas where disturbance was high were mapped as degraded or severely degraded.

It is therefore not expected that the disturbance within the survey area will significantly negatively impact on the vegetation in the area in terms of fragmentation and loss of vegetation associations or species that may be unique. This is partially due to the overall size of the survey area as well as the similar abundant vegetation and habitat outside of the survey area.

6 IMPACT ASSESSMENT

6.1 THREATENING PROCESSES

The major processes likely to impact the Flora within the survey area, if clearing were to proceed include:

- Vegetation clearing and therefore a reduction in biodiversity;
- Reduction in the population size of Priority Flora, however, the impact will only affect less than 10% of the regional populations.
- Vehicle impacts on uncleared vegetation could increase if existing tracks are not adhered to;
- An increase in the area of disturbed land could result in an increase in 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.

7 CONCLUSIONS AND RECOMMENDATIONS

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 within the Doolgunna ex-pastoral lease. No TECs were recorded in the survey area.

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 Augustus 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 the first stage of a detailed flora and vegetation survey.

The following recommendations arise from the current flora survey:

- Any disturbance/clearing be minimised as much as practicable to reduce the loss of individual species;
- Potential impacts of the proposed clearing minimised by the implementation of BG's clearing management procedures to ensure compliance with any clearing permit requirements;
- Weed control measures should be implemented during and post construction activities;
- Driving restrictions, ensuring that off-road driving is minimised; and
- All staff to be educated on the importance of fire prevention, and equipment provided for use in the event of fire.

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9 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)
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
GAS	Gascoyne Bioregion, IBRA
GAS3	Augustus Subregion, IBRA
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 Priority Species
Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora.

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

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

Priority 1: Poorly-known species
Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

Priority 2: Poorly-known species
Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

Priority 3: Poorly-known species
Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

Priority 4: Rare, Near Threatened and other species in need of monitoring
(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.
(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.
(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

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.

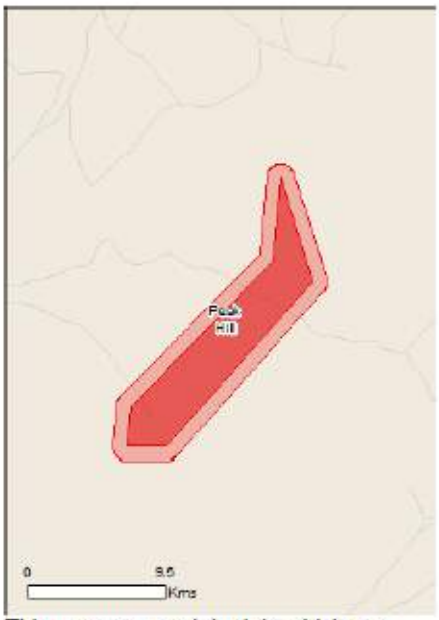
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

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

Report created: 17/11/21 17:39:19

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

Caveat
Acknowledgements



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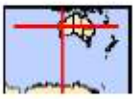


Summary

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:	4
Listed Migratory Species:	7

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:	8
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
Polytelis alexandrae Princess Parrot, Alexandra's Parrot [758]	Vulnerable	Species or species habitat may occur within area
Plants		
Pityrodia augustensis Mt Augustus Foxglove [4962]	Vulnerable	Species or species habitat likely to 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 Terrestrial Species		
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species

Name	Threatened	Type of Presence
		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
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
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat known 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
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Doolgunna	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
Mammals		
Camelus dromedarius Dromedary, Camel [7]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Equus asinus Donkey, Ass [4]		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
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		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

-25.71667 118.85826,-25.7169 118.8336,-25.6952 118.8359,-25.6137 118.9247,-25.5671 118.9295,-25.6255 118.9494,-25.71667 118.85826

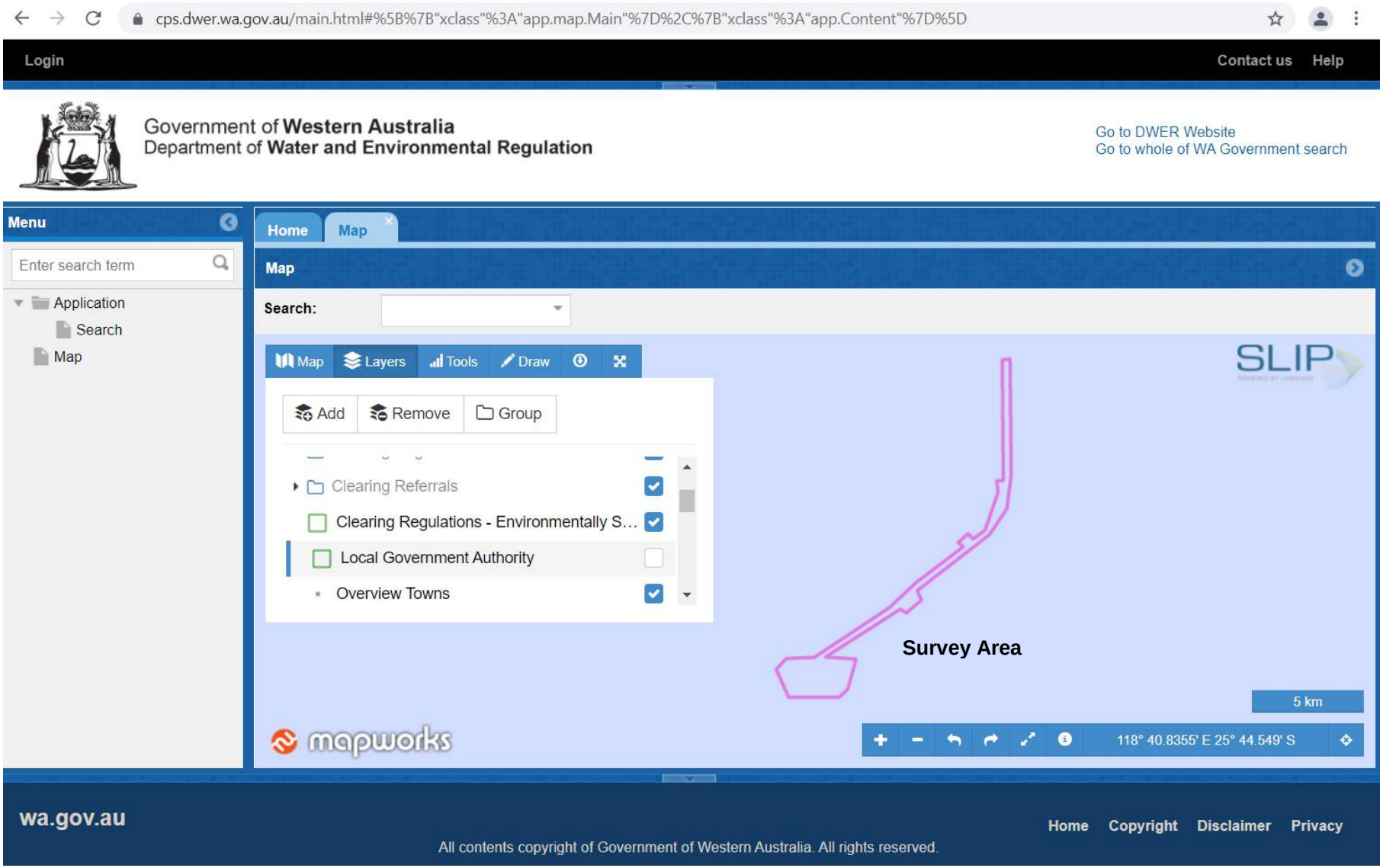
Acknowledgements

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

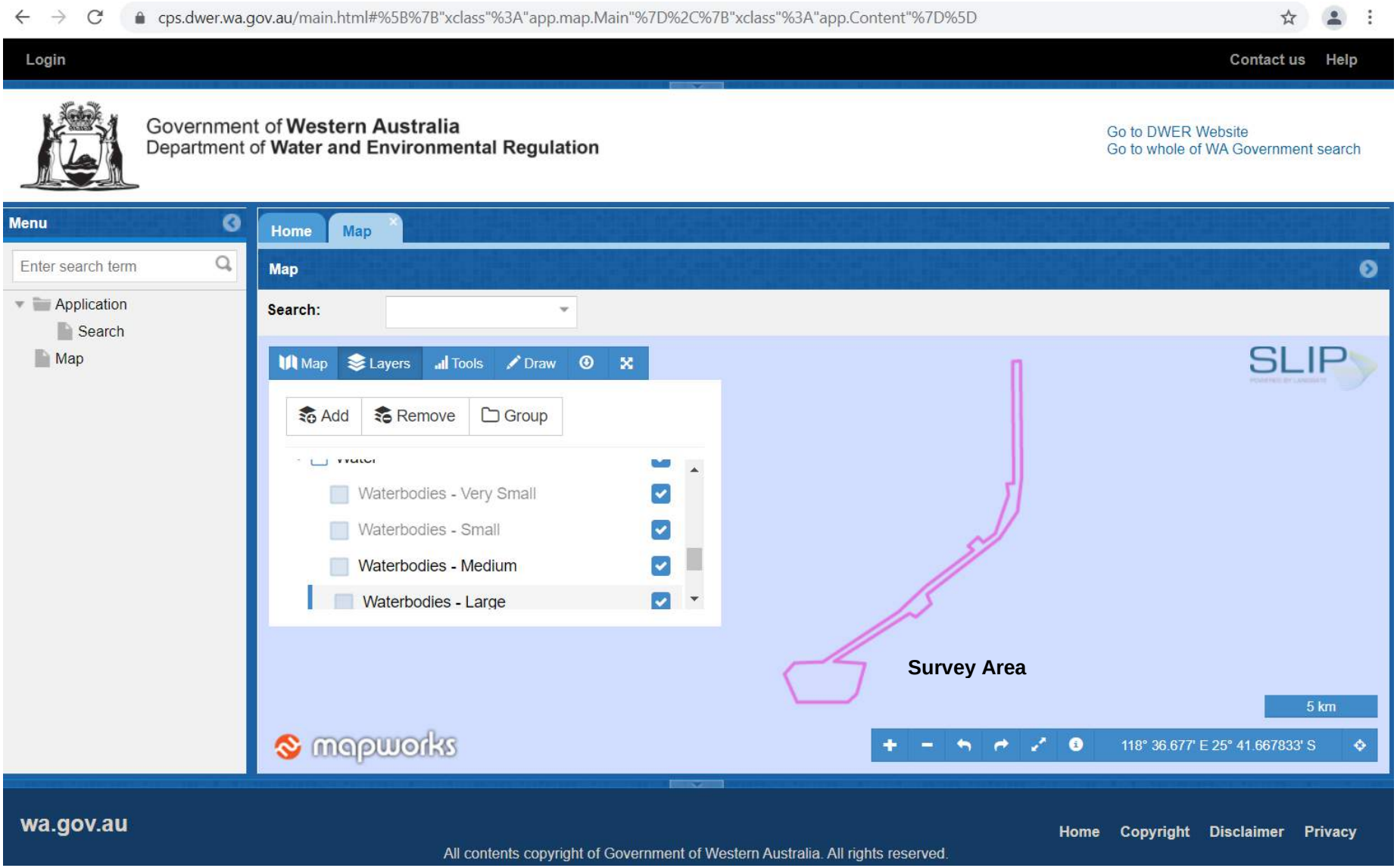
-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, 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 polygon) (DWER, 2021)



DWER CPS Map Viewer - showing no water bodies within the survey area (pink polygon) (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.

