DETAILED FLORA AND VEGETATION SURVEY OF THE LEONORA PROJECT-

September 2022

Prepared for: St Barbara

St Barbara Limited

Prepared by: **Native Vegetation Solutions**
PO Box 41
KALGOORLIE WA 6430
Telephone: 08 9021 5818
Mobile: 0407 998 953
E-mail: eren@nativevegsolutions.com.au
ABN: 63 584 896 400

FINAL
V2.0
March 2023

EXECUTIVE SUMMARY

St Barbara Limited (ASX: SBM), an Australian based company, has three gold mining operations, including their Leonora Operation/Project. The Leonora Project consists of the Gwalia mine, located just south of Leonora, approximately 235 kilometres (km) north of Kalgoorlie, Western Australia (WA).

SBM plan to expand their existing Leonora Project to include additional railway facilities, solar and wind farms, as well as open pit and waste landform expansions.

Talis Consultants (Talis) provided Native Vegetation Solutions (NVS) with a survey area encompassing the proposed disturbances. The Leonora Project expansion consists of three distinct areas: Gwalia (2,015 ha), Tower Hill (1,143 ha) and Harbour Lights (400 ha). The location of these survey areas is within the Murchison Bioregion of Western Australia (Figure 1), totalling approximately 3,558 hectares. At this stage, the final footprint of proposed disturbances is yet to be finalised, however, these disturbances are anticipated to be wholly contained within the survey area.

A previous comprehensive desktop assessment of the flora and vegetation within the same survey area was completed by Spectrum Ecology in November 2021 (Spectrum, 2022). The findings of the desktop assessment identified the potential occurrence of conservation significant flora, and hence a detailed flora and vegetation survey was recommended.

The survey area is located within the Eastern Murchison Interim Biogeographic Regionalisation for Australia (IBRA) subregion. The vegetation of the Eastern Murchison botanical subregion consists of Mulga woodlands often rich in ephemerals. Vegetation is dominated by hummock grasslands, saltbush and *Tecticornia* shrublands (CALM, 2002).

The Protected Matters Search Tool (PMST) provided information under the Environment Protection and Biodiversity Conservation (EPBC) Act 1999 and indicated no Threatened Ecological Communities (TECs) or Commonwealth Reserves occur within the requested search area.

The Western Australian Department of Biodiversity Conservation and Attractions (DBCA) database searches revealed a potential for no Threatened and 3 Priority Flora species to occur within a 20 km radius of the survey area (DBCA, 2023a). No known locations of Threatened or Priority Flora occur within the survey area, with the closest Priority Flora located approximately 8.6 km south of the survey area.

The Threatened Ecological Communities (TEC) search revealed no TECs within the survey area (DBCA, 2023).

The search identified two Priority Ecological Communities (PEC) within 50 km of the Survey Area; both listed as Priority 1. One of PECs intersects the Survey Area at both Gwalia and Tower Hill: The Melita calcrete groundwater assemblage type on Raeside palaeodrainage on Melita (Sons of Gwalia) Station (Appendix A). It is known for its unique assemblages of invertebrates in the groundwater calcretes and is threatened by hydrological changes associated with mining. The remaining PEC is located 25 km to the west of the Survey Area. It was assigned a ‘Low likelihood’ to occur within the survey area based on the restriction to a palaeodrainage system on Sturt Meadows Station.

No Environmentally Sensitive Areas (ESAs) are located within the survey area.

No water bodies were identified within the survey area via the Clearing Permit System (CPS) Map Viewer (DWER, 2023).

The survey area lies south of the 26th parallel, however receives average annual rainfall of approximately 236.4 mm (BOM, 2023). There is no record of *Phytophthora cinnamomi* (Dieback*)* establishing in natural ecosystems in regions receiving <400mm rainfall per annum (CALM, 2003). However, as indicated within the new Dieback guidelines (DBCA, 2020), other species of *Phytophthora* may persist east of the 400mm isohyet in unusually wet conditions. It is therefore recommended to conduct a risk assessment as per these guidelines.

Additionally if clearing is to occur within the survey area, 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.

Sixteen vegetation groups were identified during this survey, largely following topographical features and dominant species. Mapping of the 16 vegetation groups, as well as the quadrat locations can be seen in Appendix C. Photographs of each quadrat and the relevant vegetation group can be seen in Appendix F.

Two-hundred and one species were recorded within the survey area with 176 species recorded within quadrats. Forty-two families and 95 genera were recorded overall. These are listed in Appendix E, per Quadrat as well as per vegetation group. Of the native species, Asteraceae had the highest representation, with 31 species from 21 genera. The next best represented families were Chenopodiaceae and Fabaceae with 30 and 25 species respectively.

The most common and widespread species was *Ptilotus obovatus* which was recorded in 41 quadrats. The next most common were *Erodium cygnorum* and *Maireana pyramidata*, both occurring in 35 quadrats.

Quadrats Q53 and Q59 had the richest species list with 34 taxa recorded in both.

There were no Threatened or Priority Flora recorded during the survey.

Eighteen introduced weed species were detected within the survey area. Three of these are considered Declared Pests (DPIRD, 2023), *Cylindropuntia imbricata*- s22(2) C3 Restricted, *Opuntia stricta*- s22(2) C3 Restricted and *Rumex vesicarius*- Prohibited s12 C1 Prohibited.

Vegetation condition was generally ‘Good’ to ‘Very Good’ (Keighery 1994). Disturbance was present within the survey area mostly attributed to, access tracks and exploration related activities, as well as open pit mines and waste landforms.

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

Most of the species and communities recorded during this survey are widespread throughout the Eastern Murchison subregion and adjoining regions. At this stage, the final footprint of mining related disturbances is yet to be finalised, however, these disturbances are not anticipated to occur within the survey area.

This report summarises the results of a detailed flora and vegetation survey. This detailed flora and vegetation report will support numerous applications including mining proposals and clearing permits submitted to relevant Government Departments.

TABLE OF CONTENTS

Page No.

FIGURES

TABLES

APPENDICES

1 INTRODUCTION

1.1 BACKGROUND

St Barbara Limited (ASX: SBM), an Australian based company, has three gold mining operations, including their Leonora Operation/Project. The Leonora Project consists of the Gwalia mine, located just south of Leonora, approximately 235 kilometres (km) north of Kalgoorlie, Western Australia (WA).

SBM plan to expand their existing Leonora Project to include additional railway facilities, solar and wind farms, as well as open pit and waste landform expansions.

Talis Consultants (Talis) provided Native Vegetation Solutions (NVS) with a survey area encompassing the proposed disturbances. The Leonora Project expansion consists of three distinct areas: Gwalia (2,015 ha), Tower Hill (1,143 ha) and Harbour Lights (400 ha). The location of these survey areas is within the Murchison Bioregion of Western Australia (Figure 1), totalling approximately 3,558 hectares. At this stage, the final footprint of proposed disturbances is yet to be finalised, however, these disturbances are anticipated to be wholly contained within the survey area.

A previous comprehensive desktop assessment of the flora and vegetation within the same survey area was completed by Spectrum Ecology in November 2021 (Spectrum, 2022). The findings of the desktop assessment identified the potential occurrence of conservation significant flora, and hence a detailed flora and vegetation survey was recommended.

This detailed flora and vegetation report will support numerous applications including mining proposals and clearing permits submitted to relevant Government Departments.