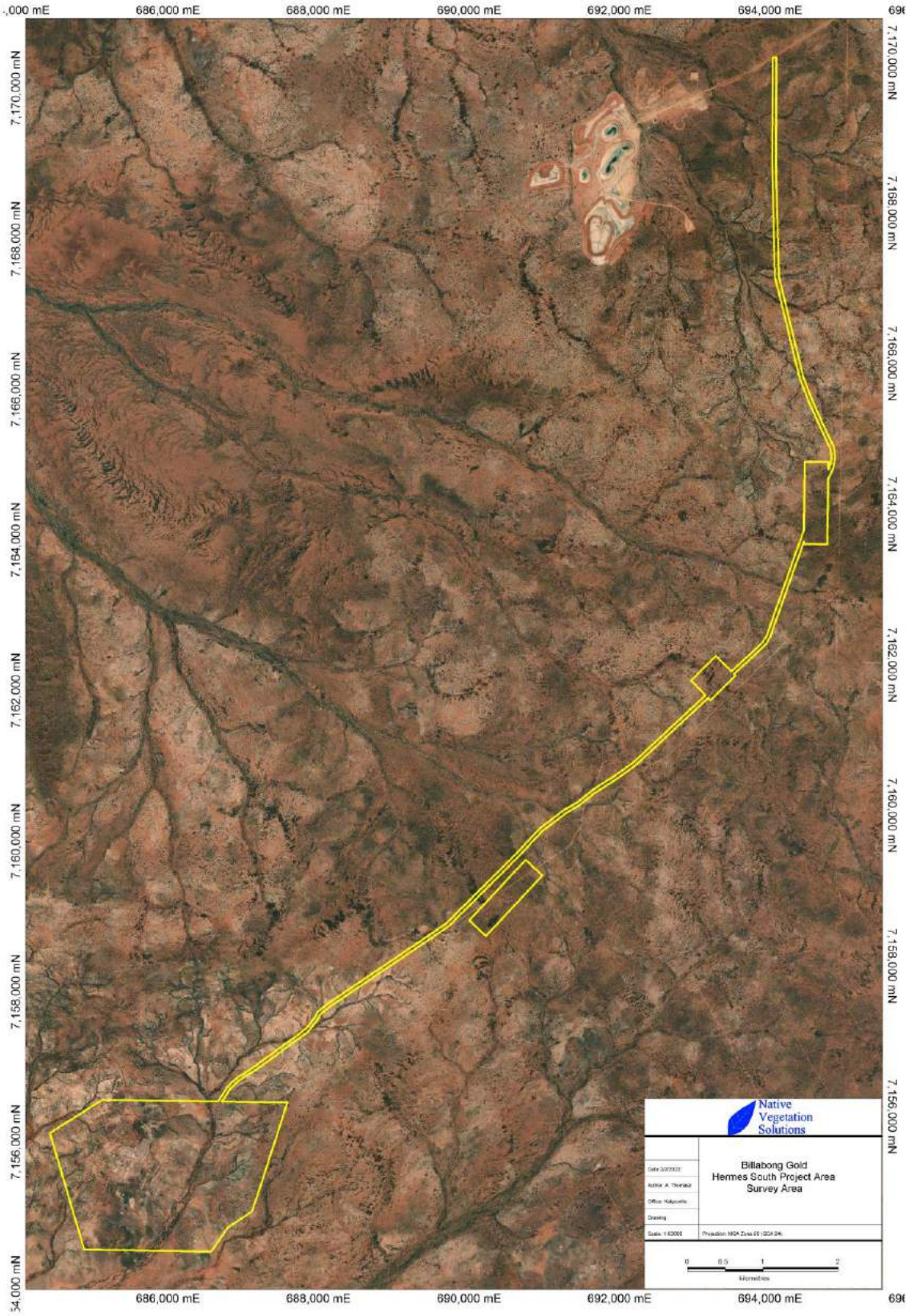
Degraded (5). Basic vegetation structure severely impacted by disturbance.
Scope for regeneration but not to a state approaching good condition without intensive management.
For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial 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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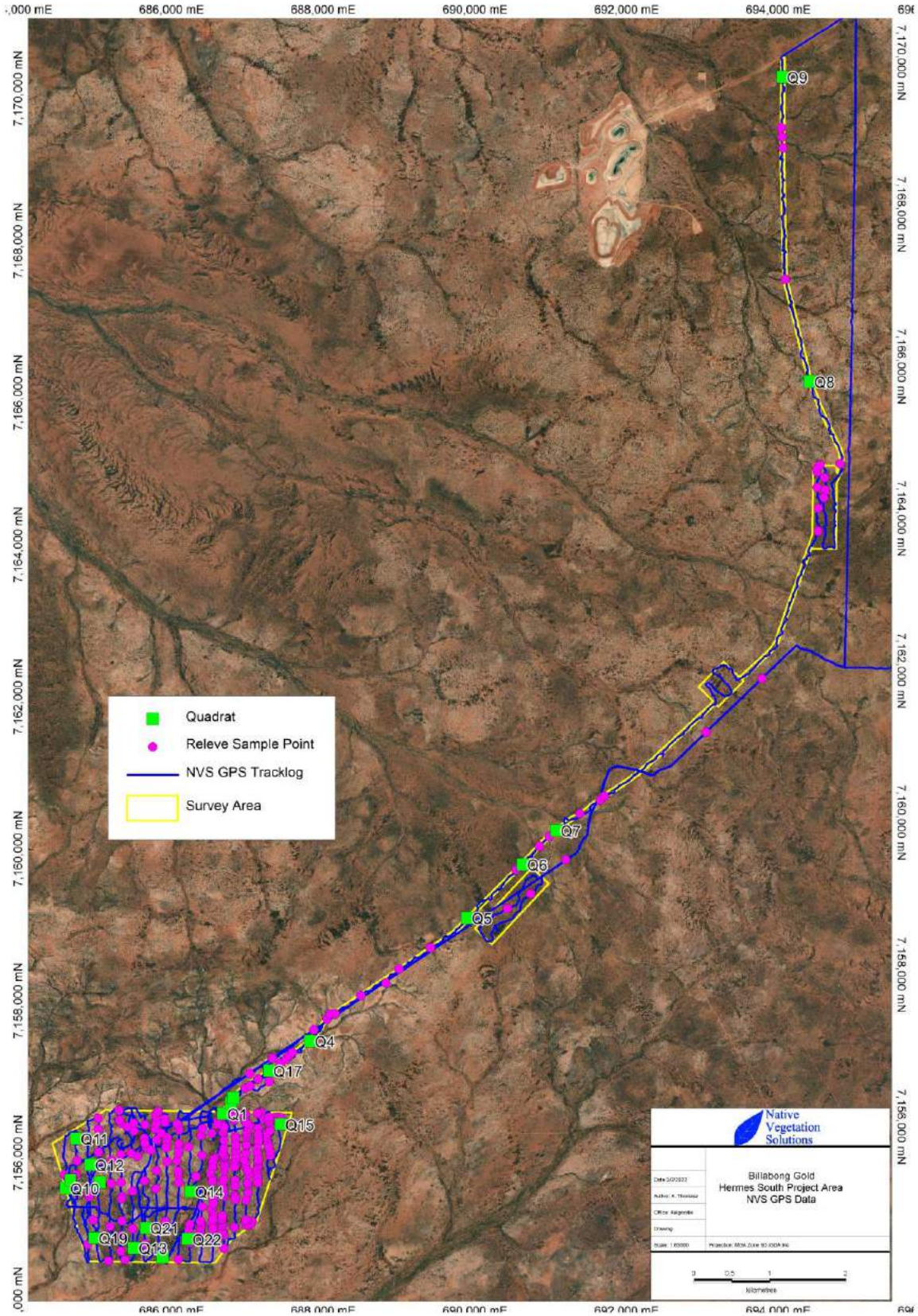
Native Vegetation Solutions
Billabong Gold
Hermes South Project Area
Survey Area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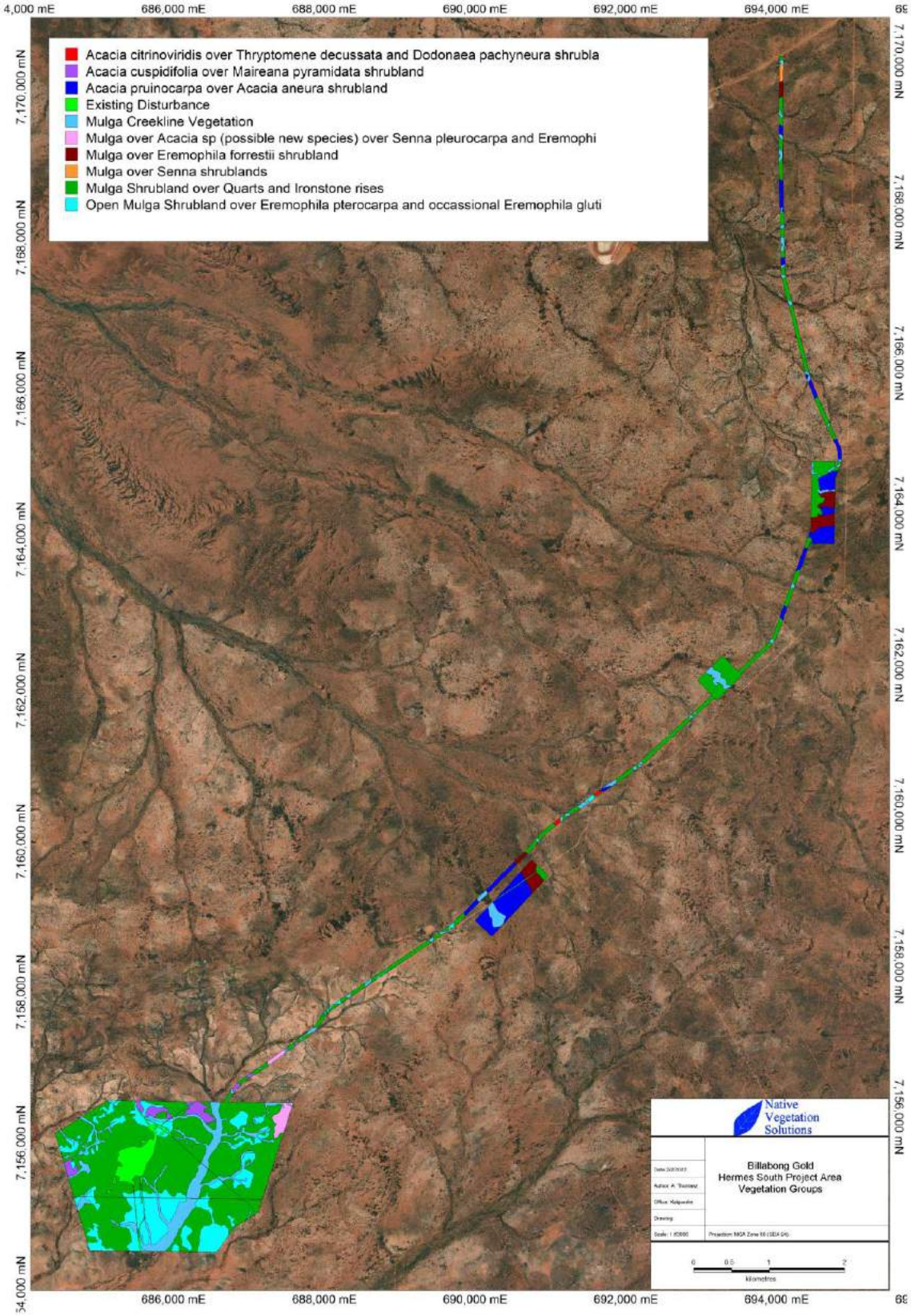
Q12
Q10
Q14
Q21
Q19
Q13
Q22
Quadrat
Releve Sample Point
NVS GPS Tracklog
Survey Area
Native Vegetation Solutions
Billabong Gold
Hermes South Project Area
NVS GPS Data


Acacia citrinoviridis over Thryptomene decussata and Dodonaea pachyneura shrubla
Acacia cuspidifolia over Maireana pyramidata shrubland
Acacia pruinocarpa over Acacia aneura shrubland
Existing Disturbance
Mulga Creekline Vegetation
Mulga over Acacia sp (possible new species) over Senna pleurocarpa and Eremophi
Mulga over Eremophila forrestii shrubland
Mulga over Senna shrublands
Mulga Shrubland over Quarts and Ironstone rises
Open Mulga Shrubland over Eremophila pterocarpa and occassional Eremophila gluti
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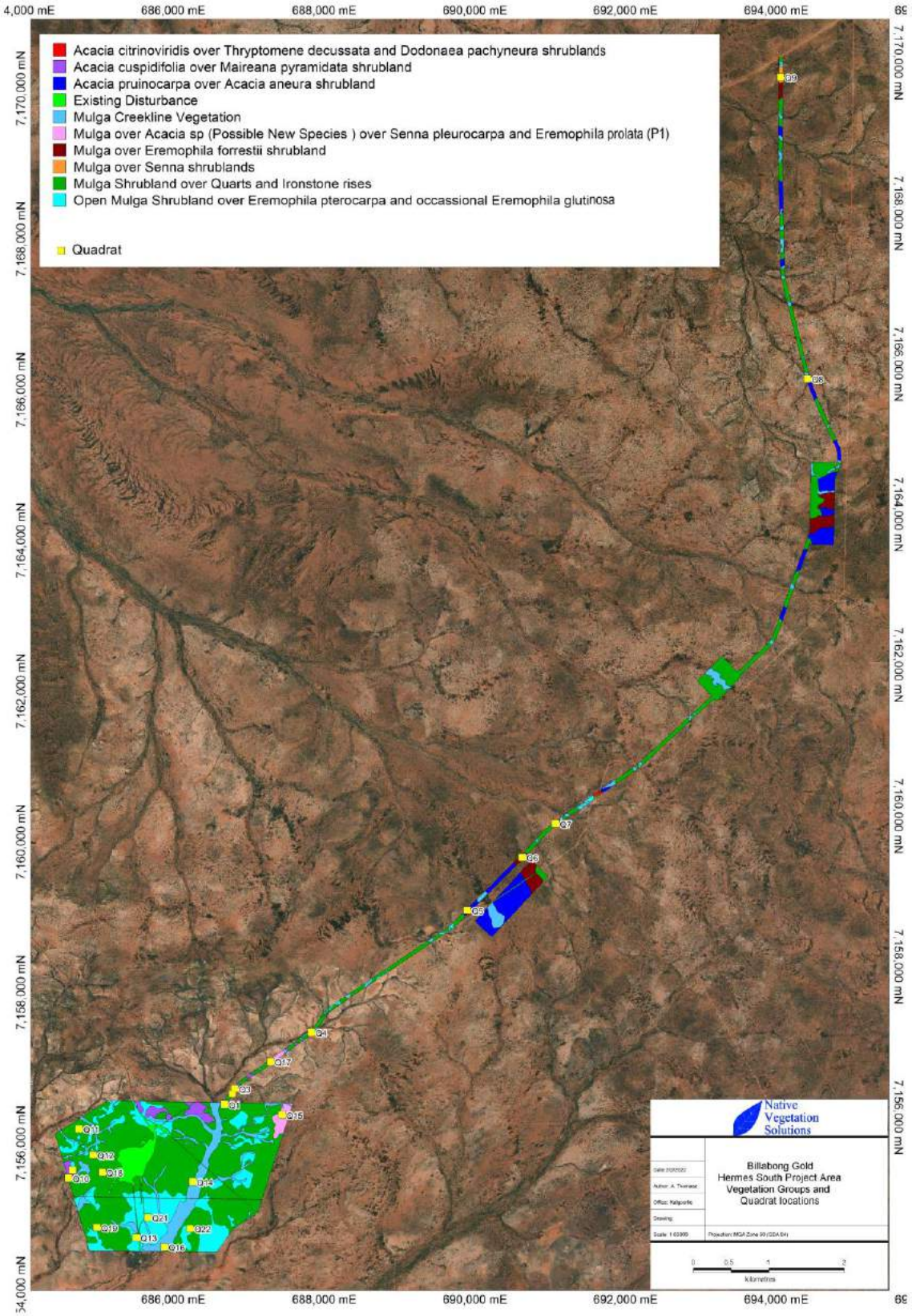
Native Vegetation Solutions
Billabong Gold
Hermes South Project Area
Vegetation Groups
kilometres


Acacia citrinoviridis over Thryptomene decussata and Dodonaea pachyneura shrublands
Acacia cuspidifolia over Maireana pyramidata shrubland
Acacia pruinocarpa over Acacia aneura shrubland
Existing Disturbance
Mulga Creekline Vegetation
Mulga over Acacia sp (Possible New Species) over Senna pleurocarpa and Eremophila prolata (P1)
Mulga over Eremophila forrestii shrubland
Mulga over Senna shrublands
Mulga Shrubland over Quarts and Ironstone rises
Open Mulga Shrubland over Eremophila pterocarpa and occassional Eremophila glutinosa
Quadrat
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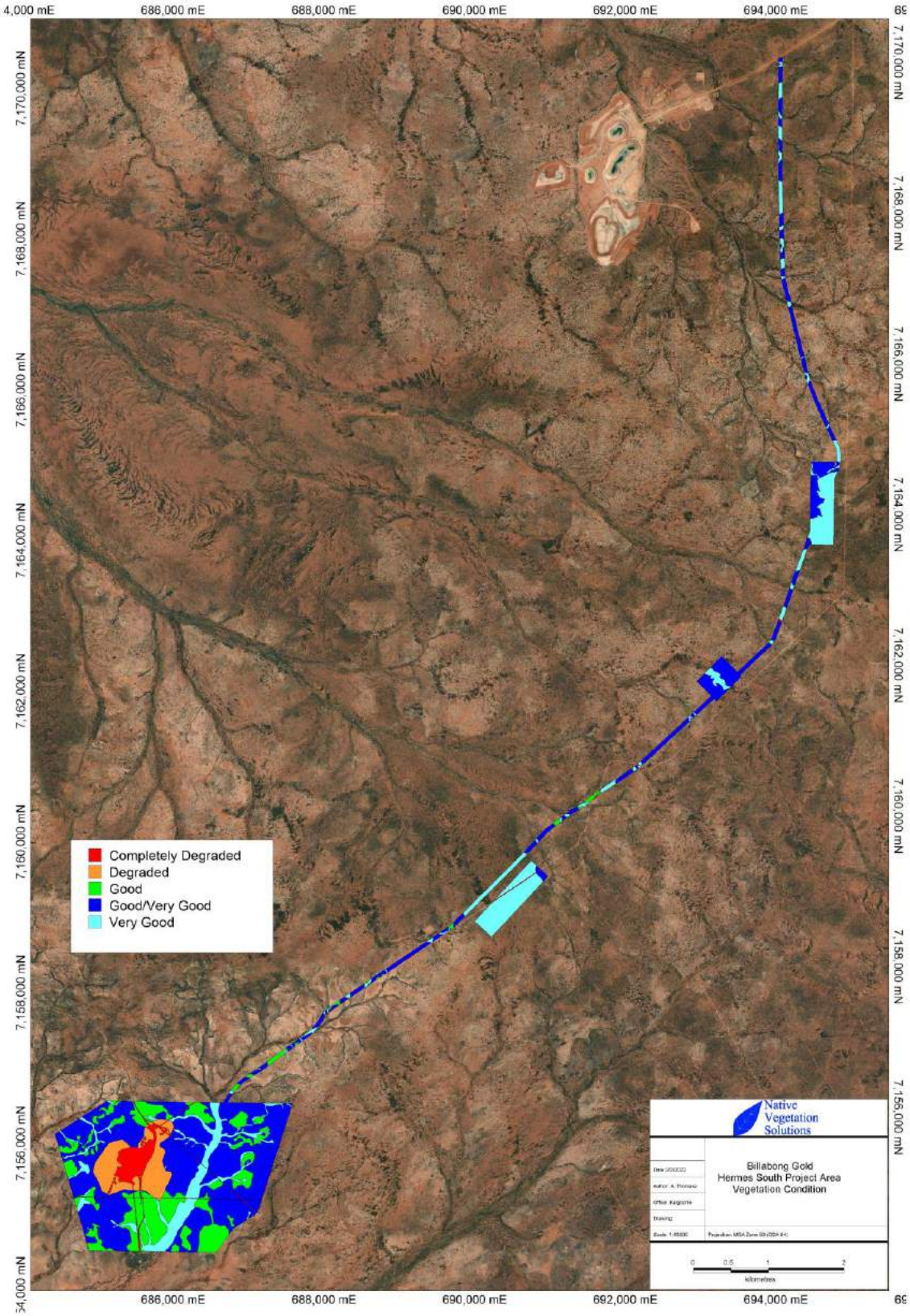
Native Vegetation Solutions
Billabong Gold
Hermes South Project Area
Vegetation Groups and
Quadrat locations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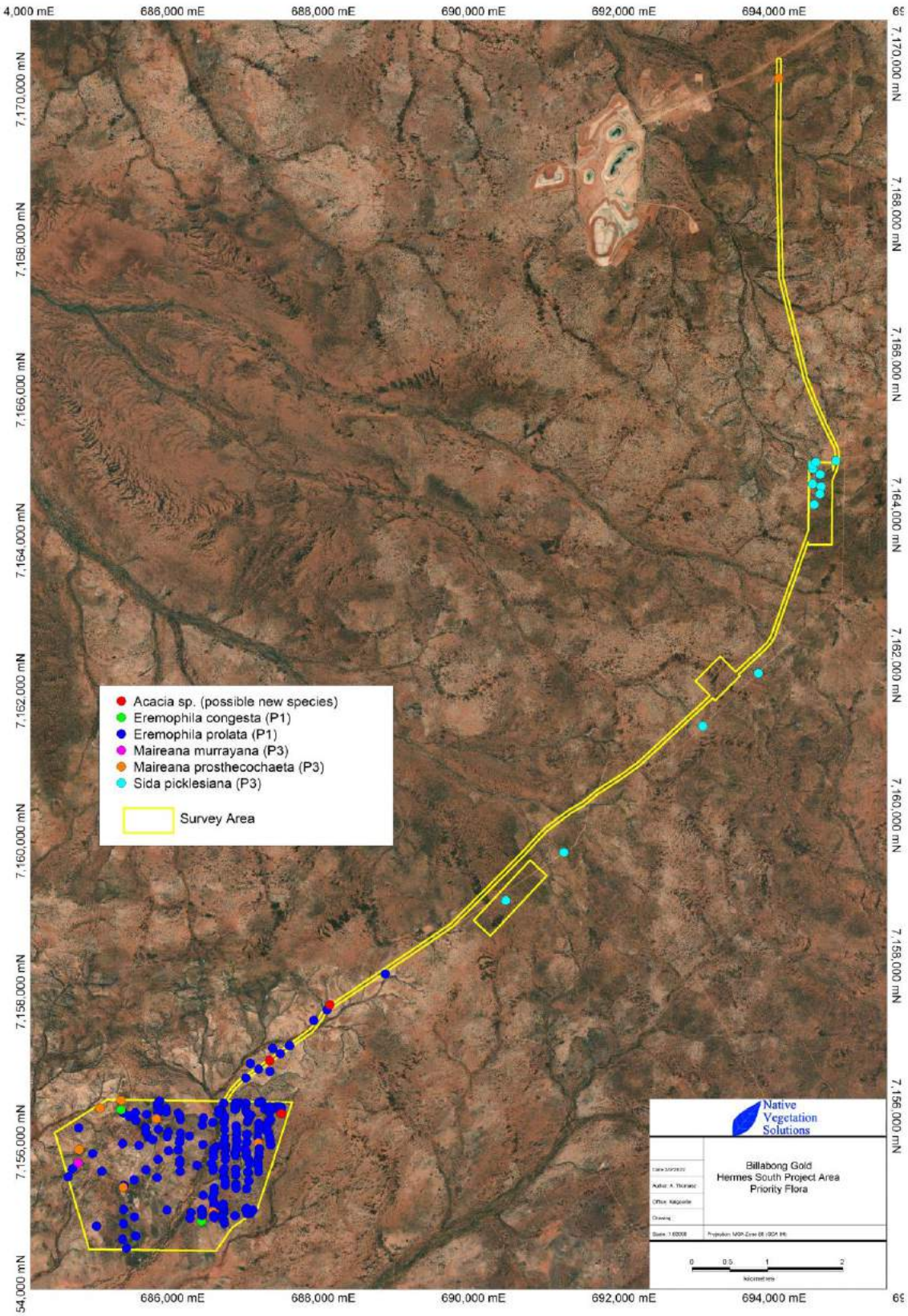
Completely Degraded
Degraded
Good
Good/Very Good
Very Good
Native Vegetation Solutions
Billabong Gold
Hermes South Project Area
Vegetation Condition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Acacia sp. (possible new species)
Eremophila congesta (P1)
Eremophila prolata (P1)
Maireana murrayana (P3)
Maireana prosthecochaeta (P3)
Sida picklesiana (P3)
Survey Area
Native Vegetation Solutions
Billabong Gold
Hermes South Project Area
Priority Flora

Appendix D - Threatened Flora Database Search Results

Taxon	Cons_Code	Likelihood of occurring in survey area	Comment, based on survey effort
Dodonaea amplisemina	P4	Unlikely	Possible habitat, however, search thoroughly
Eremophila demissa	P1	Unlikely	No suitable habitat
Eremophila lanata	P3	Unlikely	Possible habitat, however, search thoroughly
Eremophila prolata	P1	Likely	Captured in survey data
Eremophila sp. Meekatharra (D.J. Edinger 4430)	P1	Unlikely	Possible habitat, however, search thoroughly
Eucalyptus semota	P1	Unlikely	Possible habitat, however, search thoroughly
Euphorbia sarcostemmoides	P1	Unlikely	Possible habitat, however, search thoroughly
Goodenia berringbinensis	P4	Possible	Possible habitat, however, search thoroughly
Hemigenia virescens	P3	Unlikely	Possible habitat, however, search thoroughly
Homalocalyx echinulatus	P3	Unlikely	No suitable habitat
Indigofera fractiflexa subsp. *augustensis*	P2	Unlikely	Possible habitat, however, search thoroughly
Maireana murrayana	P3	Likely	Captured in survey data
Maireana prosthecochaeta	P3	Likely	Captured in survey data
Pityrodia iphthima	P1	Unlikely	No suitable habitat
Prostanthera ferricola	P3	Unlikely	No suitable habitat
Ptilotus actinocladus	P1	Unlikely	Possible habitat, however, search thoroughly
Ptilotus lazaridis	P3	Unlikely	Possible habitat, however, search thoroughly
Ptilotus luteolus	P3	Unlikely	Possible habitat, however, search thoroughly
Rhodanthe sphaerocephala	P1	Unlikely	Possible habitat, however, search thoroughly
Seringia exastia	T	Unlikely	No suitable habitat
Thryptomene sp. Leinster (B.J. Lepschi & L.A. Craven 4362)	P3	Unlikely	Possible habitat, however, search thoroughly
Tribulus adelacanthus	P3	Unlikely	Possible habitat, however, search thoroughly
Verticordia jamiesonii	P3	Unlikely	No suitable habitat
Wurmbea sp. Denham Pool (F. Hort et al. 2216)	P1	Unlikely	No suitable habitat