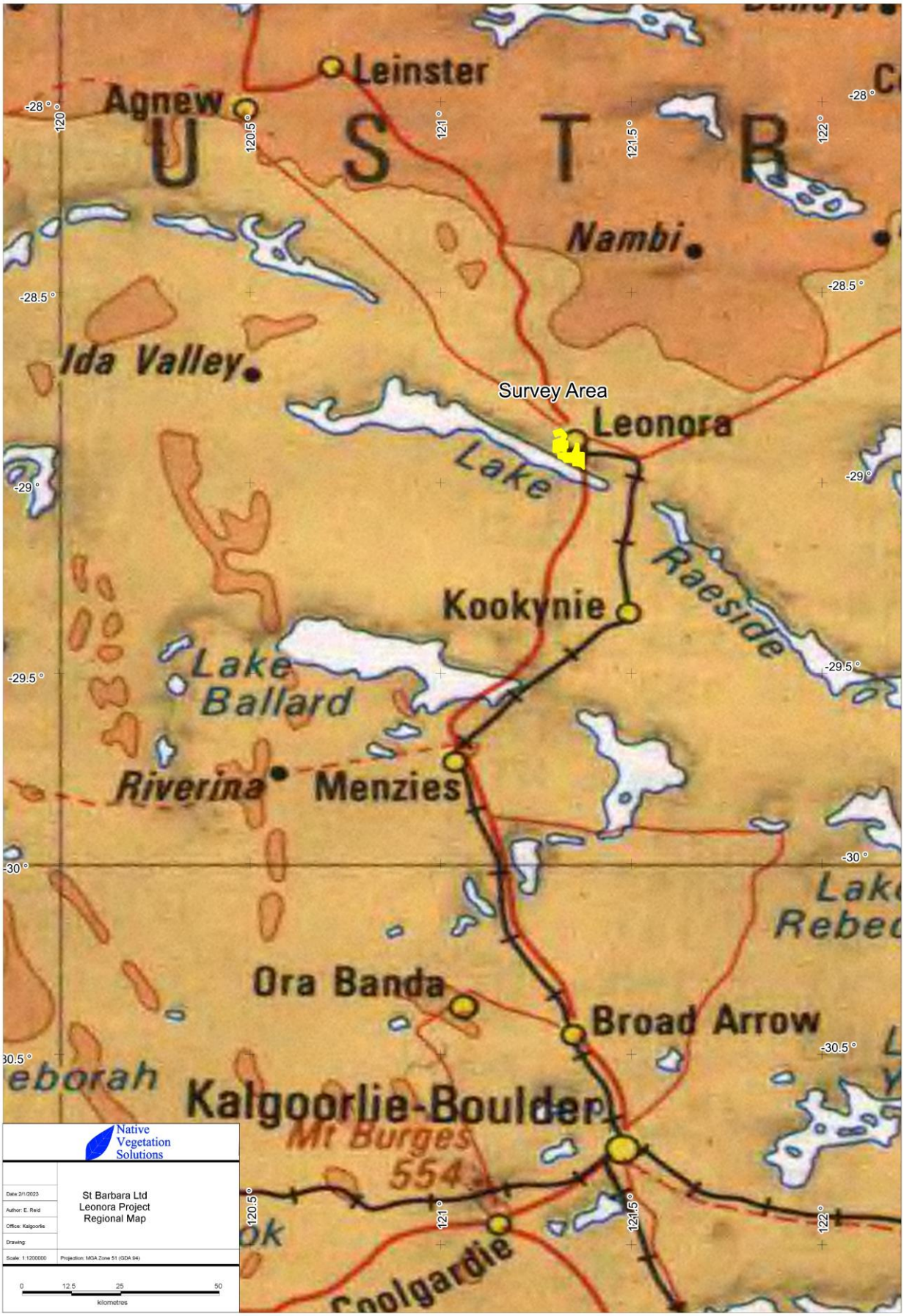


Figure 1: Regional Location of the Leonora Project

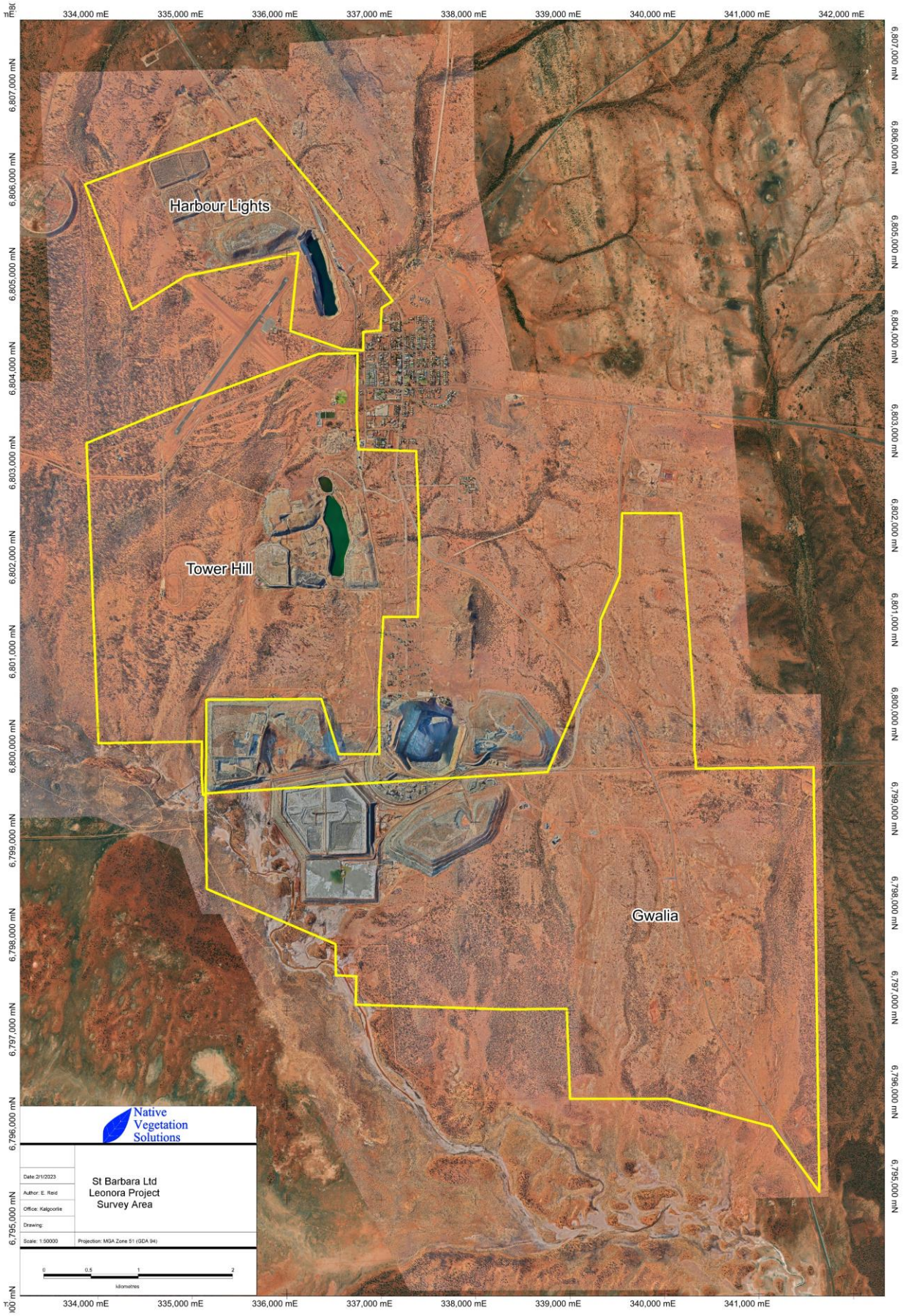


Figure 2: Survey Areas

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

1.3 STATUTORY FRAMEWORK AND GUIDANCE

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

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

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

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

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

1.3.1 Western Australian *Biodiversity Conservation Act 2016*

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

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

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

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

1.3.2 Environmental Protection Act 1986

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

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

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

1.3.3 Environment Protection and Biodiversity Conservation Act 1999

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

1.3.4 Flora

1.3.4.1 Threatened and Priority Flora

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

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

Flora are listed as PF where populations are geographically restricted or threatened by local processes, or where there is insufficient information to formally assign them to TF categories. Whilst PF are not specifically listed in the BC Act, some may qualify as being of special conservation interest and these may require a greater level of protection than unlisted species. Generally though, PF have no statutory protection. They are generally considered in environmental impact assessments under the state approval processes by Department of Mines, Industry Regulation and Safety (DMIRS) under the Mining Act and DBCA under the EP Act. Under this approval process measures are usually taken to protect and avoid PF.

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

1.3.4.2 Other Significant Flora

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

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

1.3.5 Ecological Communities and Vegetation

1.3.5.1 Threatened and Priority Ecological Communities

Nationally Listed Threatened Ecological Communities

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

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

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

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

1.3.5.2 Other Significant Vegetation

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

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

1.3.5.3 Declared Pest Plants

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

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

2 EXISTING ENVIRONMENT

2.1 CLIMATE

The subregion climate is Arid with an annual average of 200 mm of rainfall, sometimes in summer but usually in winter (CALM, 2002). The nearest official meteorological weather station with the most complete and up to date information is Leonora weather station, which is located less than 5 km of the survey area. Recordings of the local climatic conditions commenced at Leonora in 1994 (BOM, 2023) and data collected at stations 012046 and 012241 were used for this report.

2.1.1 Temperature

Mean annual minimum temperature at Leonora is 14.0°C and mean annual maximum temperature is 27.9°C. The coldest temperatures occur in July (mean minimum temperature 6.1°C), the hottest is January (mean maximum temperature 37.0°C) and diurnal temperature variations are relatively consistent throughout the year (Figure 2).

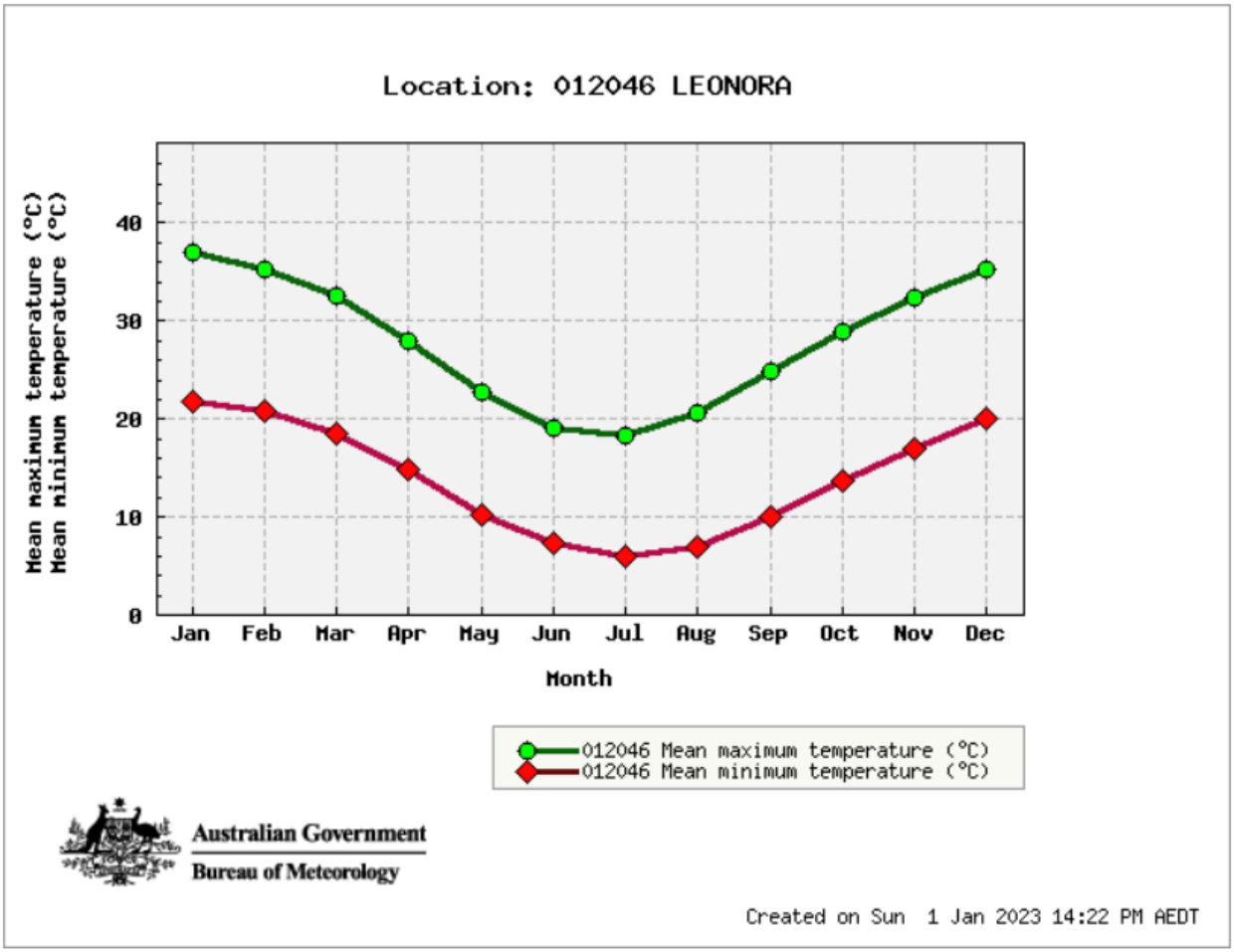


Figure 3: Mean temperature ranges for Leonora Meteorological Station (BOM, 2023)

2.1.2 Rainfall

The annual average rainfall at Leonora is 236.4 mm over an average of 28.9 days above 1mm of rain (BOM, 2023). Average rainfall varies across the months, with larger rainfall events falling between December to June (Figure 4). Rainfall for 2022 was above average for the months of April, July and September and below average for all other months prior to the survey (Figure 5). September 2022 rainfall was more than 5 times higher than the average monthly rainfall amount (Figure 5), invigorating and extending the flowering season beyond normal circumstances.