Likely – suitable habitat, close (<10km) records and/or field survey completed in sub-optimal season, suggest species is likely to occur
Possible- suitable habitat, record(<50km) and/or field survey completed in sub-optimal season.
Unlikely- Lack of suitable habitat and/or no records(<5okm) and /or field survey completed in optimal season, suggests species is unlikely to occur

Appendix E – Priority Species Recorded During the October 2021 and January 2022 Survey

Taxon	Abundance	Total observed	Date of observation	Longitude	Latitude	Location
Eremophila congesta (P1)	13	15	27/10/2021	118.856275	-25.713104	Survey Area
Eremophila congesta (P1)	2		25/01/2022	118.845407	-25.699888	Survey Area
Eremophila prolata (P1)	15	8747	26/10/2021	118.859016	-25.698913	Q1
Eremophila prolata (P1)	30		26/10/2021	118.861892	-25.695840	Survey Area
Eremophila prolata (P1)	30		26/10/2021	118.863563	-25.694749	Survey Area
Eremophila prolata (P1)	30		26/10/2021	118.866404	-25.692871	Survey Area
Eremophila prolata (P1)	100		26/10/2021	118.867603	-25.691891	Survey Area
Eremophila prolata (P1)	50		26/10/2021	118.872529	-25.687495	Survey Area
Eremophila prolata (P1)	120		26/10/2021	118.845682	-25.703914	Survey Area
Eremophila prolata (P1)	30		26/10/2021	118.845938	-25.708944	Survey Area
Eremophila prolata (P1)	10		26/10/2021	118.845969	-25.711834	Survey Area
Eremophila prolata (P1)	5		26/10/2021	118.845935	-25.713545	Survey Area
Eremophila prolata (P1)	50		26/10/2021	118.845864	-25.715417	Survey Area
Eremophila prolata (P1)	20		26/10/2021	118.846423	-25.716449	Survey Area
Eremophila prolata (P1)	5		26/10/2021	118.847384	-25.712716	Survey Area
Eremophila prolata (P1)	50		26/10/2021	118.847269	-25.708256	Survey Area
Eremophila prolata (P1)	30		26/10/2021	118.849065	-25.703136	Survey Area
Eremophila prolata (P1)	20		26/10/2021	118.847846	-25.704131	Survey Area
Eremophila prolata (P1)	2		26/10/2021	118.847385	-25.701123	Survey Area
Eremophila prolata (P1)	3		26/10/2021	118.847304	-25.700207	Survey Area
Eremophila prolata (P1)	15		26/10/2021	118.848797	-25.700367	Survey Area
Eremophila prolata (P1)	15		26/10/2021	118.848714	-25.701952	Survey Area
Eremophila prolata (P1)	20		26/10/2021	118.848773	-25.702592	Survey Area
Eremophila prolata (P1)	1		26/10/2021	118.849650	-25.703384	Survey Area
Eremophila prolata (P1)	15		26/10/2021	118.848823	-25.707040	Survey Area
Eremophila prolata (P1)	30		26/10/2021	118.850340	-25.707940	Survey Area
Eremophila prolata (P1)	15		26/10/2021	118.850409	-25.705760	Survey Area
Eremophila prolata (P1)	15		26/10/2021	118.850365	-25.702140	Survey Area
Eremophila prolata (P1)	20		26/10/2021	118.850136	-25.700871	Survey Area
Eremophila prolata (P1)	30		26/10/2021	118.850296	-25.700150	Survey Area
Eremophila prolata (P1)	5		26/10/2021	118.850280	-25.699440	Survey Area
Eremophila prolata (P1)	20		26/10/2021	118.850222	-25.699077	Survey Area
Eremophila prolata (P1)	50		26/10/2021	118.850503	-25.698760	Survey Area
Eremophila prolata (P1)	10		26/10/2021	118.851400	-25.699614	Survey Area
Eremophila prolata (P1)	50		26/10/2021	118.851428	-25.700060	Survey Area
Eremophila prolata (P1)	10		26/10/2021	118.851731	-25.702469	Survey Area
Eremophila prolata (P1)	100		26/10/2021	118.851603	-25.703037	Survey Area
Eremophila prolata (P1)	40		26/10/2021	118.851778	-25.704704	Survey Area
Eremophila prolata (P1)	5		26/10/2021	118.851661	-25.711820	Survey Area
Eremophila prolata (P1)	5		26/10/2021	118.853361	-25.707167	Survey Area
Eremophila prolata (P1)	2		26/10/2021	118.853267	-25.706260	Survey Area
Eremophila prolata (P1)	3		26/10/2021	118.853288	-25.705815	Survey Area
Eremophila prolata (P1)	2		26/10/2021	118.853070	-25.704618	Survey Area
Eremophila prolata (P1)	3		27/10/2021	118.838526	-25.708006	Q10
Eremophila prolata (P1)	6		27/10/2021	118.839823	-25.702102	Q11
Eremophila prolata (P1)	1		27/10/2021	118.841739	-25.705190	Q12
Eremophila prolata (P1)	1		27/10/2021	118.847612	-25.715002	Q13
Eremophila prolata (P1)	11		27/10/2021	118.866661	-25.700077	Q15
Eremophila prolata (P1)	5		27/10/2021	118.853236	-25.703670	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.853303	-25.703314	Survey Area
Eremophila prolata (P1)	5		27/10/2021	118.853300	-25.702552	Survey Area
Eremophila prolata (P1)	2		27/10/2021	118.853288	-25.700928	Survey Area
Eremophila prolata (P1)	5		27/10/2021	118.853212	-25.700502	Survey Area
Eremophila prolata (P1)	5		27/10/2021	118.852989	-25.700186	Survey Area
Eremophila prolata (P1)	5		27/10/2021	118.854546	-25.702923	Survey Area
Eremophila prolata (P1)	3		27/10/2021	118.855580	-25.706418	Survey Area
Eremophila prolata (P1)	2		27/10/2021	118.856327	-25.703900	Survey Area
Eremophila prolata (P1)	2		27/10/2021	118.856192	-25.701560	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.856342	-25.700725	Survey Area

Taxon	Abundance	Total observed	Date of observation	Longitude	Latitude	Location
Eremophila prolata (P1)	10		27/10/2021	118.862615	-25.700297	Survey Area
Eremophila prolata (P1)	120		27/10/2021	118.864409	-25.699544	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.864924	-25.699582	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.865129	-25.699642	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.865315	-25.699650	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.865499	-25.699502	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.865572	-25.699444	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.865831	-25.699269	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.866037	-25.699246	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.866388	-25.699245	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.866658	-25.699302	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.866584	-25.699648	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.865307	-25.703804	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.865241	-25.703324	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.865117	-25.702865	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.864924	-25.702341	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.864778	-25.701660	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.864875	-25.701149	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.865230	-25.700818	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.865090	-25.699942	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.865089	-25.699778	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.865011	-25.699496	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.865090	-25.699261	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.864027	-25.698696	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.863623	-25.698743	Survey Area
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Eremophila prolata (P1)	20		27/10/2021	118.863716	-25.702198	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.863576	-25.702992	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.863634	-25.703620	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.863798	-25.704296	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.863741	-25.704828	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.863777	-25.705259	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.863678	-25.705484	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.863620	-25.705692	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.863599	-25.705822	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.863667	-25.706014	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.863681	-25.706200	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.863702	-25.706535	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.863742	-25.707065	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.863085	-25.711693	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.862807	-25.712065	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.862501	-25.712098	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.862298	-25.712123	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.862150	-25.711682	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.862218	-25.711482	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.862199	-25.709160	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.862456	-25.708231	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.862399	-25.707259	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.862365	-25.707096	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.862533	-25.706133	Survey Area
Eremophila prolata (P1)	20		27/10/2021	118.862373	-25.705592	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.862085	-25.705208	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.862115	-25.704719	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.861907	-25.704338	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.862135	-25.703560	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.862122	-25.702689	Survey Area

Taxon	Abundance	Total observed	Date of observation	Longitude	Latitude	Location
Eremophila prolata (P1)	10		27/10/2021	118.862149	-25.702581	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.862194	-25.701069	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.862349	-25.700729	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.862345	-25.700373	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.862171	-25.700045	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.862076	-25.699934	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.862032	-25.699882	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.861976	-25.699775	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.861885	-25.699153	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.861973	-25.698908	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.861162	-25.698904	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.860863	-25.698889	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.860703	-25.698854	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.860527	-25.698912	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.860508	-25.699333	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.860500	-25.699645	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.860671	-25.701625	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.860709	-25.701885	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.860770	-25.702639	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.860776	-25.703272	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.860871	-25.703491	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.860755	-25.704170	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.860758	-25.704497	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.860593	-25.704845	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.860628	-25.705179	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.860695	-25.706837	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.860733	-25.707475	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.860740	-25.708630	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.860746	-25.708781	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.860795	-25.709090	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.860722	-25.712409	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859332	-25.713345	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859245	-25.712981	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859156	-25.712890	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859077	-25.712319	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859175	-25.712180	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859220	-25.711844	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859158	-25.711596	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859110	-25.711468	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859126	-25.711333	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859122	-25.711026	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859363	-25.708757	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859319	-25.708424	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859357	-25.708282	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859327	-25.708122	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859170	-25.707786	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859111	-25.707068	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859229	-25.706758	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859319	-25.705681	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859353	-25.705377	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859248	-25.704934	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859331	-25.704542	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859235	-25.704199	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859314	-25.704085	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859371	-25.703998	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859349	-25.703881	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859155	-25.703734	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859094	-25.703563	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859215	-25.703050	Survey Area

Taxon	Abundance	Total observed	Date of observation	Longitude	Latitude	Location
Eremophila prolata (P1)	10		27/10/2021	118.859176	-25.702085	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859054	-25.701142	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859143	-25.700770	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.859195	-25.700504	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.858767	-25.699866	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.858646	-25.699845	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.858517	-25.699770	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.858382	-25.699723	Survey Area
Eremophila prolata (P1)	2		27/10/2021	118.858316	-25.700176	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.858110	-25.704129	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.857968	-25.704250	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.857811	-25.704383	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.857758	-25.704738	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.857726	-25.705332	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.857493	-25.706182	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.857748	-25.706708	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.857726	-25.706981	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.857915	-25.709118	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.857937	-25.709626	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.857708	-25.710297	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.857915	-25.710907	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.857912	-25.711195	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.857902	-25.711475	Survey Area
Eremophila prolata (P1)	5		27/10/2021	118.857906	-25.712373	Survey Area
Eremophila prolata (P1)	5		27/10/2021	118.857928	-25.712669	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.856330	-25.712425	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.856358	-25.712148	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.856294	-25.711848	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.856280	-25.711699	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.856465	-25.710001	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.854859	-25.712107	Survey Area
Eremophila prolata (P1)	10		27/10/2021	118.854758	-25.712804	Survey Area
Eremophila prolata (P1)	200		27/10/2021	118.845641	-25.700167	Survey Area
Eremophila prolata (P1)	200		27/10/2021	118.845666	-25.700206	Survey Area
Eremophila prolata (P1)	50		27/10/2021	118.846483	-25.700615	Survey Area
Eremophila prolata (P1)	25		25/01/2022	118.864997	-25.693748	Q17
Eremophila prolata (P1)	6		25/01/2022	118.842967	-25.707285	Q18
Eremophila prolata (P1)	5		25/01/2022	118.842358	-25.713891	Q19
Eremophila prolata (P1)	5		25/01/2022	118.839067	-25.707045	Q20
Eremophila prolata (P1)	3000		25/01/2022	118.862462	-25.694108	Survey Area
Eremophila prolata (P1)	500		25/01/2022	118.865048	-25.69503	Survey Area
Eremophila prolata (P1)	500		26/01/2022	118.865404	-25.692269	Survey Area
Eremophila prolata (P1)	500		26/01/2022	118.870786	-25.688837	Survey Area
Eremophila prolata (P1)	500		26/01/2022	118.880164	-25.683123	Survey Area
Maireana murrayana (P3)	1	1	27/10/2021	118.839802	-25.706375	Survey Area
Maireana prosthecochaeta (P3)	5	37	26/10/2021	118.930543	-25.574888	Q9
Maireana prosthecochaeta (P3)	7		26/10/2021	118.839945	-25.704724	Survey Area
Maireana prosthecochaeta (P3)	3		26/10/2021	118.842607	-25.699694	Survey Area
Maireana prosthecochaeta (P3)	8		26/10/2021	118.845369	-25.698724	Survey Area
Maireana prosthecochaeta (P3)	7		26/10/2021	118.845859	-25.709171	Survey Area
Maireana prosthecochaeta (P3)	2		26/10/2021	118.850365	-25.702140	Survey Area
Maireana prosthecochaeta (P3)	3		27/10/2021	118.863634	-25.703620	Survey Area
Maireana prosthecochaeta (P3)	2		27/10/2021	118.857732	-25.711921	Survey Area
Sida picklesiana (P3)	2	1331	26/10/2021	118.930543	-25.574888	Q9
Sida picklesiana (P3)	1		26/10/2021	118.936070	-25.626034	Survey Area
Sida picklesiana (P3)	1		26/10/2021	118.935838	-25.623533	Survey Area
Sida picklesiana (P3)	5		26/10/2021	118.935843	-25.621727	Survey Area
Sida picklesiana (P3)	2		26/10/2021	118.935745	-25.621290	Survey Area
Sida picklesiana (P3)	2		26/10/2021	118.936186	-25.620945	Survey Area

Taxon	Abundance	Total observed	Date of observation	Longitude	Latitude	Location
Sida picklesiana (P3)	3		26/10/2021	118.936812	-25.622410	Survey Area
Sida picklesiana (P3)	5		26/10/2021	118.936935	-25.623855	Survey Area
Sida picklesiana (P3)	3		26/10/2021	118.936794	-25.624755	Survey Area
Sida picklesiana (P3)	5		26/10/2021	118.938847	-25.620712	Survey Area
Sida picklesiana (P3)	2		26/10/2021	118.89599	-25.674098	Survey Area
Sida picklesiana (P3)	1000		25/01/2022	118.928976	-25.646382	Survey Area
Sida picklesiana (P3)	100		25/01/2022	118.921745	-25.652821	Survey Area
Sida picklesiana (P3)	200		25/01/2022	118.903565	-25.668212	Survey Area
Acacia sp. (possible new species)	1	1002	27/10/2021	118.866661	-25.700077	Q15
Acacia sp. (possible new species)	500		25/01/2022	118.865048	-25.69503	Survey Area
Acacia sp. (possible new species)	500		25/01/2022	118.87299	-25.687256	Survey Area
Acacia sp. (possible new species)	1		25/01/2022	118.864997	-25.693748	Q17

Appendix F - Species Recorded During the October 2021 and January 2022 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
Amaranthaceae	*Ptilotus*	*Ptilotus exaltatus*			*																	*		
Amaranthaceae	*Ptilotus*	*Ptilotus obovatus*	*	*		*	*	*		*	*	*	*	*		*		*		*		*		*
Amaranthaceae	*Ptilotus*	*Ptilotus rotundifolius*								*			*											
Amaranthaceae	*Ptilotus*	*Ptilotus schwartzii*					*	*	*	*	*		*											*
Apocynaceae	*Leichhardtia*	*Leichhardtia australis*												*		*								
Asteraceae	*Bidens*	*Bidens bipinnata**														*								
Asteraceae	*Streptoglossa*	*Streptoglossa liatroides*														*								
Chenopodiaceae	*Enchylaena*	*?Enchylaena tomentosa*	*																					
Chenopodiaceae	*Maireana*	*Maireana convexa*												*										
Chenopodiaceae	*Maireana*	*Maireana georgei*															*							
Chenopodiaceae	*Maireana*	*Maireana glomerifolia*																			*			
Chenopodiaceae	*Maireana*	*Maireana prosthecochaeta* (P3)									*													
Chenopodiaceae	*Maireana*	*Maireana pyramidata*		*	*							*						*				*	*	
Chenopodiaceae	*Maireana*	*Maireana triptera*											*											
Chenopodiaceae	*Maireana*	*Maireana ?melanocoma*	*																					
Chenopodiaceae	*Rhagodia*	*Rhagodia drummondii*					*			*		*												*
Chenopodiaceae	*Sclerolaena*	*Sclerolaena cornishiana*			*																	*		
Chenopodiaceae	*Sclerolaena*	*Sclerolaena cuneata*													*						*			
Chenopodiaceae	*Sclerolaena*	*Sclerolaena densiflora*													*						*			
Chenopodiaceae	*Sclerolaena*	*Sclerolaena diacantha*			*									*	*						*	*	*	
Chenopodiaceae	*Sclerolaena*	*Sclerolaena eriacantha*	*												*						*			
Chenopodiaceae	*Tecticornia*	*Tecticornia disarticulata*			*	*									*						*	*	*	
Fabaceae	*Acacia*	*Acacia ?kempeana*							*															
Fabaceae	*Acacia*	*Acacia aneura*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		*	*
Fabaceae	*Acacia*	*Acacia aptaneura*	*	*		*				*						*		*						
Fabaceae	*Acacia*	*Acacia citrinoviridis*							*		*													
Fabaceae	*Acacia*	*Acacia craspedocarpa*					*																	*
Fabaceae	*Acacia*	*Acacia cuspidifolia*			*																*	*	*	
Fabaceae	*Acacia*	*Acacia fuscaneura*		*																				
Fabaceae	*Acacia*	*Acacia kempeana*				*																		
Fabaceae	*Acacia*	*Acacia mulganeura*		*		*		*				*						*						*
Fabaceae	*Acacia*	*Acacia pruinocarpa*					*			*			*											*
Fabaceae	*Acacia*	*Acacia pteraneura*	*	*				*				*		*			*	*						
Fabaceae	*Acacia*	*Acacia ramulosa* var. *linophylla*				*				*														
Fabaceae	*Acacia*	*Acacia sclerosperma* subsp. *sclerosperma*	*													*			*					
Fabaceae	*Acacia*	*Acacia* sp. (possible new species)															*		*					

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
Fabaceae	*Acacia*	*Acacia tetragonophylla*	*	*		*				*	*	*	*	*	*	*	*	*		*				
Fabaceae	*Acacia*	*Acacia papyrocarpa*		*								*	*				*	*	*	*				
Fabaceae	*Senna*	*Senna artemisioides* subsp. *×sturtii*	*	*		*	*	*			*	*	*					*						*
Fabaceae	*Senna*	*Senna artemisioides* subsp. *artemisioides*	*	*							*		*				*	*	*					
Fabaceae	*Senna*	*Senna artemisioides* subsp. *filifolia*											*											
Fabaceae	*Senna*	*Senna artemisioides* subsp. *helmsii*				*						*	*			*								
Fabaceae	*Senna*	*Senna glutinosa* subsp. *×luerssenii*							*					*	*									
Fabaceae	*Senna*	*Senna glutinosa* subsp. *chatelainiana*								*		*	*						*	*				
Fabaceae	*Senna*	*Senna pleurocarpa*															*		*					
Fabaceae	*Senna*	*Senna* sp. Meekatharra		*											*			*					*	
Frankeniaceae	*Frankenia*	*Frankenia ?magnifica*												*										
Goodeniaceae	*Scaevola*	*Scaevola spinescens*	*	*							*		*					*	*	*		*		
Malvaceae	*Abutilon*	*Abutilon otocarpum*														*								
Malvaceae	*Abutilon*	*Abutilon oxycarpum*					*					*				*								*
Malvaceae	*Sida*	*Sida calyxhymenia*		*		*							*	*		*		*						
Malvaceae	*Sida*	*Sida ectogama*		*		*			*	*		*				*		*						
Malvaceae	*Sida*	*Sida picklesiana* (P3)									*													
Myrtaceae	*Corymbia*	*Corymbia ferriticola*												*										
Myrtaceae	*Thryptomene*	*Thryptomene decussata*							*															
Poaceae	*Aristida*	*Aristida contorta*	*	*		*	*			*	*	*	*	*		*		*		*				*
Poaceae	*Enneapogon*	*Enneapogon caerulescens*		*		*	*					*						*						*
Poaceae	*Enteropogon*	*Enteropogon ramosus*	*	*		*						*				*	*	*						
Poaceae	*Eragrostis*	*Eragrostis eriopoda*		*			*											*						*
Poaceae	*Eragrostis*	*Eragrostis falcata*					*																	*
Poaceae	*Eriachne*	*Eriachne helmsii*				*																		
Poaceae	*Eriachne*	*Eriachne pulchella* subsp. *pulchella*	*	*							*	*	*	*	*		*	*						
Poaceae	*Monachather*	*Monachather paradoxus*					*		*	*			*	*		*								*
Proteaceae	*Grevillea*	*Grevillea berryana*					*	*			*													*
Proteaceae	*Hakea*	*Hakea lorea subsp. lorea*														*								
Proteaceae	*Hakea*	*Hakea recurva* subsp. *recurva*																		*				
Pteridaceae	*Cheilanthes*	*Cheilanthes sieberi* subsp. *sieberi*				*		*		*			*	*										
Rubiaceae	*Psydrax*	*Psydrax latifolia*						*		*														
Rubiaceae	*Psydrax*	*Psydrax rigidula*																		*				
Rubiaceae	*Psydrax*	*Psydrax suaveolens*								*			*											
Santalaceae	*Santalum*	*Santalum lanceolatum*		*														*						
Santalaceae	*Santalum*	*Santalum spicatum*				*																		
Sapindaceae	*Dodonaea*	*Dodonaea pachyneura*							*		*			*										

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
Sapindaceae	*Dodonaea*	*Dodonaea viscosa* subsp. *angustissima*												*										
Scrophulariaceae	*Eremophila*	*Eremophila jucunda*											*	*										
Scrophulariaceae	*Eremophila*	*Eremophila exilifolia*																	*					
Scrophulariaceae	*Eremophila*	*Eremophila forrestii* subsp. *forrestii*		*				*								*		*						
Scrophulariaceae	*Eremophila*	*Eremophila galeata*								*			*											*
Scrophulariaceae	*Eremophila*	*Eremophila glutinosa*													*				*	*	*		*	
Scrophulariaceae	*Eremophila*	*Eremophila latrobei* subsp. *latrobei*				*		*					*	*										
Scrophulariaceae	*Eremophila*	*Eremophila oppositifolia* subsp. *angustifolia*		*		*												*						
Scrophulariaceae	*Eremophila*	*Eremophila prolata* (P1)	*									*	*	*	*		*		*	*	*	*		
Scrophulariaceae	*Eremophila*	*Eremophila pterocarpa* subsp. *acicularis*													*						*		*	
Scrophulariaceae	*Eremophila*	*Eremophila spectabilis*	*	*			*				*		*				*	*						*
Solanaceae	*Solanum*	*Solanum lasiophyllum*									*		*											
Zygophyllaceae	*Tribulus*	*Tribulus suberosus*												*	*									

Species List per Vegetation Group (Quadrat data including opportunistic sampling)

Family	Genus	Taxon	a	b	c	d	e	f	g	h	i
Amaranthaceae	*Ptilotus*	*Ptilotus albidus*	*								
Amaranthaceae	*Ptilotus*	*Ptilotus exaltatus*			*						
Amaranthaceae	*Ptilotus*	*Ptilotus obovatus*	*	*	*	*	*		*		
Amaranthaceae	*Ptilotus*	*Ptilotus rotundifolius*	*			*					
Amaranthaceae	*Ptilotus*	*Ptilotus schwartzii*	*			*	*	*	*		
Apocynaceae	*Leichhardtia*	*Leichhardtia australis*	*	*							
Asteraceae	*Bidens*	*Bidens bipinnata**		*							
Asteraceae	*Streptoglossa*	*Streptoglossa liatroides*		*							
Chenopodiaceae	*Maireana*	*Maireana murrayana* (P3)	*								
Chenopodiaceae	*Enchylaena*	*?Enchylaena tomentosa*	*								
Chenopodiaceae	*Maireana*	*Maireana convexa*	*								
Chenopodiaceae	*Maireana*	*Maireana georgei*									*
Chenopodiaceae	*Maireana*	*Maireana glomerifolia*								*	
Chenopodiaceae	*Maireana*	*Maireana prosthecochaeta* (P3)							*		
Chenopodiaceae	*Maireana*	*Maireana pyramidata*		*	*					*	
Chenopodiaceae	*Maireana*	*Maireana triptera*	*								
Chenopodiaceae	*Maireana*	*Maireana ?melanocoma*	*								
Chenopodiaceae	*Rhagodia*	*Rhagodia drummondii*		*		*					
Chenopodiaceae	*Sclerolaena*	*Sclerolaena cornishiana*			*						
Chenopodiaceae	*Sclerolaena*	*Sclerolaena cuneata*								*	
Chenopodiaceae	*Sclerolaena*	*Sclerolaena densiflora*								*	
Chenopodiaceae	*Sclerolaena*	*Sclerolaena diacantha*	*		*					*	
Chenopodiaceae	*Sclerolaena*	*Sclerolaena eriacantha*	*							*	
Chenopodiaceae	*Tecticornia*	*Tecticornia disarticulata*		*	*					*	
Fabaceae	*Acacia*	*Acacia ?sibirica*	*								
Fabaceae	*Acacia*	*Acacia grasbyi*		*							
Fabaceae	*Acacia*	*Acacia rhodophloia*	*								
Fabaceae	*Acacia*	*Acacia umbraculiformis*	*								
Fabaceae	*Acacia*	*Acacia ?kempeana*						*			
Fabaceae	*Acacia*	*Acacia aneura*	*	*		*	*	*	*	*	*
Fabaceae	*Acacia*	*Acacia aptaneura*	*	*		*					
Fabaceae	*Acacia*	*Acacia citrinoviridis*						*	*		
Fabaceae	*Acacia*	*Acacia craspedocarpa*				*					
Fabaceae	*Acacia*	*Acacia cuspidifolia*			*					*	
Fabaceae	*Acacia*	*Acacia fuscaneura*		*							
Fabaceae	*Acacia*	*Acacia kempeana*		*							
Fabaceae	*Acacia*	*Acacia mulganeura*		*		*	*				
Fabaceae	*Acacia*	*Acacia pruinocarpa*	*			*					
Fabaceae	*Acacia*	*Acacia pteraneura*	*	*			*				*
Fabaceae	*Acacia*	*Acacia ramulosa* var. *linophylla*		*		*					
Fabaceae	*Acacia*	*Acacia sclerosperma* subsp. *sclerosperma*	*	*							*
Fabaceae	*Acacia*	*Acacia* sp. (possible new species)									*