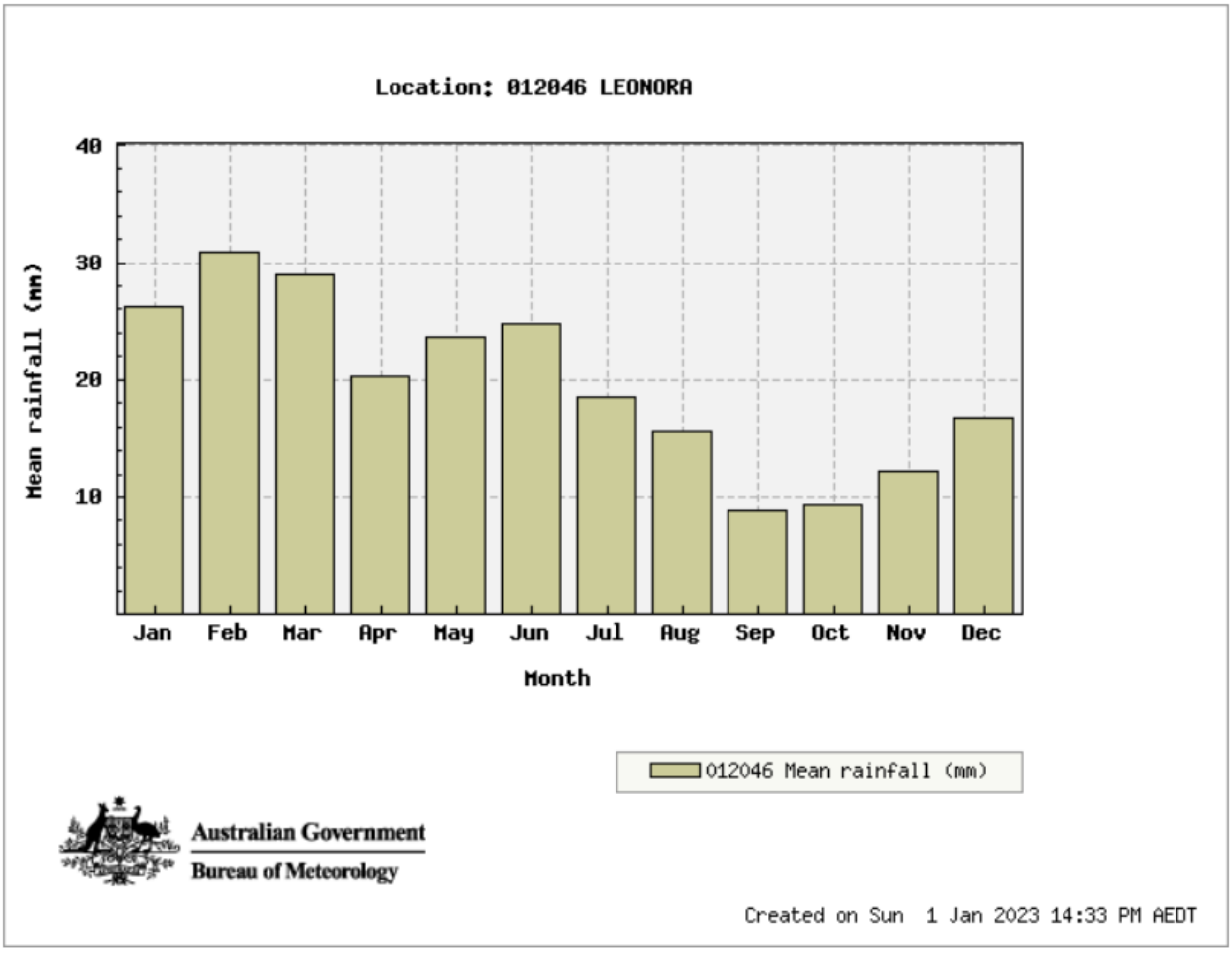


Figure 4: Average rainfall data for the Leonora Meteorological Station (BOM, 2023)

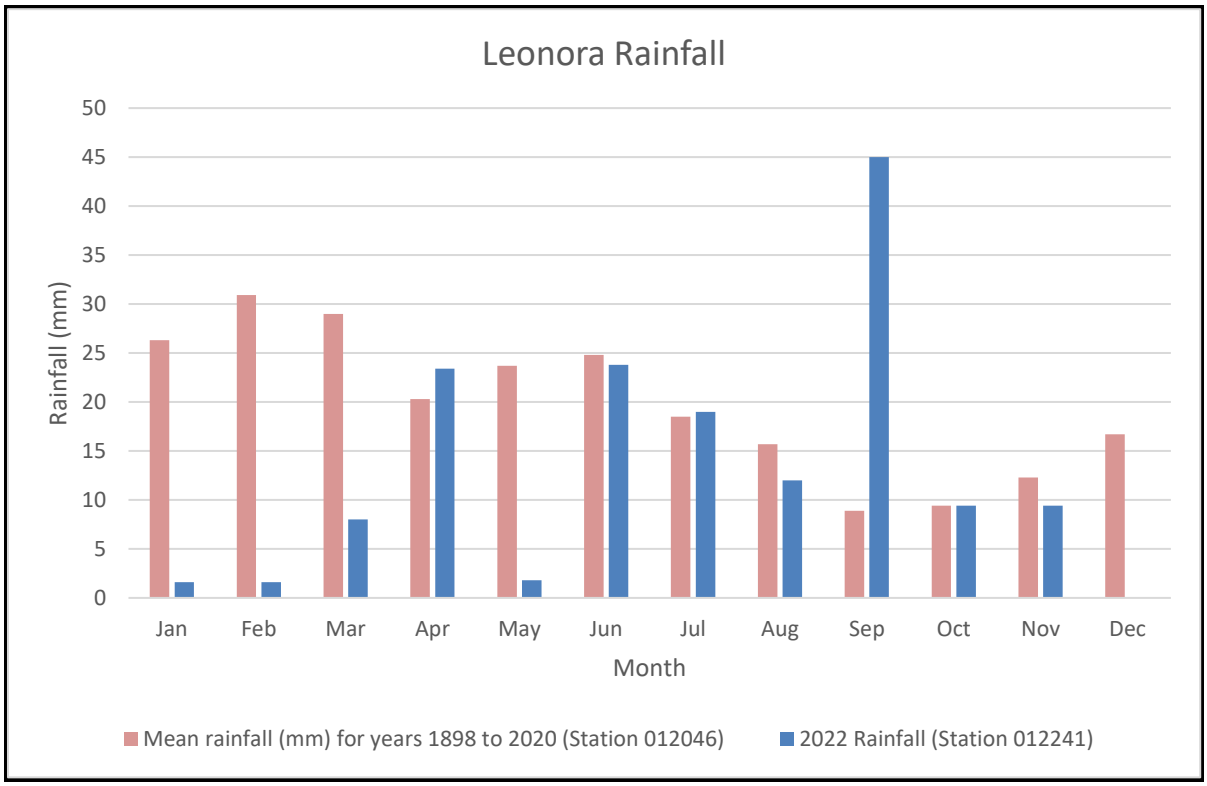


Figure 5: Leonora rainfall in 2022 (BOM, 2023)

2.2 INTERIM BIOGEOGRAPHIC REGIONALISATION OF AUSTRALIA (IBRA) REGION

The IBRA recognises 89 bioregions within Australia and 419 subregions (DCCEEW, 2023). The project is located within the Eastern Murchison IBRA subregion (MUR01) which totals over 7 million hectares (CALM, 2002). The Eastern Murchison subregion is characterised by extensive areas of elevated red desert sandplains with minimal dune development and internal drainage. (CALM 2002).

2.3 LANDFORMS AND SOILS

The Eastern Murchison comprises the northern parts of the 'Southern Cross' and 'Eastern Goldfields' Terrains of the Yilgarn Craton. The occluded Paleodrainage system generates Salt Lake systems. Other features include broad plains of red-brown soils, breakaway complexes, and red sandplains (CALM 2002).

2.4 BOTANICAL SUBREGION AND EXISTING VEGETATION

The vegetation of the Eastern Murchison botanical subregion consists of Mulga woodlands often rich in ephemerals. Vegetation is dominated by hummock grasslands, saltbush and *Tecticornia* shrublands (CALM, 2002).

3 METHODS

3.1 PERSONNEL AND REPORTING

The following personnel were involved in the single season detailed flora and vegetation survey (September 2022):

- Mr Eren Reid (*BSc*- Biological Science), Principal Botanist, Native Vegetation Solutions (NVS), undertook field work of the detailed survey in September 2022, vegetation mapping, data collation, identification of flora during field work and preparation and review 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, made recommendations regarding Threatened flora, range extensions and new locations requiring submission to the WAHERB as per the EPA Technical Guidelines (EPA 2016a).

3.2 PRELIMINARY DESKTOP STUDY

A preliminary assessment of the survey area and its potential constraints was undertaken by reviewing relevant government agency managed databases (Sections 3.2.2 to 3.2.8, 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 Previous Flora Surveys

Multiple surveys have been conducted in the general vicinity of the current survey area, however, most of these surveys occurred prior to 2011. One previous desktop assessment of flora vegetation was completed in the current survey area in November 2021 (Spectrum, 2022).

All surveys previously conducted in the vicinity of the survey area were reviewed for significant flora and vegetation. Reports were incorporated if they were provided by the client or publicly available. The reports included in the desktop assessment are listed in Table 1.

Table 1: Previous Flora and Vegetation Surveys

Report	Reference	Location from current survey area	Survey Summary
Comprehensive desktop assessment of flora and vegetation, with site visit in November 2021	Spectrum, 2022	Overlaps current Survey Area	A total of 86 significant flora taxa were identified during the flora desktop searches. Of these, five were assigned a High Likelihood of occurrence, while ten were assigned a Medium Likelihood of occurrence. No Threatened Ecological Communities (TEC) were recorded within 50 km of the Survey Area. However, the desktop assessment recorded two Priority Ecological Communities (PEC) within 50 km of the Survey Area which are both listed as Priority 1. One of PECs intersects the Survey Area at both Gwalia and Tower Hill: The Melita calcrete groundwater assemblage type on Raeside palaeodrainage on Melita (Sons of Gwalia) Station
Assessment of Flora and Vegetation Values- King of the Hills Mine	Mattiske Consulting Pty Ltd, 2020	5km North	One Priority 1 species, *Frankenia georgei*, was recorded. No other threatened species were recorded. Five vegetation communities were recorded, with no TECs or PECs identified.
Flora and Vegetation Survey of the Kallis – Trump and Poker – Forrest Lease Areas	Mattiske Consulting Pty Ltd, 2008	Overlaps a small portion of the current Survey Area	No species of conservation significance were recorded. Six vegetation communities were defined and affected by grazing and previous mining activities.
Flora and Vegetation Survey and Establishment of Baseline Transects for a Creek Diversion at Tower Hill	Mattiske Consulting Pty Ltd, 2007	Overlaps current Survey Area	Three vegetation communities were recorded; none are considered regionally or locally significant. Two 50 m monitoring transects were established.
Flora and Vegetation Survey of St Barbara, Leonora Pipeline Site	Mattiske Consulting Pty Ltd, 2006	Overlaps current Survey Area	No Declared Rare Flora or Priority species were recorded during the survey. Four plant communities were defined, no TECs were located.
Declared Rare and Priority Flora Search of Proposed Mining Areas at Ulysses and Gwalia Deeps	Mattiske Consulting Pty Ltd, 2000	Overlaps current Survey Area	Fifty-nine rare and endangered taxa identified as potentially occurring. No Declared Rare Flora or Priority species were recorded during the survey.