Fabaceae	*Acacia*	*Acacia tetragonophylla*	*	*		*			*	*	*
Fabaceae	*Acacia*	*Acacia papyrocarpa*	*	*							*
Fabaceae	*Senna*	*Senna artemisioides* subsp. *×sturtii*	*	*		*	*		*		
Fabaceae	*Senna*	*Senna artemisioides* subsp. *artemisioides*	*	*					*		*
Fabaceae	*Senna*	*Senna artemisioides* subsp. *filifolia*	*								
Fabaceae	*Senna*	*Senna artemisioides* subsp. *helmsii*	*	*							
Fabaceae	*Senna*	*Senna glutinosa subsp. ×luerssenii*	*					*		*	
Fabaceae	*Senna*	*Senna glutinosa* subsp. *chatelainiana*	*	*		*					*
Fabaceae	*Senna*	*Senna pleurocarpa*									*
Fabaceae	*Senna*	*Senna* sp. Meekatharra		*						*	
Frankeniaceae	*Frankenia*	*Frankenia ?magnifica*	*								
Goodeniaceae	*Scaevola*	*Scaevola spinescens*	*	*	*				*		*
Malvaceae	*Abutilon*	*Abutilon cryptopetalum*		*							
Malvaceae	*Abutilon*	*Abutilon otocarpum*		*							
Malvaceae	*Abutilon*	*Abutilon oxycarpum*		*		*					
Malvaceae	*Sida*	*Sida calyxhymenia*	*	*							
Malvaceae	*Sida*	*Sida ectogama*		*		*		*			
Malvaceae	*Sida*	*Sida picklesiana* (P3)							*		
Myrtaceae	*Micromyrtus*	*?Micromyrtus* sp.		*							
Myrtaceae	*Corymbia*	*Corymbia ferriticola*	*								
Myrtaceae	*Thryptomene*	*Thryptomene decussata*						*			
Poaceae	*Aristida*	*Aristida contorta*	*	*		*			*		
Poaceae	*Enneapogon*	*Enneapogon caerulescens*		*		*					
Poaceae	*Enteropogon*	*Enteropogon ramosus*	*	*							*
Poaceae	*Eragrostis*	*Eragrostis eriopoda*		*		*					
Poaceae	*Eragrostis*	*Eragrostis falcata*				*					
Poaceae	*Eriachne*	*Eriachne helmsii*		*							
Poaceae	*Eriachne*	*Eriachne pulchella* subsp. *pulchella*	*	*					*	*	*
Poaceae	*Monachather*	*Monachather paradoxus*	*	*		*		*			
Proteaceae	*Grevillea*	*Grevillea berryana*				*	*		*		
Proteaceae	*Hakea*	*Hakea lorea* subsp. *lorea*		*							
Proteaceae	*Hakea*	*Hakea recurva* subsp. *recurva*	*								
Pteridaceae	*Cheilanthes*	*Cheilanthes sieberi* subsp. *sieberi*	*	*		*	*				
Rubiaceae	*Psydrax*	*Psydrax latifolia*				*	*				
Rubiaceae	*Psydrax*	*Psydrax rigidula*	*								
Rubiaceae	*Psydrax*	*Psydrax suaveolens*	*			*					
Santalaceae	*Santalum*	*Santalum lanceolatum*		*							
Santalaceae	*Santalum*	*Santalum spicatum*		*							
Sapindaceae	*Dodonaea*	*Dodonaea pachyneura*	*					*	*		
Sapindaceae	*Dodonaea*	*Dodonaea viscosa* subsp. *angustissima*	*								
Scrophulariaceae	*Eremophila*	*Eremophila congesta* (P1)	*								
Scrophulariaceae	*Eremophila*	*Eremophila linearis*	*								
Scrophulariaceae	*Eremophila*	*Eremophila micrantha*								*	
Scrophulariaceae	*Eremophila*	*Eremophila pterocarpa*									

Scrophulariaceae	*Eremophila*	*Eremophila jucunda*	*								
Scrophulariaceae	*Eremophila*	*Eremophila exilifolia*									*
Scrophulariaceae	*Eremophila*	*Eremophila forrestii* subsp. *forrestii*		*			*				
Scrophulariaceae	*Eremophila*	*Eremophila galeata*	*			*					
Scrophulariaceae	*Eremophila*	*Eremophila glutinosa*	*							*	*
Scrophulariaceae	*Eremophila*	*Eremophila latrobei* subsp. *latrobei*	*	*			*				
Scrophulariaceae	*Eremophila*	*Eremophila oppositifolia* subsp. *angustifolia*		*							
Scrophulariaceae	*Eremophila*	*Eremophila prolata* (P1)	*	*	*					*	*
Scrophulariaceae	*Eremophila*	*Eremophila pterocarpa* subsp. *acicularis*								*	
Scrophulariaceae	*Eremophila*	*Eremophila spectabilis*	*	*		*			*		*
Solanaceae	*Solanum*	*Solanum lasiophyllum*	*						*		
Zygophyllaceae	*Tribulus*	*Tribulus suberosus*	*							*	

Appendix G - Site Descriptions

Project Name: Hermes South			
Date:	26/10/2021	**Botanist:**	Eren Reid
Location:	South Hermes	**Quadrat:**	Q1
Quadrat size:	20x20		
Vegetation group:	Mulga Shrubland over Quarts and Ironstone rises		
WP:	1		
Photo number:		1	
Landform:		Hillock/Mound	
Land surface/disturbance:		No effective disturbance	
Coarse fragments on the surface (abundance/size/shape):		Extremely; very abundant/Cobbly; or cobbles/Angular	
Rock outcrop (abundance/runoff):		Rockland/Moderately rapid	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Firm	
% Cover leaf litter:		5	
% Cover bare ground:		75	

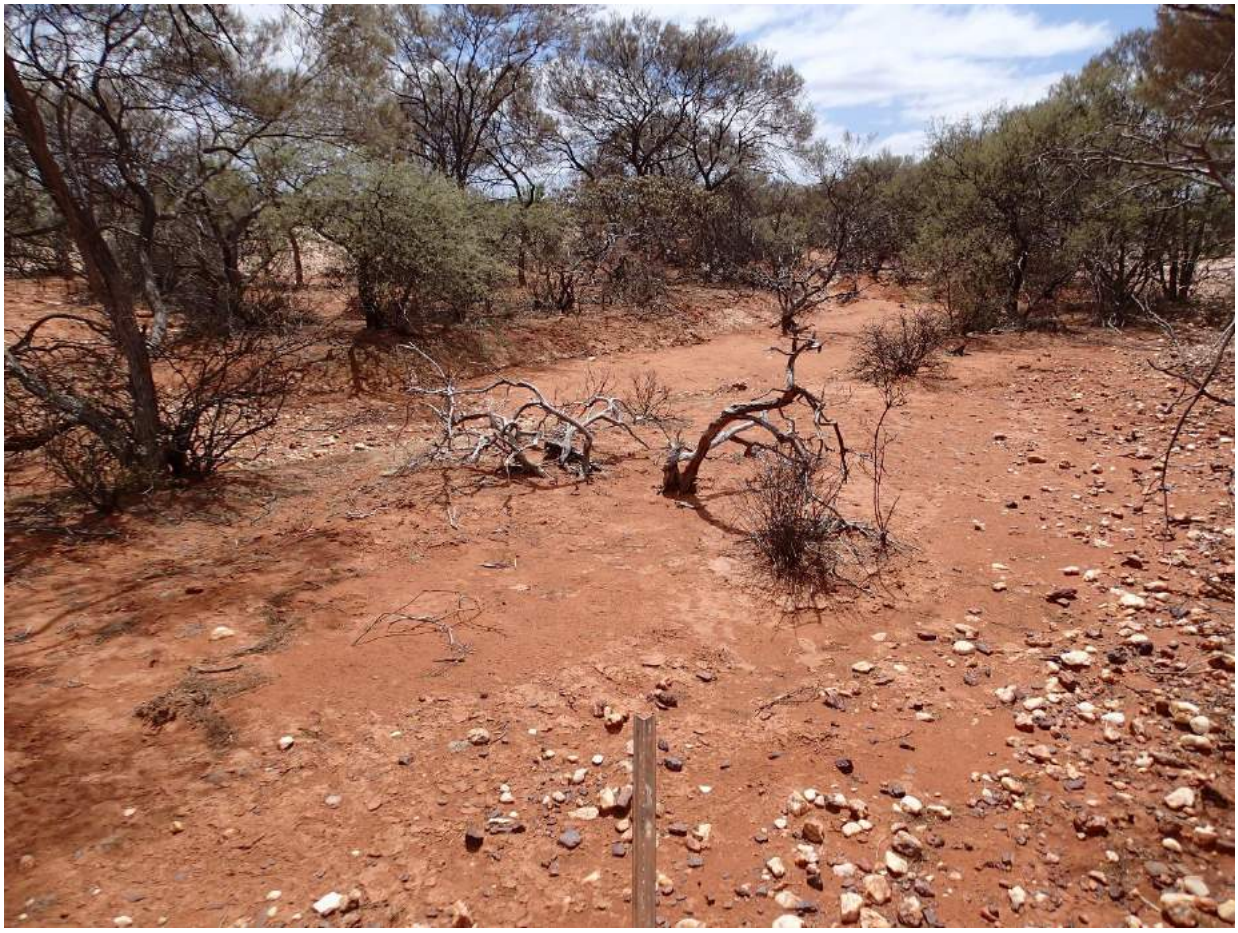
Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	S Shrub	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	3-6m	**Height:**	0.5-1m	**Height:**	0.25-0.5m
Crown cover %:	V <10	**Crown cover %:**	V <10	**Crown cover %:**	V <10
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Eremophila prolata (P1)-15 plants		Ptilotus obovatus	
Acacia aptaneura		Senna artemisioides subsp. ×sturtii			

ALL SPECIES
Acacia aneura
Acacia aptaneura
Eremophila prolata (P1)-15 plants
Senna artemisioides subsp. ×sturtii
Ptilotus obovatus
Acacia tetragonophylla
Aristida contorta
Senna artemisioides subsp. artemisioides
Enteropogon ramosus
Acacia pteraneura
Eriachne pulchella subsp. pulchella
Maireana? melanocoma - 2 plants
Eremophila spectabilis
Scaevola spinescens
Acacia sclerosperma subsp. sclerosperma
? Enchylaena tomentosa
Sclerolaena eriacantha
Outside
Eremophila pterocarpa subsp. acicularis
Acacia papyrocarpa
Acacia cuspidifolia
Senna glutinosa subsp. ×luerssenii

Project Name: Hermes South			
Date:	26/10/2021	**Botanist:**	Eren Reid
Location:	Hermes south	**Quadrat:**	Q2
Quadrat size:	20x20		
Vegetation group:	Mulga creekline Vegetation		
WP:	2		
Photo number:		4	
Landform:		Open depression (vale)/Drainage depression	
Land surface/disturbance:		No effective disturbance	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Cobbly; or cobbles/Rounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/Moderately rapid	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Loose	
% Cover leaf litter:		10	
% Cover bare ground:		60	

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 %:	S 10-30	**Crown cover %:**	S 10-30	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Acacia tetragonophylla		Sida ectogama	
Acacia aptaneura		Eremophila oppositifolia subsp. angustifolia		Eremophila forrestii subsp. forrestii	
				Senna artemisioides subsp. ×sturtii	

ALL SPECIES
Acacia aneura
Acacia aptaneura
Acacia tetragonophylla
Eremophila oppositifolia subsp. angustifolia
Sida ectogama
Eremophila forrestii subsp. forrestii
Senna artemisioides subsp. ×sturtii
Senna artemisioides subsp. artemisioides
Eremophila spectabilis
Aristida contorta
Santalum lanceolatum
Senna sp. Meekatharra
Acacia ?papyrocarpa
Acacia mulganeura
Enteropogon ramosus
Scaevola spinescens
Eragrostis eriopoda
Eriachne pulchella subsp. pulchella
Enneapogon caerulescens
Acacia pteraneura
Sida calyxhymenia
Ptilotus obovatus
Maireana pyramidata
Acacia fuscaneura
Outside



Project Name: Hermes South			
Date:	26/10/2021	**Botanist:**	Eren Reid
Location:	South Hermes	**Quadrat:**	Q3
Quadrat size:	20x20		
Vegetation group:	Acacia cuspidifolia over Maireana pyramidata shrubland		
WP:	3		
Photo number:		8	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance	
Coarse fragments on the surface (abundance/size/shape):		Very; abundant/Cobbly; or cobbles/Rounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/Slow	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Firm	
% Cover leaf litter:		5	
% Cover bare ground:		70	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	S Shrub	**Growth form:**		**Growth form:**	S Shrub
Height:	3-6m	**Height:**		**Height:**	0.5-1m
Crown cover %:	I <1	**Crown cover %:**		**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia cuspidifolia				Maireana pyramidata	