3.2.2 *Environment Protection and Biodiversity Conservation Act* Protected Matters

The *EPBC Act* Protected Matters Search tool was utilised to provide results for matters of National Environmental Significance within the survey area using the shapefiles of the survey area (Appendix A) with a 10 km buffer (DCCEEW, 2023a).

3.2.3 Threatened Flora and Communities

The Threatened and Priority Flora Database managed by the Department of Biodiversity, Conservation and Attractions (DBCA) was searched for threatened and priority flora within a 20 km radial area of the survey area shapefile (DBCA, 2023a).

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 20 km buffer of the survey area shapefile (DBCA, 2023).

3.2.4 Environmentally Sensitive Areas (ESAs) and Conservation Reserves

The Department of Water and Environmental Regulation (DWER) Clearing Permit System (CPS) Map Viewer was used to determine the location of any ESAs and Conservation Reserves (DWER, 2023).

3.2.5 Land Systems

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

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

3.2.6 Vegetation Type, Extent and Status

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

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

3.2.7 Wetlands

The potential of wetlands within the project area was determined by examining DWER's Clearing Permit System Map Viewer (DWER, 2023).

3.2.8 Dieback

Under normal circumstances Dieback is only considered a potential issue for any project if the project area lies within the Southwest Land Division and the mean annual rainfall of the area is greater than 400 mm. There is no record of *Phytophthora cinnamomi* (Dieback*)* establishing in natural ecosystems in regions receiving <400mm rainfall per annum (CALM, 2003). However, as indicated within the more recent Dieback guidelines (DBCA, 2020), other species of *Phytophthora* may persist east of the 400mm isohyet in unusually wet conditions. It is therefore recommended to conduct a risk assessment as per these guidelines.

3.3 SITE INVESTIGATION

The field survey was conducted by Mr. Eren Reid, Botanist of Native Vegetation Solutions (NVS), from the 12th to 16th of September 2022. NVS established 59 quadrats within the survey area, recording 176 vascular plant species within 16 vegetation groups. A further 440 Relevé sample sites were also recorded within and around the survey area, determining vegetation units for mapping and species present.

A total of 60 hours was spent on site traversing the survey area in September 2022.

While a vehicle was used to reach the site, all traverses were made on foot or via a Yamaha Viking (All Terrain Vehicle).

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 Murchison IBRA region, a detailed flora and vegetation survey was deemed appropriate.

3.3.1 Licenses

Flora was collected for identification under the Scientific Collection License FB62000171, held by Mr Eren Reid with expiry 08/10/2023.

3.3.2 Field Methods

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

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

Each quadrat site was marked in all corners with a 97cm galvanized fence dropper and was defined by tape measures. The location of the North-East (NE) corner was captured on a TwoNav Aventura GPS at ±4m accuracy, using Universal Transverse Mercator location on GDA94 datum. Digital photographs were taken of each quadrat site from the NE corner.

Data collected at each of the six quadrats included, but not limited to:

- Site Code
- Location (via GPS)
- Size of Quadrat
- Quadrat marking method
- Photograph/s from north-west corner
- Landform and soil description
- Comprehensive Species List (including dominant growth form, height, cover and species present for the upper, mid and lower stratums)
- % Bare Ground and Litter
- Description of disturbances (including fire history)
- 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 (Upper, Mid and Lower).

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

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

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

Vegetation groups were mapped (section 3.3.4 below).

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

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

3.3.3 Post-Field Methods

Unknown specimens collected in the field were identified post field work by Eren Reid and Frank Obbens with reference to published keys and samples held in the Reference Section of the Western Australian Herbarium (WAHERB, 2023).

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

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

A Species Accumulation Curve was also generated via input into the computer program “Species Diversity and Richness IV” (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 DMIRS require Index of Biodiversity Surveys for Assessments (IBSA) Data Packages to be submitted to support assessment and compliance under the *Environmental Protection Act 1986.*

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

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

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

3.4 NOMENCLATURE AND TAXONOMY

Nomenclature follows that used by the WAHERB.

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

3.5 LIMITATIONS

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

Table 2: 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 Curve 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 September 2022. Local rainfall in 2022 was below average for most months prior to the survey excluding April, July and September. Rainfall received in September was more than 5 times the monthly average in 2022. The survey coincided with flowering of many flora species that were invigorated by the September rainfall.
Disturbance in survey area	Yes	Disturbances within the survey area included the Goldfields Highway, existing open pits and waste landforms, as well as exploration areas. The disturbances did not significantly compromise the results of the survey as these areas were avoided whilst collecting data.
Intensity of survey effort	No	The survey intensity is considered to have been sufficient for a detailed survey according to EPA (2016) guidelines. Areas most likely to contain threatened and priority species were targeted. Vegetation mapping sites were selected to provide adequate coverage of the survey area. The Species accumulation curve suggests sampling efficacy was sufficient.
Resources	No	Resources, in terms of time, equipment, support and personnel were adequate to undertake and complete the detailed survey.
Remoteness and/or access problems	No	All the areas in need of survey were easily accessible from existing tracks, or by foot.
Availability of contextual information for the region	No	Contextual information regarding vegetation and flora around the Eastern Murchison 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 report indicated no TECs or Commonwealth Reserves within the requested search area.

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

4.1.2 Threatened Flora and Communities

The DBCA database searches revealed a potential for no Threatened and 3 Priority Flora species to occur within a 20 km radius of the survey area (DBCA, 2023a). No known locations of Threatened or Priority Flora occur within the survey area.

Results of the threatened flora database search are included in Table 2 below**.**

Table 3: Threatened flora database search results

TAXON	CONS_CODE	Likelihood of occurring in survey area- Comment post field work
Angianthus prostratus	P3	Unlikely- possible suitable habitat , extensively searched
Calytrix praecipua	P3	Unlikely- possible suitable habitat , extensively searched
Nicotiana salina	P1	Unlikely- possible suitable habitat , extensively searched

The PEC/TEC search revealed no TECs within 50km of the survey area (DBCA, 2023).

The search identified two Priority Ecological Communities (PEC) within 50 km of the Survey Area; both listed as Priority 1. One of PECs intersects the Survey Area at both Gwalia and Tower Hill: The Melita calcrete groundwater assemblage type on Raeside palaeodrainage on Melita (Sons of Gwalia) Station (Appendix A). It is known for its unique assemblages of invertebrates in the groundwater calcretes and is threatened by hydrological changes associated with mining. The remaining PEC is located 25 km to the west of the Survey Area. It was assigned a 'Low likelihood' to occur within the survey area based on the restriction to a palaeodrainage system on Sturt Meadows Station.

4.1.3 Environmentally Sensitive Areas and Conservation Reserves

No ESAs are located within the survey area (DWER, 2023).

4.1.4 Land Systems

As part of the Rangeland resource surveys, the Department of Agriculture mapped the Land Systems of Western Australia (DPIRD, 2017). The Land Systems occurring within the survey area are listed in Table 4 below, and displayed in Appendix C.

Table 4: Land Systems occurring within the survey area (DPIRD, 2017)

Land System	Description	Extent of Survey Area (ha)	% Of Survey Area (%)	Total Eastern Murchison Extent (ha)	% of Eastern Murchison extent within survey area
Rainbow System	Hardpan plains supporting mulga tall shrublands.	320.13	9.00	235,345.67	0.14
Violet System	Gently undulating gravelly plains on greenstone, laterite and hardpan, with low stony rises and minor saline plains; supporting groved mulga and bowgada shrublands and occasionally chenopod shrublands.	221.49	6.23	418,724.97	0.05
Leonora System	Low greenstone hills and stony plains supporting mixed chenopod shrublands.	152.74	4.29	125,955.45	0.12
Tiger System	Gravelly hardpan plains and sandy banks with mulga shrublands and wanderrie grasses.	102.70	2.89	110,095.64	0.09
Gundockerta System	Extensive, gently undulating calcareous stony plains supporting bluebush shrublands.	2,241.51	63.00	330,076.45	0.68
Brooking System	Prominent ridges of banded iron formation supporting mulga shrublands and occasional minor halophytic communities.	182.69	5.13	96,123.30	0.19
Carnegie System	Salt lakes with fringing saline alluvial plains, kopi dunes and sandy banks, supporting halophytic shrublands and *Acacia* tall shrublands.	336.75	9.46	1,664,130.07	0.02

4.1.5 Vegetation Type, Extent and Status

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

Information relating to the known Beard (1990) vegetation units within the survey area has been summarised in Tables 5, 6, 7, 8 and 9 below. This information has been compiled through both desktop assessments and the site visit. The extent of Beard vegetation units within the survey area is less than 1.5% of the total area at each scale (Table 5), and each are above the 30% threshold at a State, bioregional and subregional level (Tables 6, 7, 8 & 9).

Table 5: Extent of Beard Association within the survey area

Beard Vegetation Association	Extent within survey area (ha)	% of survey area (%)	% of extent at each scale^
18	382.74	10.76	<1%
28	1,994.72	56.06	0<1.5%
39	272.98	7.67	<1%
676	907.61	25.51	<1%

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

Table 6: 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*** *(Murchison)*	***By IBRA Sub-region*** *(Eastern Murchison)*	***By LGA*** *(Shire of Leonora*
	22,029,557*	19,892,306**	12,363,252**	10,269,896**	2,010,057**
% Pre-European Extent Remaining	*100.00%**	*99.75%***	*99.68%***	*99.66%***	*99.62%***
Surrounding Land Use***	Mining, Exploration, Prospecting, Pastoral Lease				
Weed prevalence***	Low				

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

Table 7: Summary of information regarding Pre-European and current vegetation extent of vegetation association 28 within the survey area

Factor	**Value**				
Beard Vegetation Association*	28				
Vegetation Association Description*	Open low woodland; mulga				
Pre-European Extent (ha)	**Scale**				
	By Association *(WA)*	***By Association*** *(WA)*	***By IBRA Region*** *(Murchison)*	***By IBRA Sub-region*** *(Eastern Murchison)*	***By LGA*** *(Shire of Leonora)*
	317,397*	395,895**	220,583**	141,411**	126,344**
% Pre-European Extent Remaining	*100.00%**	*99.06%***	*98.35%***	*97.38%***	*98.25%***
Surrounding Land Use***	Mining, Exploration, Prospecting, Pastoral Lease				
Weed prevalence***	Low				

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

Table 8: 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*** *(Murchison)*	***By IBRA Sub-region*** *(Eastern Murchison)*	***By LGA*** *(Shire of Leonora)*
	4,856,768*	6,613,567**	1,138,064**	711,328.84**	252,141**
% Pre-European Extent Remaining	*100.00%**	*99.83%***	*99.10%***	*98.68%***	*97.56%***
Surrounding Land Use***	Mining, Exploration, Prospecting, Pastoral Lease				
Weed prevalence***	Low				

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

Table 9: Summary of information regarding Pre-European and current vegetation extent of vegetation association 676 within the survey area

Factor	**Value**				
Beard Vegetation Association*	676				
Vegetation Association Description*	Succulent steppe; samphire				
Pre-European Extent (ha)	**Scale**				
	By Association *(WA)*	***By Association*** *(WA)*	***By IBRA Region*** *(Murchison)*	***By IBRA Sub-region*** *(Eastern Murchison)*	***By LGA*** *(Shire of Leonora*
	1,907,938*	2,063,413**	382,704**	369,324**	207,892**
% Pre-European Extent Remaining	*99.01%**	*95.18%***	*99.97%***	*99.97%***	*99.95%***
Surrounding Land Use***	Mining, Exploration, Prospecting, Pastoral Lease				
Weed prevalence***	Low				

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

4.1.6 Wetlands

No water bodies were identified within the survey area via the CPS Map Viewer. The closest waterbody lies 400 m south of the survey area (DWER, 2023).

4.1.7 Dieback

The survey area receives average annual rainfall of approximately 236.4 mm (BOM, 2023). Under normal circumstances Dieback is only considered a potential issue for any project if the project

area lies within the Southwest Land Division and the mean annual rainfall of the area is greater than 400 mm. There is no record of *Phytophthora cinnamomi* (Dieback*)* establishing in natural ecosystems in regions receiving <400mm rainfall per annum (CALM, 2003). However, as indicated within the more recent Dieback guidelines (DBCA, 2020), other species of *Phytophthora* may persist east of the 400mm isohyet in unusually wet conditions. Therefore, if any clearing is to be completed within the survey area, it is recommended to conduct a risk assessment as per these guidelines.

Additionally, if clearing is proposed within the survey area, all measures should be taken to prevent any possible soil contamination (seeds of non-native species *etc*.) which poses a risk in the survey area during seasonally favourable conditions.

4.2 FIELD ASSESSMENT

4.2.1 Vegetation of the Survey Area

Beard's vegetation associations are very broad and are used over large areas in which there is also a large amount of variation at a more local level. The vegetation groups described below for the survey area fit into the broader Beard description above in section 4.1.5.

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

4.2.1.1 Vegetation Groups

Sixteen vegetation groups were identified during this survey, largely following topographical features and dominant species. Table 10 summarises the vegetation group extent and relative Quadrat and flora information. Mapping of the 16 vegetation groups, as well as the quadrat locations can be seen in Appendix C. Photographs of each quadrat and the relevant vegetation group can be seen in Appendix F.

Table 10: Vegetation Group Extent within Survey Area

Vegetation Group	Vegetation Group Code	Quadrats	Family	Genera	Species	Area (ha)	Percentage of Survey Area (%)
Open Mulga Woodland over Chenopod Shrubland	A	Q1, Q4, Q7, Q15, Q25 and Q59	26	44	80	261.07	7.34
Creekline Vegetation	B	Q2, Q5, Q6, Q45, Q48 and Q50	25	48	70	170.32	4.79
Mulga Woodland	C	Q3, Q11, Q12, Q13, Q16, Q20 and Q46	20	32	55	890.80	25.03
Mulga over *Senna* shrubland	D	Q8, Q28 and Q57	11	17	25	115.33	3.24
Mulga over Chenopod Shrubland	E	Q9, Q23, Q24 and Q49	21	32	56	411.62	11.57
Mulga over Ironstone and Quartz outcrops	F	Q10, Q56 and Q58	14	20	28	2.96	0.08
Open Low Chenopod Shrubland	G	Q14, Q18 and Q19	13	22	32	393.74	11.06
Eremophila youngii subsp. *youngii* over Chenopod and *Tecticornia* shrubland	H	Q17, Q26, Q54 and Q55	11	19	25	35.88	1.01
Acacia quadrimarginea shrubland over rocky plain	I	Q21	13	16	21	17.67	0.50
Mulga over *Eremophila forrestii* and *Eremophila compacta*	J	Q22, Q27, Q29 and Q31	17	22	31	121.57	3.42
Mulga over Banded Ironstone Formation (BIF)	K	Q30, Q32 and Q33	18	26	49	60.43	1.70
Acacia duriuscula over *Maireana sedifolia* and *Scaevola spinescens*	L	Q34, Q35 and Q36	12	17	29	9.05	0.25
Tecticornia shrubland	M	Q37, Q39, Q40 and Q44	6	10	15	85.43	2.40
Mulga over *Melaleuca interioris* and *Eremophila miniata* sand dune	N	Q38, Q41 and Q47	15	24	32	38.43	1.08
Melaleuca sheathiana over *Cratystylis subspinescens* and *Tecticornia* shrubland	O	Q42 and Q43	13	20	23	9.54	0.27
Acacia burkittii creekline vegetation	P	Q51, Q52 and Q53	18	28	39	6.62	0.19
Bare Salt Lake	Q	None	N/A	N/A	N/A	15.93	0.45
Existing Disturbance	R	None	N/A	N/A	N/A	912.23	25.63
		Total	42*	95*	201*	3558.62#	100%#

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

4.2.1.2 PATN Analysis of Quadrat Data

PATN analysis was used to determine the similarities or differences between and within the delineated vegetation groups. The results are supplied below in Figure 6 and Figure 7 as dendrograms. Dendrograms demonstrate the hierarchical relationship between objects.

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

The PATN analysis dendrogram of the dominant species in Figure 6, displays each quadrat with like symbols representing the NVS mapped vegetation groups, and coloured lines depicting PATN defined vegetation groups. The dendrogram shows a good association between vegetation groups described in section 4.2.1.1, as there were 13 outliers. Outliers are quadrats that do not show a good association with other quadrats in the same NVS mapped vegetation group.

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.

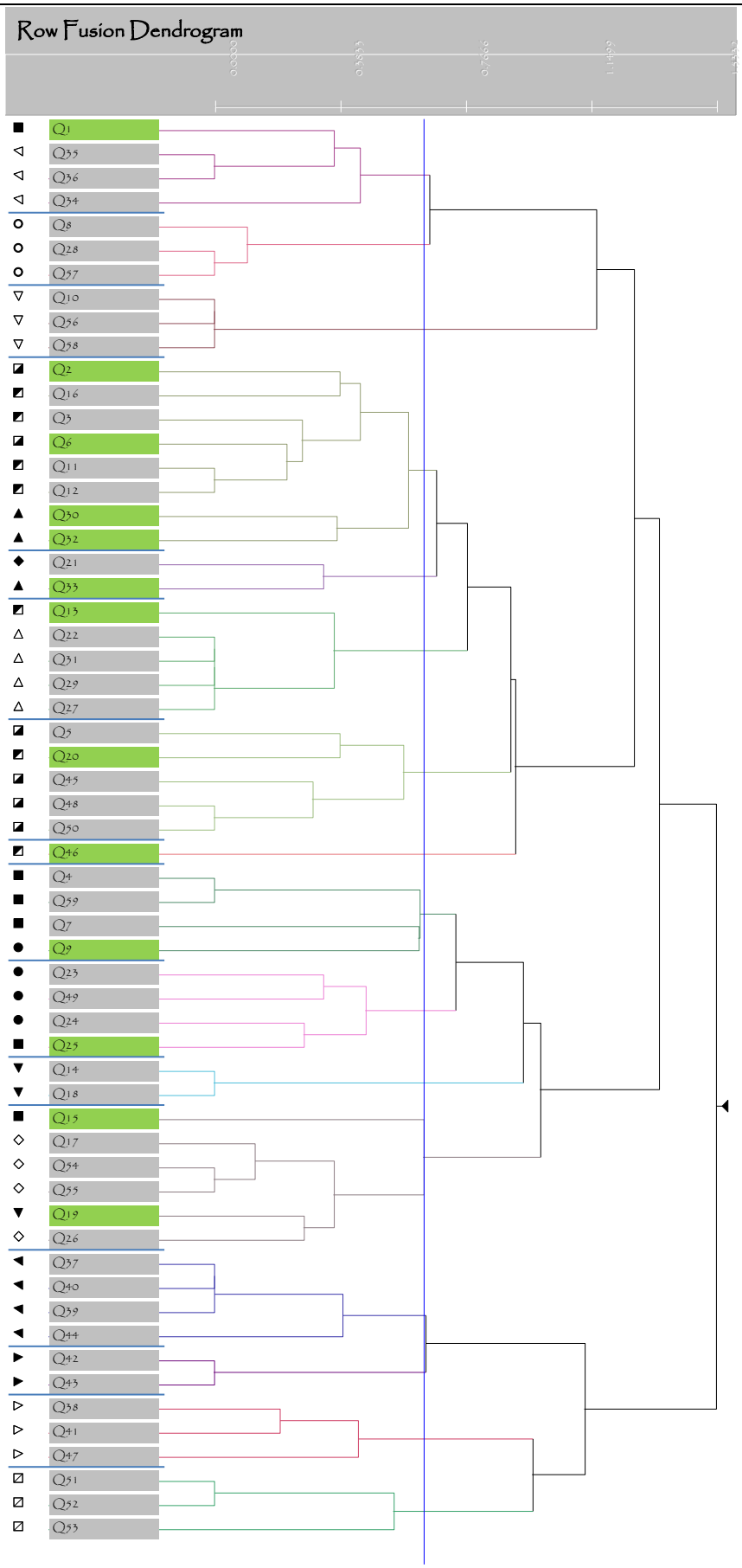


Figure 6: PATN Analysis of Dominant Species into 16 groups

The dendrogram below (Figure 7) 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. The All species PATN analysis shows a good association between vegetation groups as there were only eight outliers (Figure 7). Outliers are quadrats in the PATN Analysis that do not show a good association with other quadrats in the same vegetation group mapped by NVS. This is expected due to the unweighted nature of PATN analysis, which does not take into account topographical/lithological features or the density of key species defining the vegetation group.

All 16 vegetation groups were well represented via all species PATN Analysis, with all NVS grouped quadrats forming in the analysis. Of the 176 species detected within Quadrats, only eight were shared across 10 or more different vegetation groups.