ALL SPECIES
Acacia cuspidifolia
Maireana pyramidata
Sclerolaena diacantha
Tecticornia disarticulata
Sclerolaena cornishiana
Ptilotus exaltatus
Outside
Senna artemisioides subsp. x sturtii
Rhagodia drummondii

Project Name: Hermes South			
Date:	21/10/2021	**Botanist:**	Eren Reid
Location:	Hermes south	**Quadrat:**	Q4
Quadrat size:	20x20		
Vegetation group:	Mulga creekline Vegetation		
WP:	11		
Photo number:		11	
Landform:		Open depression (vale)/Drainage depression	
Land surface/disturbance:		No effective disturbance	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Cobbly; or cobbles/Rounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/Moderately rapid	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Loose	
% Cover leaf litter:		10	
% Cover bare ground:		60	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	S Shrub	**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:**	
Acacia aneura		Acacia tetragonophylla		Sida ectogama	
Acacia aptaneura				Eremophila latrobei subsp. latrobei	
				Senna artemisioides subsp. helmsii	

ALL SPECIES
Acacia aneura
Acacia aptaneura
Acacia tetragonophylla
Sida ectogama
Eremophila latrobei subsp. latrobei
Senna artemisioides subsp. helmsii
Acacia mulganeura
Cheilanthes sieberi subsp. sieberi
Ptilotus obovatus
Acacia ramulosa var. linophylla
Senna artemisioides subsp. ×sturtii
Acacia kempeana
Enteropogon ramosus
Aristida contorta
Tecticornia disarticulata
Eremophila oppositifolia subsp. angustifolia
Santalum spicatum
Eriachne helmsii
Enneapogon caerulescens
Sida calyxhymenia
Outside
Maireana triptera
Grevillea berryana

Project Name:			
Date:	26/10/2021	**Botanist:**	Eren Reid
Location:	South Hermes	**Quadrat:**	Q5
Quadrat size:	20x20		
Vegetation group:	Acacia pruinocarpa over Acacia aneura shrubland		
WP:	17		
Photo number:		13	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance	
Coarse fragments on the surface (abundance/size/shape):		Very; abundant/Medium gravelly; medium pebbles/Subrounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/Slow	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Firm	
% Cover leaf litter:		20	
% Cover bare ground:		60	

Tallest stratum		**Mid-stratum**		**Lower stratum**	
Growth form:	T Tree	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	3-6m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	I <1	**Crown cover %:**	S 10-30	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia pruinocarpa		Acacia aneura		Eremophila spectabilis	
		Acacia craspedocarpa		Rhagodia drummondii	

ALL SPECIES
Acacia pruinocarpa
Acacia aneura
Acacia craspedocarpa
Eremophila spectabilis
Rhagodia drummondii
Ptilotus obovatus
Grevillea berryana
Ptilotus schwartzii
Enneapogon caerulescens
Monachather paradoxus
Abutilon oxycarpum
Eragrostis eriopoda
Senna artemisioides subsp. ×sturtii
Aristida contorta
Eragrostis falcata
Outside
Psydrax latifolia
Eremophila forrestii subsp. forrestii

Project Name: Hermes South			
Date:	26/10/2021	**Botanist:**	Eren Reid
Location:	South Hermes	**Quadrat:**	Q6
Quadrat size:	20x20		
Vegetation group:	Mulga over Eremophila forrestii shrubland		
WP:	19		
Photo number:		14	
Landform:		Mid slope/Hillslope	
Land surface/disturbance:		No effective disturbance	
Coarse fragments on the surface (abundance/size/shape):		Very; abundant/Medium gravelly; medium pebbles/Subrounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/Slow	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Hard setting	
% Cover leaf litter:		20	
% Cover bare ground:		60	

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 %:	S 10-30	**Crown cover %:**	V <10	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Grevillea berryana		Eremophila forrestii subsp. forrestii	

ALL SPECIES
Acacia aneura
Grevillea berryana
Eremophila forrestii subsp. forrestii
Acacia mulganeura
Ptilotus schwartzii
Ptilotus obovatus
Psydrax latifolia
Eremophila latrobei subsp. latrobei
Cheilanthes sieberi subsp. sieberi
Acacia pteraneura
Senna artemisioides subsp. ×sturtii
Outside

Project Name: Hermes South			
Date:	26/10/2021	**Botanist:**	Eren Reid
Location:	South Hermes	**Quadrat:**	Q7
Quadrat size:	20x20		
Vegetation group:	Acacia citrinoviridis over Thryptomene decussata and Dodonaea pachyneura		
WP:	22		
Photo number:		17	
Landform:		Mid slope/Hillslope	
Land surface/disturbance:		No effective disturbance	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Cobbly; or cobbles/Subrounded	
Rock outcrop (abundance/runoff):		Rockland/Rapid	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Firm	
% Cover leaf litter:		10	
% Cover bare ground:		70	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	S Shrub	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	1-3m	**Height:**	0.5-1m	**Height:**	0.25-0.5m
Crown cover %:	V <10	**Crown cover %:**	S 10-30	**Crown cover %:**	I <1
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia citrinoviridis		Thryptomene decussata		Dodonaea pachyneura	

ALL SPECIES
Acacia citrinoviridis
Thryptomene decussata
Dodonaea pachyneura
Acacia aneura
Senna glutinosa subsp. ×luerssenii
Monachather paradoxus
Sida ectogama
Ptilotus schwartzii
Acacia ?kempeana
Outside

Project Name: Hermes South			
Date:	26/10/2021	**Botanist:**	Eren Reid
Location:	South Hermes	**Quadrat:**	Q8
Quadrat size:	20x20		
Vegetation group:	Mulga creekline Vegetation		
WP:	36		
Photo number:		18	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Cobbly; or cobbles/Subangular tabular	
Rock outcrop (abundance/runoff):		No bedrock exposed/Slow	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Firm	
% Cover leaf litter:		5	
% Cover bare ground:		65	

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 %:	V <10	**Crown cover %:**	S 10-30	**Crown cover %:**	V <10
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia pruinocarpa		Acacia aneura		Ptilotus rotundifolius	
		Acacia aptaneura		Acacia tetragonophylla	
		Eremophila galeata		Ptilotus obovatus	

ALL SPECIES
Acacia pruinocarpa
Acacia aneura
Acacia aptaneura
Eremophila galeata
Ptilotus rotundifolius
Acacia tetragonophylla
Ptilotus obovatus
Aristida contorta
Sida ectogama
Psydrax latifolia
Cheilanthes sieberi subsp. sieberi
Acacia ramulosa var. linophylla
Ptilotus schwartzii
Psydrax suaveolens
Senna glutinosa subsp. chatelainiana
Monachather paradoxus
Rhagodia drummondii
Outside

Project Name: Hermes South			
Date:	26/10/2021	**Botanist:**	Eren Reid
Location:	South Hermes	**Quadrat:**	Q9
Quadrat size:	20x20		
Vegetation group:	Mulga over Senna shrublands		
WP:	41		
Photo number:		19	
Landform:		Hillock/Mound	
Land surface/disturbance:		No effective disturbance	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Cobbly; or cobbles/Rounded tabular	
Rock outcrop (abundance/runoff):		Slightly rocky/Slow	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Firm	
% Cover leaf litter:		5	
% Cover bare ground:		75	

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 %:	V <10	**Crown cover %:**	V <10	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Acacia citrinoviridis		Eremophila spectabilis	
		Grevillea berryana		Senna artemisioides subsp. artemisioides	
				Senna artemisioides subsp. ×sturtii	

ALL SPECIES
Acacia aneura
Acacia citrinoviridis
Grevillea berryana
Eremophila spectabilis
Senna artemisioides subsp. artemisioides
Senna artemisioides subsp. ×sturtii
Scaevola spinescens
Eriachne pulchella subsp. pulchella
Ptilotus schwartzii
Ptilotus obovatus
Dodonaea pachyneura
Solanum lasiophyllum
Aristida contorta
Sida picklesiana (P3)- 2 plants
Acacia tetragonophylla
Maireana prosthecochaeta(P3)- 5 plants
Outside

Project Name: Hermes South			
Date:	27/10/2021	**Botanist:**	Eren Reid
Location:	South Hermes	**Quadrat:**	Q10
Quadrat size:	20x20		
Vegetation group:	Mulga creekline Vegetation		
WP:	44		
Photo number:		23	
Landform:		Open depression (vale)/Drainage depression	
Land surface/disturbance:		No effective disturbance	
Coarse fragments on the surface (abundance/size/shape):		Slightly; few/Cobbly; or cobbles/Subangular	
Rock outcrop (abundance/runoff):		No bedrock exposed/Slow	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Loose	
% Cover leaf litter:		20	
% Cover bare ground:		70	

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 %:	S 10-30	**Crown cover %:**	S 10-30	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Acacia papyrocarpa		Senna artemisioides subsp. ×sturtii	
				Eremophila prolata (P1)- 3 plants	
				Ptilotus obovatus	

ALL SPECIES
Acacia aneura
Acacia papyrocarpa
Senna artemisioides subsp. ×sturtii
Eremophila prolata (P1)- 3 plants
Ptilotus obovatus
Acacia mulganeura
Acacia pteraneura
Maireana pyramidata
Acacia tetragonophylla
Sida ectogama
Enteropogon ramosus
Senna artemisioides subsp. helmsii
Senna glutinosa subsp. chatelainiana
Abutilon oxycarpum
Aristida contorta
Enneapogon caerulescens
Rhagodia drummondii
Eriachne pulchella subsp. pulchella
Outside
Acacia cuspidifolia

Project Name: Hermes South			
Date:	27/10/2021	**Botanist:**	Eren Reid
Location:	South Hermes	**Quadrat:**	Q11
Quadrat size:	20x20		
Vegetation group:	Mulga Shrubland over Quarts and Ironstone rises		
WP:	46		
Photo number:		24	
Landform:		Simple slope/Hillslope	
Land surface/disturbance:		No effective disturbance	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Cobbly; or cobbles/Subrounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/Slow	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Firm	
% Cover leaf litter:		5	
% Cover bare ground:		80	

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 %:	S 10-30	**Crown cover %:**	S 10-30	**Crown cover %:**	V <10
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Eremophila spectabilis		Ptilotus rotundifolius	
		Acacia tetragonophylla		Eremophila prolata (P1)- 6 plants	
		Eremophila galeata		Senna artemisioides subsp. artemisioides	

ALL SPECIES
Acacia aneura
Eremophila spectabilis
Acacia tetragonophylla
Eremophila galeata
Ptilotus rotundifolius
Eremophila prolata (P1)- 6 plants
Senna artemisioides subsp. artemisioides
Ptilotus schwartzii
Aristida contorta
Psydrax suaveolens
Cheilanthes sieberi subsp. sieberi
Ptilotus obovatus
Eremophila jucunda
Eriachne pulchella subsp. pulchella
Senna artemisioides subsp. ×sturtii
Senna glutinosa subsp. chatelainiana
Maireana triptera
Scaevola spinescens
Senna artemisioides subsp. filifolia
Acacia pruinocarpa
Acacia papyrocarpa
Senna artemisioides subsp. helmsii
Eremophila latrobei subsp. latrobei
Monachather paradoxus
Sida calyxhymenia
Solanum lasiophyllum
Outside

Project Name: Hermes South			
Date:	27/10/2021	**Botanist:**	Eren Reid
Location:	South Hermes	**Quadrat:**	Q12
Quadrat size:	20x20		
Vegetation group:	Mulga Shrubland over Quarts and Ironstone rises		
WP:	52		
Photo number:		28-31	
Landform:		Lower slope/Breakaway	
Land surface/disturbance:		No effective disturbance	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Cobbly; or cobbles/Angular tabular	
Rock outcrop (abundance/runoff):		Very rocky/Very rapid	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Firm	
% Cover leaf litter:		10	
% Cover bare ground:		45	

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 %:	S 10-30	**Crown cover %:**	S 10-30	**Crown cover %:**	V <10
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Dodonaea pachyneura		Eremophila prolata (P1)	
				Eremophila jucunda	

ALL SPECIES
Acacia aneura
Dodonaea pachyneura
Eremophila prolata (P1)
Eremophila jucunda
Eriachne pulchella subsp. pulchella
Aristida contorta
Leichhardtia australis
Monachather paradoxus
Cheilanthes sieberi subsp. sieberi
Sclerolaena diacantha
Senna glutinosa subsp. ×luerssenii
Maireana convexa
Ptilotus obovatus
Acacia pteraneura
Eremophila latrobei subsp. latrobei
Dodonaea viscosa subsp. angustissima
Acacia tetragonophylla
Tribulus suberosus
Sida calyxhymenia
Frankenia ?magnifica
Corymbia ferriticola
Outside