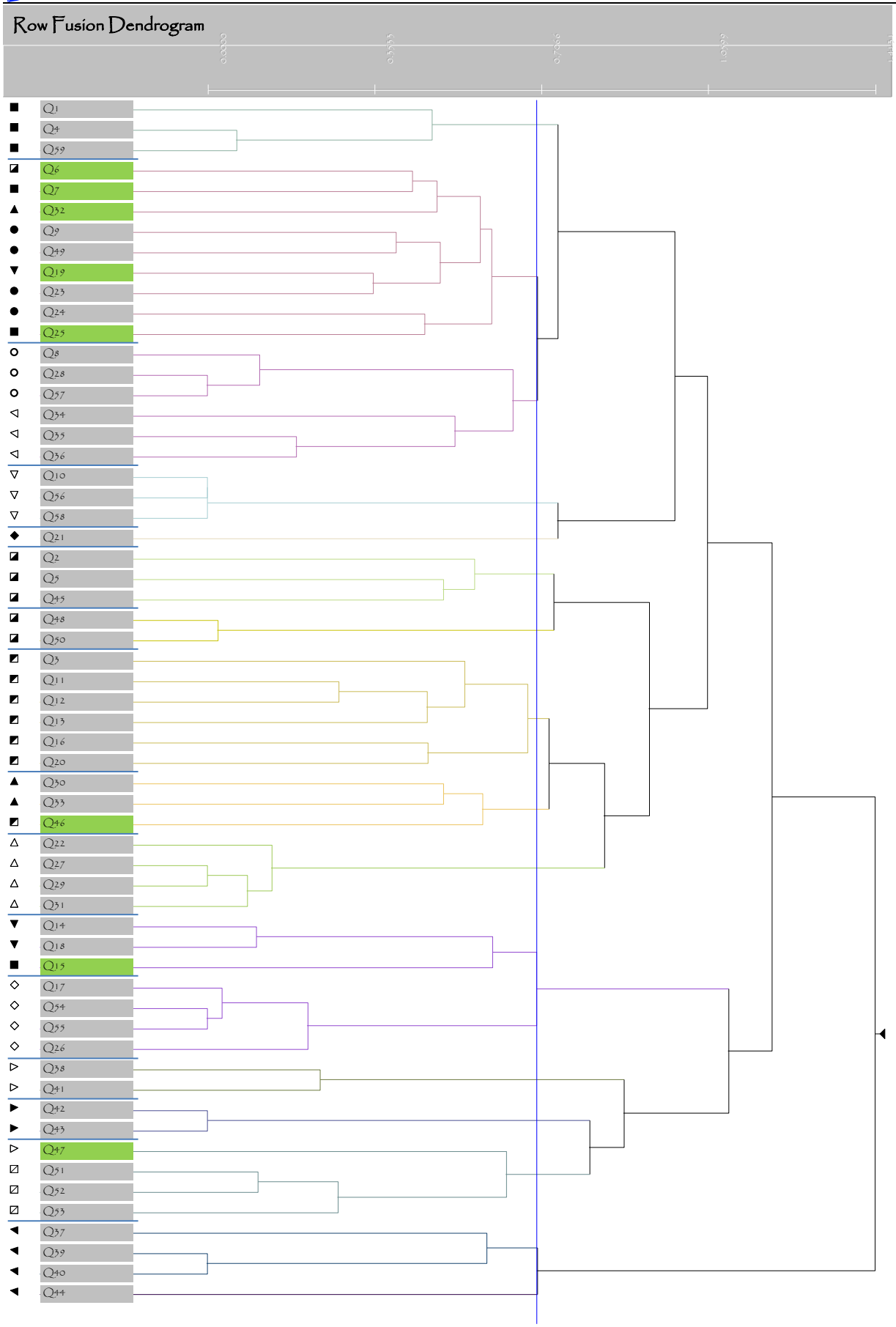


Figure 7: PATN Analysis of All Species into 16 groups

4.2.1.3 Vegetation Condition

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

In accordance with the Keighery (1994) scale, most of the sites/quadrats inspected were in Good to Very Good condition (Appendix F). Disturbed areas were present within the survey area, mostly attributed existing roads, historical open pits and historical waste land forms. The vegetation more than 0.5m off these tracks was mostly in Good to condition (Keighery 1994).

As discussed below in Section 4.2.2.4 below, there were eighteen non-native species recorded in the survey area.

4.2.2 Flora of the Survey Area

4.2.2.1 General

Two-hundred and one species were recorded within the survey area with 176 species recorded within quadrats. Fourty-two families and 95 genera were recorded overall. These are listed in Appendix E, per Quadrat as well as per vegetation group. Of the native species, Asteraceae had the highest representation, with 31 species from 21 genera. The next best represented families were Chenopodiaceae and Fabaceae with 30 and 25 species respectively.

The most common and widespread species was *Ptilotus obovatus* which was recorded in 41 quadrats. The next most common were *Erodium cygnorum* and *Maireana pyramidata*, both occurring in 35 quadrats.

Quadrats Q53 and Q59 had the richest species list with 34 taxa recorded in both.

Eighteen introduced weed species were detected within the survey area. Three of these are considered Declared Pests (DPIRD, 2023), *Cylindropuntia imbricata*- s22(2) C3 Restricted, *Opuntia stricta*- s22(2) C3 Restricted and *Rumex vesicarius*- Prohibited s12 C1 Prohibited.

4.2.2.2 Species Accumulation Curve

A Species Accumulation Curve was generated using the computer programme Species Diversity and Richness- Version 4.1.2 (Seaby & Henderson, 2006). The model assumed 59 random selections of sample order. This curve was then fitted to a logarithmic curve in Excel® (Figure 8). The logarithmic trend line and R^2 values were generated in Excel®. 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 8).

Sufficient sampling was inferred via the effort of intensity (number of quadrats established) versus the return of species collected (total accumulated species). From this fitted logarithmic curve formula, sufficient sampling was determined where the gain of new species was less than 1% for every new quadrat established. Based on this reasoning, sufficient sampling would be reached at 30 quadrats, at which the extrapolated total accumulated number of species would be 147. Therefore the 176 species collected within the 59 quadrats represents 119% of the predicted total abundance.

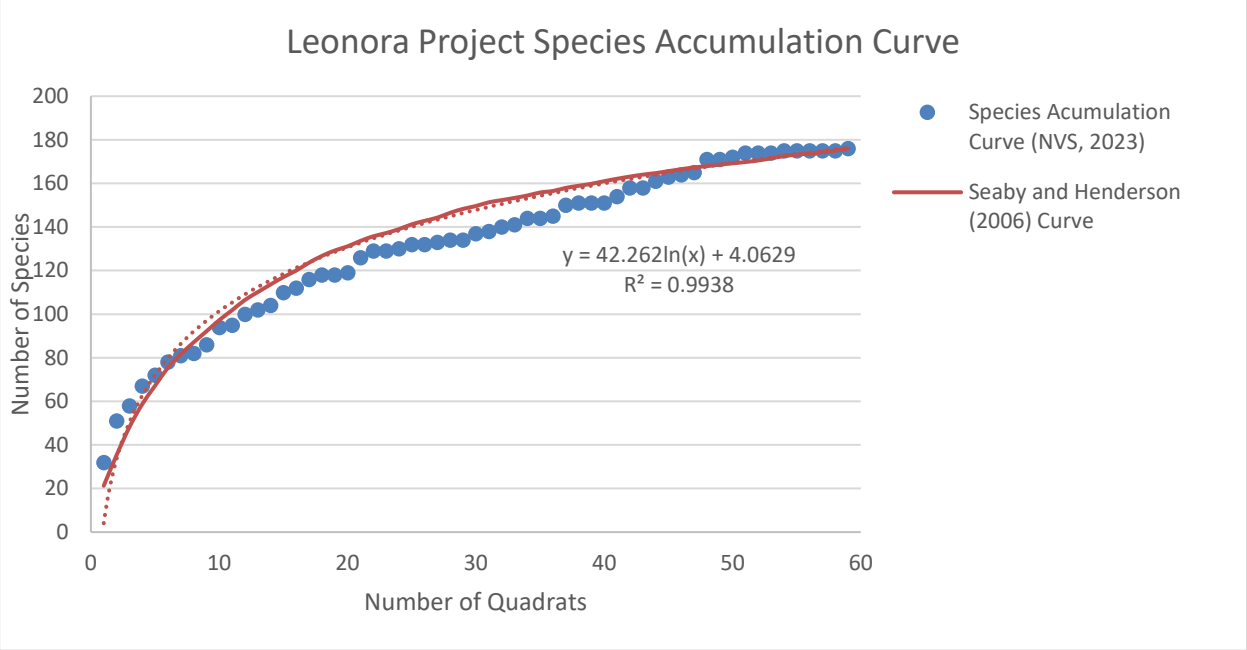


Figure 8: Species Accumulation Curve for the 59 sampled quadrats

4.2.2.3 Conservation significant species

No Threatened flora were recorded in the survey area.

No Priority flora were recorded in the survey area.

One species recorded in the survey area, *Sondottia connata* is considered a significant range extension to already known population locations. The Leonora location is more than 200km east of known locations west of Lake Barlee and Mount Magnet.

4.2.2.4 Introduced species

Eighteen introduced weed species were detected within the survey area. Three of these are considered Declared Pests (DPIRD, 2023), *Cylindropuntia imbricata*- s22(2) C3 Restricted, *Opuntia stricta*- s22(2) C3 Restricted and *Rumex vesicarius*- Prohibited s12 C1 Prohibited.

The other 15 introduced species recorded were:

- Aloe vera*
- Asphodelus fistulosus*
- Carrichtera annua*
- Cenchrus ciliaris*
- Citrullus amarus*
- Cuscuta planiflora*
- Lysimachia arvensis*
- Medicago laciniata*
- Medicago minima*
- Salvia verbenaca*

- Schinus molle var. areira*
- Sisymbrium erysimoides*
- Sisymbrium irio*
- Solanum nigrum*
- Sonchus oleraceus*

5 DISCUSSION

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

Two-hundred and one species were recorded within the survey area with 176 of those species recorded within quadrats. Forty-two families and 95 genera were recorded overall. These are listed in Appendix E, per Quadrat as well as per vegetation group. Of the native species, Asteraceae had the highest representation, with 31 species from 21 genera. The next best represented families were Chenopodiaceae and Fabaceae with 30 and 25 species respectively.

The most common and widespread species was *Ptilotus obovatus* which was recorded in 41 quadrats. The next most common were *Erodium cygnorum* and *Maireana pyramidata*, both occurring in 35 quadrats.

Quadrats Q53 and Q59 had the richest species list with 34 taxa recorded in both.

The database searches revealed a potential for no Threatened and 3 Priority Flora species to occur within a 20 km radius of the survey area (DBCA, 2023a). No known locations of Threatened or Priority Flora occur within the survey area, with the closest Priority Flora located approximately 8.6 km south of the survey area.

No Threatened Flora were recorded in the survey area.

No Priority Flora were recorded in the survey area.

One species recorded in the survey area, *Sondottia connata* is considered a significant range extension to already known population locations. The Leonora location is more than 200km east of known locations west of Lake Barlee and Mount Magnet.

The PEC/TEC search revealed no TECs occur within 50km of the survey area (DBCA, 2023).

The search did identify two PECs within 50 km of the Survey Area; both listed as Priority 1. One of PECs intersects the Survey Area at both Gwalia and Tower Hill: The Melita calcrete groundwater assemblage type on Raeside palaeodrainage on Melita (Sons of Gwalia) Station. It is known for its unique assemblages of invertebrates in the groundwater calcretes and is threatened by hydrological changes associated with mining. The remaining PEC is located 25 km to the west of the Survey Area. It was assigned a ‘Low likelihood’ to occur within the survey area based on the restriction to a palaeodrainage system on Sturt Meadows Station.

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

Eighteen introduced weed species were detected within the survey area. Three of these are considered Declared Pests (DPIRD, 2023), *Cylindropuntia imbricata*- s22(2) C3 Restricted, *Opuntia stricta*- s22(2) C3 Restricted and *Rumex vesicarius*- Prohibited s12 C1 Prohibited.

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

IMPACT ASSESSMENT

5.1 THREATENING PROCESSES

Proposed clearing may affect the Flora within the survey area via the following ways:

- Vehicle use damaging vegetation if existing tracks are not adhered to;
- The introduction and increased abundance of non-native species;
- Dust generated during clearing of native vegetation and associated activities may settle on adjacent native vegetation, causing possible stress and perhaps death, especially during drier months; and
- Accidental fire, arising from clearing and associated activities, may affect vegetation in surrounding areas.

6 CONCLUSIONS

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

The survey established that the condition of most of the vegetation in the survey area is overall 'Good' to 'Very Good' condition. No Threatened or Priority Flora were recorded in the area. No TECs were recorded in the survey area.

The search did identify two PECs within 50 km of the Survey Area; both listed as Priority 1. One of PECs intersects the Survey Area at both Gwalia and Tower Hill: The Melita calcrete groundwater assemblage type on Raeside palaeodrainage on Melita (Sons of Gwalia) Station. It is known for its unique assemblages of invertebrates in the groundwater calcretes and is threatened by hydrological changes associated with mining. The remaining PEC is located 25 km to the west of the Survey Area. It was assigned a 'Low likelihood' to occur within the survey area based on the restriction to a palaeodrainage system on Sturt Meadows Station.

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.* Most of the species and communities recorded during this survey are widespread throughout the Eastern Murchison subregion and adjoining regions.

7 REFERENCES

Beard, J.S. (1990). *Plant life of Western Australia.* Kangaroo Press, NSW

Belbin, L. (1994). *PATN: pattern analysis package: Technical reference*, Division of Wildlife and Ecology, CSIRO

BOM, (2023), *Climate Data Online,* Bureau of Meteorology
http://www.bom.gov.au/climate/data/
Accessed: 01/01/2023

CALM, (2002), *A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002 (MUR01 – Eastern Murchison Subregion)*, Department of Conservation and Land Management

CALM, (2003), *Phytophthora cinnamomi and Diseases Caused by It, Volume 1-Management Guidelines,* Department of Conservation and Land Management
https://library.dbca.wa.gov.au/FullTextFiles/021873.pdf
Accessed: 01/01/2023

DBCA, (2019), *2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report)- Current as of March 2019*, WA Department of Biodiversity, Conservation and Attractions, Perth,
https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics
Accessed: 01/01/2023

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

DBCA, (2020), *Phytophthora Dieback Management Manual, October 2020*, Department of Biodiversity, Conservation and Attractions, Perth
https://www.dpaw.wa.gov.au/images/documents/conservation-management/pests-diseases/disease-risk-areas/DBCA%20PDMM%20v1.2%20October%202020.pdf
Accessed: 01/01/2023

DBCA, (2023), *TEC/PEC Database Results Ref: 01-0123EC,* Department of Biodiversity, Conservation and Attractions

DBCA, (2023a), *Threatened Flora Database Results Ref: 13-0123FL,* Department of Biodiversity, Conservation and Attractions

DCCEEW, (2023*), Interim Biogeographic Regionalisation for Australia* (IBRA), Department of Climate Change, Energy, the Environment and Water, Australian Government
https://www.environment.gov.au/land/nrs/science/ibra
Accessed: 01/01/2023

DCCEEW, (2023a), *Protected Matters Search Tool*, Department of Climate Change, Energy, the Environment and Water
http://www.environment.gov.au/webgis-framework/apps/pmst/pmst-coordinate.jsf
Accessed: 01/01/2023

DPIRD, (2017), *NRInfo Digital Mapping*, Department of Primary Industries and Regional Development
https://maps.agric.wa.gov.au/nrm-info/
Accessed: 01/01/2023

DPIRD, (2023), *Declared Plants Database,* Department of Primary Industries and Regional Development, Western Australia
https://www.agric.wa.gov.au/pests-weeds-diseases/weeds/declared-plants
Accessed: 01/01/2023

DWER, (2023), *Clearing Permit System Map Viewer*, Department of Water and Environmental Regulation
https://cps.der.wa.gov.au/main.html
Accessed: 01/01/2023

EPA, (2016), *Environmental Factor Guideline: Flora and Vegetation,* Environmental Protection Authority, Western Australia

EPA, (2016a), *Technical Guidance- Flora and Vegetation Surveys for Environmental Impact Assessment,* Environmental Protection Authority, Western Australia

Keighery, B.J., (1994), *Bushland Plant Survey; A guide to plant community survey for the Community,* Wildflower Society of Western Australia (Inc.) Nedlands

Muir, B.G. (1977), *Biological Survey of the Western Australian Wheatbelt. Pt. 2. Vegetation and habitat of the Bendering Reserve*. Records of the Western Australian Museum Supplement 3

Seaby R. M. & Henderson, P. A., (2006), *Species Diversity and Richness Version 4.1.2,* Pisces Conservation Ltd., Lymington, England.

Shepherd, D.P., Beeston, G.R., and A.J.M. Hopkins, (2002), *Land-Use and Vegetation in Western Australia- National Land and Water Resources Audit Report*, Technical Report 250, Department of Agriculture Western Australia

Smith, M.G., Jones, A., (2018) *Threatened and priority flora list for Western Australia*, Department of Biodiversity, Conservation and Attractions

WAHERB, (2023), *FloraBase- the Western Australian Flora*, Department of Parks and Wildlife
http://florabase.dpaw.wa.gov.au/
Accessed: 01/01/2023

8 GLOSSARY

Acronyms:

BAM Act	*Biosecurity and Agriculture Management Act 2007,* Western Australia
BC Act	*Biodiversity Conservation Act 2016* (partly enacted), Western Australia
BOM	Bureau of Meteorology, Australian Government
BSc	Bachelor of Science
CALM	Department of Conservation and Land Management (now DBCA)
CPS	Clearing Permit System (DWER)
DBCA	Department of Biodiversity, Conservation and Attractions, Western Australia
DCCEEW	Department of Climate Change, Energy, the Environment and Water, Australian Government
DMIRS	Department of Mines, Industry Regulation and Safety, Western Australia
DPAW	Department of Parks and Wildlife, Western Australia (now DBCA)
DPIRD	Department of Primary Industries and Regional Development, Western Australia
DRF	Declared Rare Flora
DWER	Department of Water and Environmental Regulation, Western Australia
EPA	Environmental Protection Authority, Western Australia
EP Act	*Environmental Protection Act 1986*, Western Australia
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth Act)
ESA	Environmentally Sensitive Area
GIS	Geographical Information System
ha	Hectare (10,000 square metres)
IBRA	Interim Biogeographic Regionalisation for Australia, DCCEEW
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
km	Kilometres
m	Metres
MUR	Murchison Bioregion, IBRA
MUR01	Eastern Murchison Subregion, IBRA
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 Climate Change, Energy, the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 02-Jan-2023

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	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 https://www.dcceew.gov.au/parks-heritage/heritage

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

Commonwealth Lands:	10
Commonwealth Heritage Places:	None
Listed Marine Species:	10
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

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

Details

Matters of National Environmental Significance

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat may occur within area	In feature area
Polytelis alexandrae Princess Parrot, Alexandra's Parrot [758]	Vulnerable	Species or species habitat known to occur within area	In feature area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

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

Commonwealth Land Name	State	Buffer Status
Unknown		
Commonwealth Land - [51752]	WA	In feature area
Commonwealth Land - [51754]	WA	In feature area
Commonwealth Land - [51755]	WA	In feature area
Commonwealth Land - [52213]	WA	In feature area
Commonwealth Land - [51756]	WA	In feature area
Commonwealth Land - [52232]	WA	In feature area
Commonwealth Land - [51753]	WA	In feature area
Commonwealth Land - [51751]	WA	In feature area
Commonwealth Land - [51058]	WA	In feature area
Commonwealth Land - [52197]	WA	In feature area

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Tringa nebularia			
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