Project Name: Hermes South			
Date:	27/10/2021	**Botanist:**	Eren Reid
Location:	Hermes south	**Quadrat:**	Q13
Quadrat size:	20x20		
Vegetation group:	Open Mulga Shrubland over Eremophila pterocarpa and occassional Eremophila glutinosa		
WP:	69		
Photo number:		39-40	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Coarse gravelly; large pebbles/Angular platy	
Rock outcrop (abundance/runoff):		No bedrock exposed/Slow	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Hard setting	
% Cover leaf litter:		5	
% Cover bare ground:		90	

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 %:	I <1	**Crown cover %:**	V <10	**Crown cover %:**	I <1
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Eremophila pterocarpa subsp. acicularis		Tecticornia disarticulata	
		Eremophila glutinosa		Senna sp. Meekatharra	

ALL SPECIES
Acacia aneura
Eremophila pterocarpa subsp. acicularis
Eremophila glutinosa
Tecticornia disarticulata
Senna sp. Meekatharra
Sclerolaena cuneata
Sclerolaena diacantha
Sclerolaena densiflora
Eremophila prolata(P1) -1 plant
Sclerolaena eriacantha
Senna glutinosa subsp. ×luerssenii
Acacia tetragonophylla
Eriachne pulchella subsp. pulchella
Tribulus suberosus
Outside

Project Name: Hermes South			
Date:	27/10/2021	**Botanist:**	Eren Reid
Location:	Hermes south	**Quadrat:**	Q14
Quadrat size:	20x20		
Vegetation group:	Mulga creekline Vegetation		
WP:	108		
Photo number:		41	
Landform:		Open depression (vale)/Drainage depression	
Land surface/disturbance:		No effective disturbance	
Coarse fragments on the surface (abundance/size/shape):		No coarse fragments	
Rock outcrop (abundance/runoff):		No bedrock exposed/Moderately rapid	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Loose	
% Cover leaf litter:		40	
% Cover bare ground:		45	

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 %:**	V <10	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Senna artemisioides subsp. helmsii		Ptilotus obovatus	
Acacia aptaneura				Sida ectogama	

ALL SPECIES
Acacia aneura
Acacia aptaneura
Senna artemisioides subsp. helmsii
Ptilotus obovatus
Sida ectogama
Sida calyxhymenia
Acacia sclerosperma subsp. sclerosperma
Abutilon otocarpum
Abutilon oxycarpum
Enteropogon ramosus
Aristida contorta
Bidens bipinnata*
Eremophila forrestii subsp. forrestii
Acacia tetragonophylla
Leichhardtia australis
Monachather paradoxus
Streptoglossa liatroides
Hakea lorea subsp. lorea
Outside

Project Name: Hermes South			
Date:	27/10/2021	**Botanist:**	Eren Reid
Location:	Hermes south	**Quadrat:**	Q15
Quadrat size:			
Vegetation group:	Mulga over Acacia sp. (possible new species) over Senna pleurocarpa and Eremophila prolata (P1)		
WP:	126		
Photo number:		45	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance	
Coarse fragments on the surface (abundance/size/shape):		Very; abundant/Cobbly; or cobbles/Subrounded	
Rock outcrop (abundance/runoff):		Slightly rocky/Slow	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Firm	
% Cover leaf litter:		5	
% Cover bare ground:		75	

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 %:	V <10	**Crown cover %:**	S 10-30	**Crown cover %:**	V <10
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Acacia sp. (possible new species)		Senna pleurocarpa	
		Acacia papyrocarpa		Senna artemisioides subsp. artemisioides	
				Eremophila prolata(P1)- 11 plants	

ALL SPECIES
Acacia aneura
Acacia sp. (possible new species)
Acacia papyrocarpa
Senna pleurocarpa
Senna artemisioides subsp. artemisioides
Eremophila prolata(P1)- 11 plants
Eremophila spectabilis
Acacia pteraneura
Acacia tetragonophylla
Enteropogon ramosus
Maireana georgei
Eriachne pulchella subsp. pulchella
Outside

Project Name: Hermes South			
Date:	27/10/2021	**Botanist:**	Eren Reid
Location:	Hermes south	**Quadrat:**	Q16
Quadrat size:	20x20		
Vegetation group:	Mulga creekline Vegetation		
WP:	274		
Photo number:		48-49	
Landform:		Open depression (vale)/Drainage depression	
Land surface/disturbance:		No effective disturbance	
Coarse fragments on the surface (abundance/size/shape):		No coarse fragments	
Rock outcrop (abundance/runoff):		No bedrock exposed/Moderately rapid	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Loose	
% Cover leaf litter:		10	
% Cover bare ground:		60	

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 %:	S 10-30	**Crown cover %:**	S 10-30	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Acacia tetragonophylla		Sida ectogama	
Acacia aptaneura		Eremophila oppositifolia subsp. angustifolia		Eremophila forrestii subsp. forrestii	
Acacia pteraneura				Senna artemisioides subsp. ×sturtii	

ALL SPECIES
Acacia aneura
Acacia aptaneura
Acacia pteraneura
Acacia tetragonophylla
Eremophila oppositifolia subsp. angustifolia
Sida ectogama
Eremophila forrestii subsp. forrestii
Senna artemisioides subsp. ×sturtii
Senna artemisioides subsp. artemisioides
Eremophila spectabilis
Aristida contorta
Santalum lanceolatum
Senna sp. Meekatharra
Acacia papyrocarpa
Acacia mulganeura
Enteropogon ramosus
Scaevola spinescens
Eragrostis eriopoda
Eriachne pulchella subsp. pulchella
Enneapogon caerulescens
Acacia pteraneura
Sida calyxhymenia
Ptilotus obovatus
Maireana pyramidata
Outside

Project Name: Hermes South			
Date:	25/01/2022	**Botanist:**	Eren Reid
Location:	Hermes South	**Quadrat:**	Q17
Quadrat size:	20x20		
Vegetation group:	Mulga over Acacia sp. (possible new species) over Senna pleurocarpa and Eremophila prolata (P1)		
WP:	5		
Photo number:		7	
Landform:		Simple slope/Hillslope	
Land surface/disturbance:		No effective disturbance	
Coarse fragments on the surface (abundance/size/shape):		Very; abundant/Bouldery; or boulders/Subrounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/Moderately rapid	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Surface crust	
% Cover leaf litter:		5	
% Cover bare ground:		75	

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 %:	V <10	**Crown cover %:**	S 10-30	**Crown cover %:**	V <10
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Acacia sp. (possible new species)		Senna pleurocarpa	
		Acacia papyrocarpa		Senna artemisioides subsp. artemisioides	
		Acacia sclerosperma subsp. sclerosperma		Eremophila prolata (P1)- 25 plants	

ALL SPECIES
Acacia aneura
Acacia sp. (possible new species)
Acacia papyrocarpa
Acacia sclerosperma subsp. sclerosperma
Senna pleurocarpa
Senna artemisioides subsp. artemisioides
Eremophila prolata (P1)- 25 plants
Scaevola spinescens
Eremophila glutinosa
Eremophila exilifolia
Senna glutinosa subsp. chatelainiana
Outside

Project Name: Hermes South			
Date:	25/01/2022	**Botanist:**	Eren Reid
Location:	Hermes south	**Quadrat:**	Q18
Quadrat size:	20x20		
Vegetation group:	Mulga Shrubland over Quarts and Ironstone rises		
WP:	13		
Photo number:		8	
Landform:		Simple slope/Hillslope	
Land surface/disturbance:		No effective disturbance	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Cobbly; or cobbles/Subrounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/Slow	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Firm	
% Cover leaf litter:		5	
% Cover bare ground:		75	

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 %:	S 10-30	**Crown cover %:**	S 10-30	**Crown cover %:**	V <10
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Acacia papyrocarpa		Senna glutinosa subsp. chatelainiana	
				Eremophila prolata (P1)- 6 plants	
				Eremophila glutinosa	

ALL SPECIES
Acacia aneura
Acacia papyrocarpa
Senna glutinosa subsp. chatelainiana
Eremophila prolata (P1)- 6 plants
Eremophila glutinosa
Aristida contorta
Hakea recurva subsp. recurva
Acacia tetragonophylla
Scaevola spinescens
Psydrax rigidula
Ptilotus obovatus
Outside

Project Name: Hermes South			
Date:	25/01/2022	**Botanist:**	Eren Reid
Location:	South Hermes	**Quadrat:**	Q19
Quadrat size:	20x20		
Vegetation group:	Open Mulga Shrubland over Eremophila pterocarpa and occassional Eremophila glutinosa		
WP:	16		
Photo number:		9	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Coarse gravelly; large pebbles/Angular platy	
Rock outcrop (abundance/runoff):		No bedrock exposed/Slow	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Hard setting	
% Cover leaf litter:		5	
% Cover bare ground:		90	

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 %:	I <1	**Crown cover %:**	V <10	**Crown cover %:**	I <1
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Eremophila pterocarpa subsp. acicularis		Tecticornia disarticulata	
Acacia cuspidifolia		Eremophila glutinosa			

ALL SPECIES
Acacia aneura
Acacia cuspidifolia
Eremophila pterocarpa subsp. acicularis
Eremophila glutinosa
Tecticornia disarticulata
Sclerolaena cuneata
Sclerolaena diacantha
Sclerolaena densiflora
Sclerolaena eriacantha
Eremophila prolata (P1)- 5 plants
Maireana glomerifolia
Outside

Project Name: Hermes South			
Date:	25/01/2022	**Botanist:**	Eren Reid
Location:	South Hermes	**Quadrat:**	Q20
Quadrat size:	20x20		
Vegetation group:	Acacia cuspidifolia over Maireana pyramidata shrubland		
WP:	17		
Photo number:		10	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance	
Coarse fragments on the surface (abundance/size/shape):		Very; abundant/Cobbly; or cobbles/Rounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/Slow	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Firm	
% Cover leaf litter:		5	
% Cover bare ground:		80	

Tallest stratum		**Mid-stratum**		**Lower stratum**	
Growth form:	S Shrub	**Growth form:**		**Growth form:**	S Shrub
Height:	3-6m	**Height:**		**Height:**	0.5-1m
Crown cover %:	I <1	**Crown cover %:**		**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia cuspidifolia				Maireana pyramidata	

ALL SPECIES
Acacia cuspidifolia
Maireana pyramidata
Sclerolaena diacantha
Tecticornia disarticulata
Sclerolaena cornishiana
Ptilotus exaltatus
Ptilotus obovatus
Scaevola spinescens
Eremophila prolata (P1)- 5 plants
Outside

Project Name: Hermes South			
Date:	26/01/2022	**Botanist:**	Eren Reid
Location:	South Hermes	**Quadrat:**	Q21
Quadrat size:	20x20		
Vegetation group:	Open Mulga Shrubland over Eremophila pterocarpa and occassional Eremophila glutinosa		
WP:	19		
Photo number:		11	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Coarse gravelly; large pebbles/Angular platy	
Rock outcrop (abundance/runoff):		No bedrock exposed/Slow	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Hard setting	
% Cover leaf litter:		5	
% Cover bare ground:		90	

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 %:	I <1	**Crown cover %:**	V <10	**Crown cover %:**	I <1
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Eremophila pterocarpa subsp. acicularis		Tecticornia disarticulata	
Acacia cuspidifolia		Eremophila glutinosa		Senna sp. Meekatharra	
				Maireana pyramidata	

ALL SPECIES
Acacia aneura
Acacia cuspidifolia
Eremophila pterocarpa subsp. acicularis
Eremophila glutinosa
Tecticornia disarticulata
Senna sp. Meekatharra
Maireana pyramidata
Sclerolaena diacantha
Outside

Project Name: Hermes South			
Date:	25/01/2022	**Botanist:**	Eren Reid
Location:	South Hermes	**Quadrat:**	Q22
Quadrat size:	20x20		
Vegetation group:	Open Mulga Shrubland over Eremophila pterocarpa and occassional Eremophila glutinosa		
WP:	20		
Photo number:		12	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance	
Coarse fragments on the surface (abundance/size/shape):		Very; abundant/Medium gravelly; medium pebbles/Subrounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/Slow	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Firm	
% Cover leaf litter:		20	
% Cover bare ground:		60	

Tallest stratum		**Mid-stratum**		**Lower stratum**	
Growth form:	T Tree	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	3-6m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	I <1	**Crown cover %:**	S 10-30	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia pruinocarpa		Acacia aneura		Eremophila spectabilis	
		Acacia craspedocarpa		Rhagodia drummondii	
		Acacia mulganeura			

ALL SPECIES
Acacia pruinocarpa
Acacia aneura
Acacia craspedocarpa
Acacia mulganeura
Eremophila spectabilis
Rhagodia drummondii
Ptilotus obovatus
Grevillea berryana
Ptilotus schwartzii
Enneapogon caerulescens
Monachather paradoxus
Abutilon oxycarpum
Eragrostis eriopoda
Senna artemisioides subsp. ×sturtii
Aristida contorta
Eragrostis falcata
Eremophila galeata
Outside