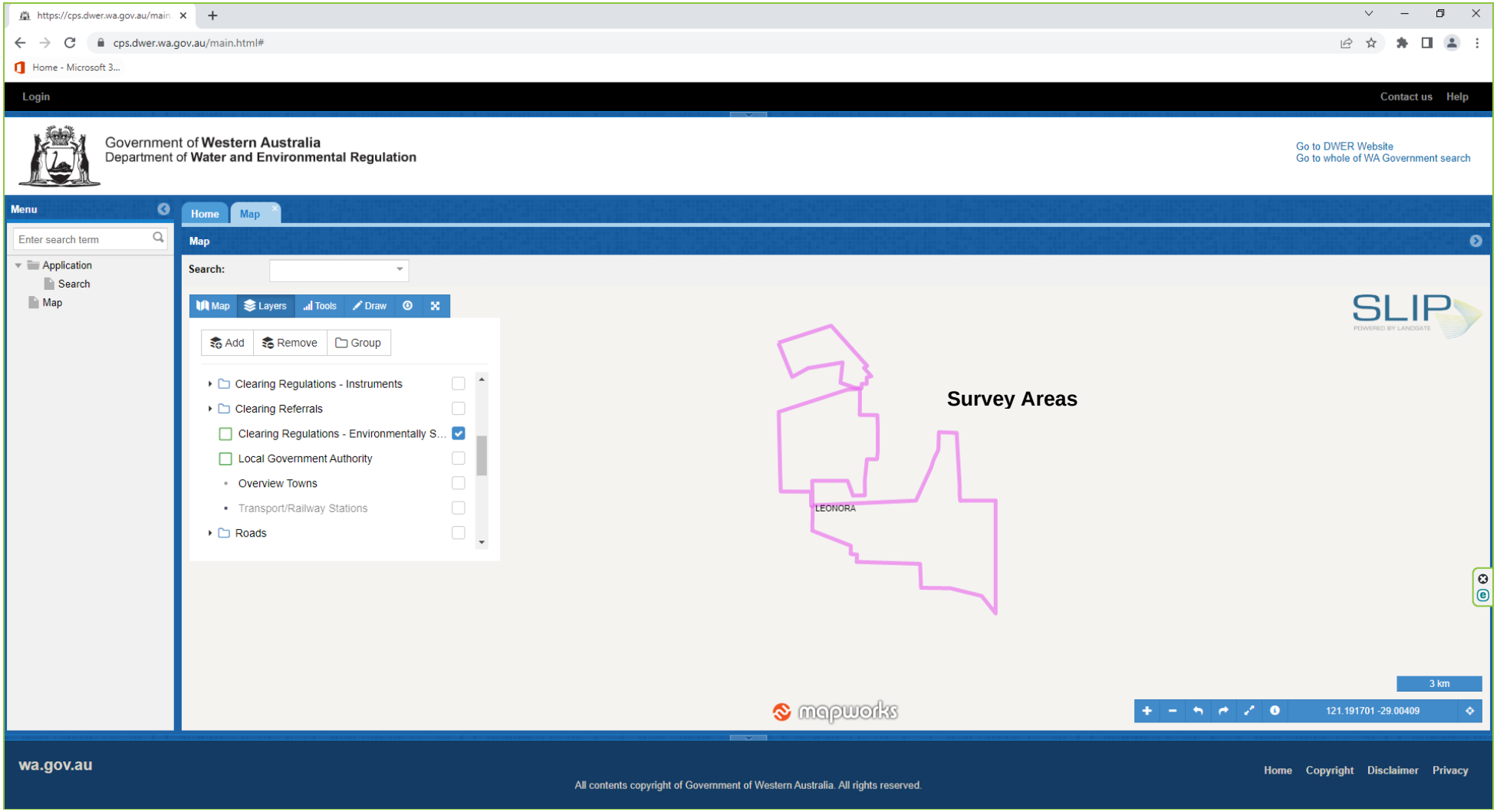
Acknowledgements

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

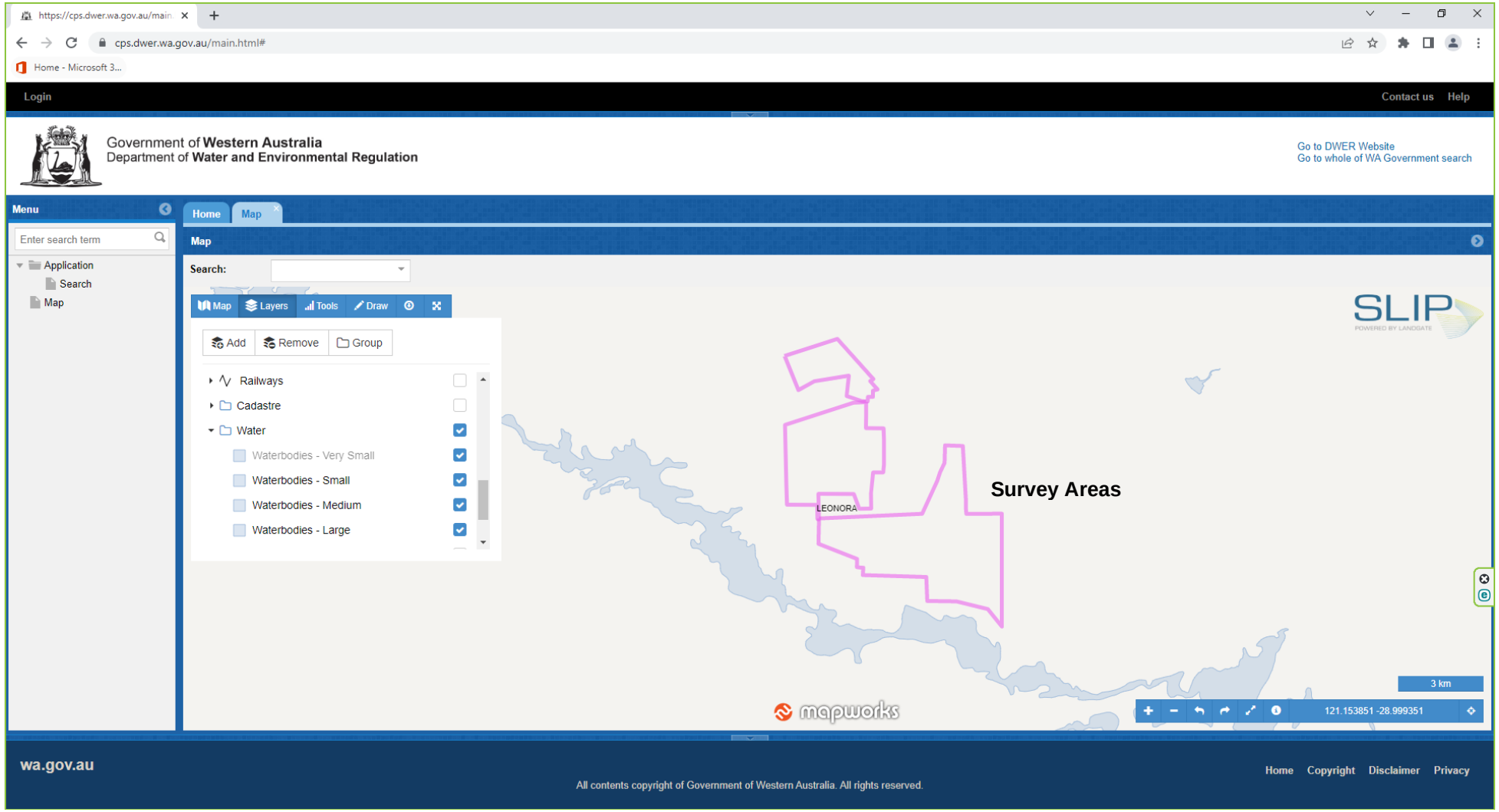
-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management,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

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

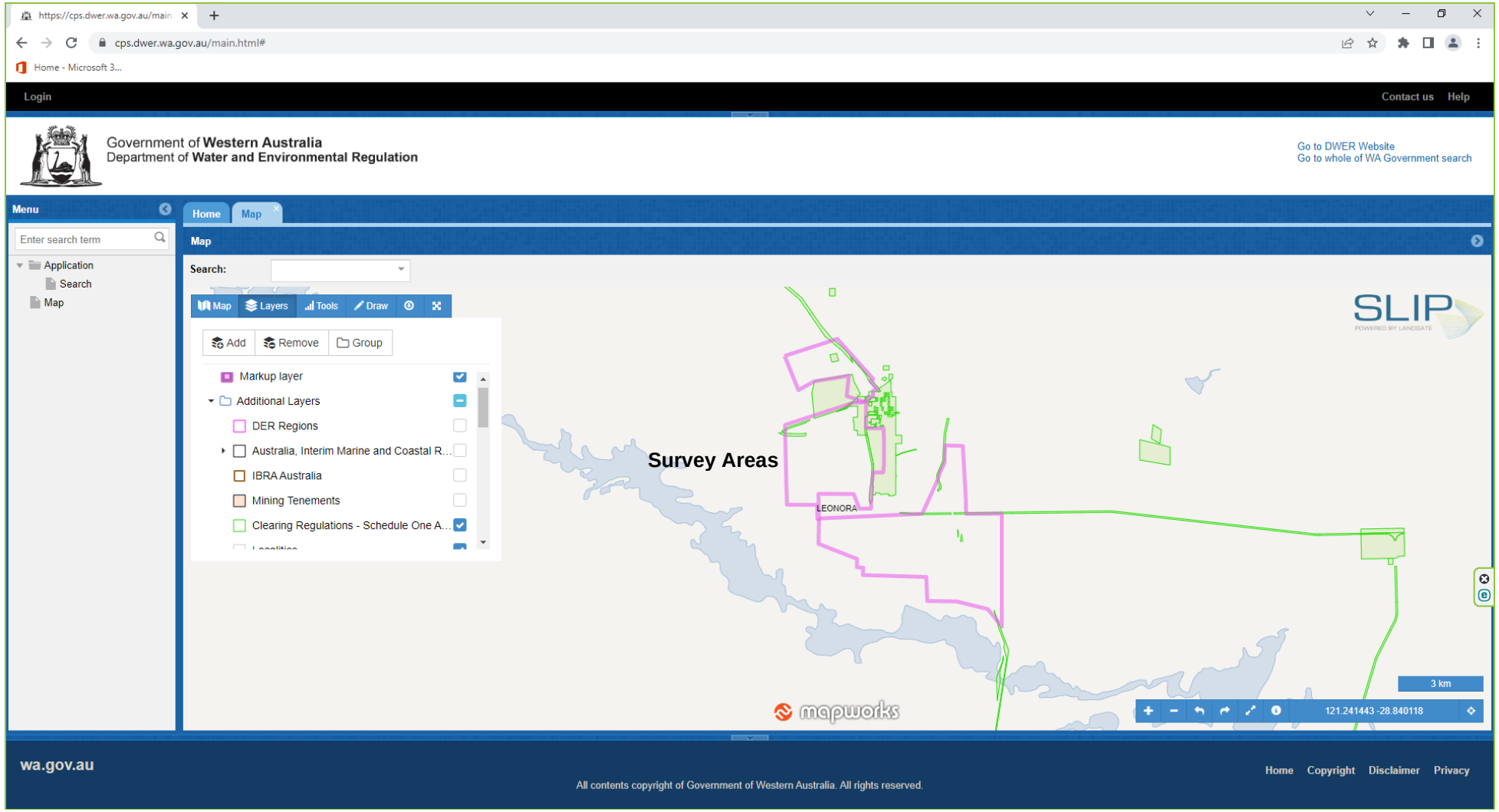
Please feel free to provide feedback via the Contact us page.



DWER CPS Map Viewer - showing no ESA's (dark green shaded areas) within the survey areas (pink polygons) (DWER, 2023)



DWER CPS Map Viewer - showing no water bodies within the survey areas (pink polygons) (DWER, 2023)



DWER CPS Map Viewer - showing Schedule One areas (green shaded area) within the survey areas (pink polygons) (DWER, 2023)

Appendix B - Vegetation Definitions

Vegetation Condition Definitions (Keighery, 1994)

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

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

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

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

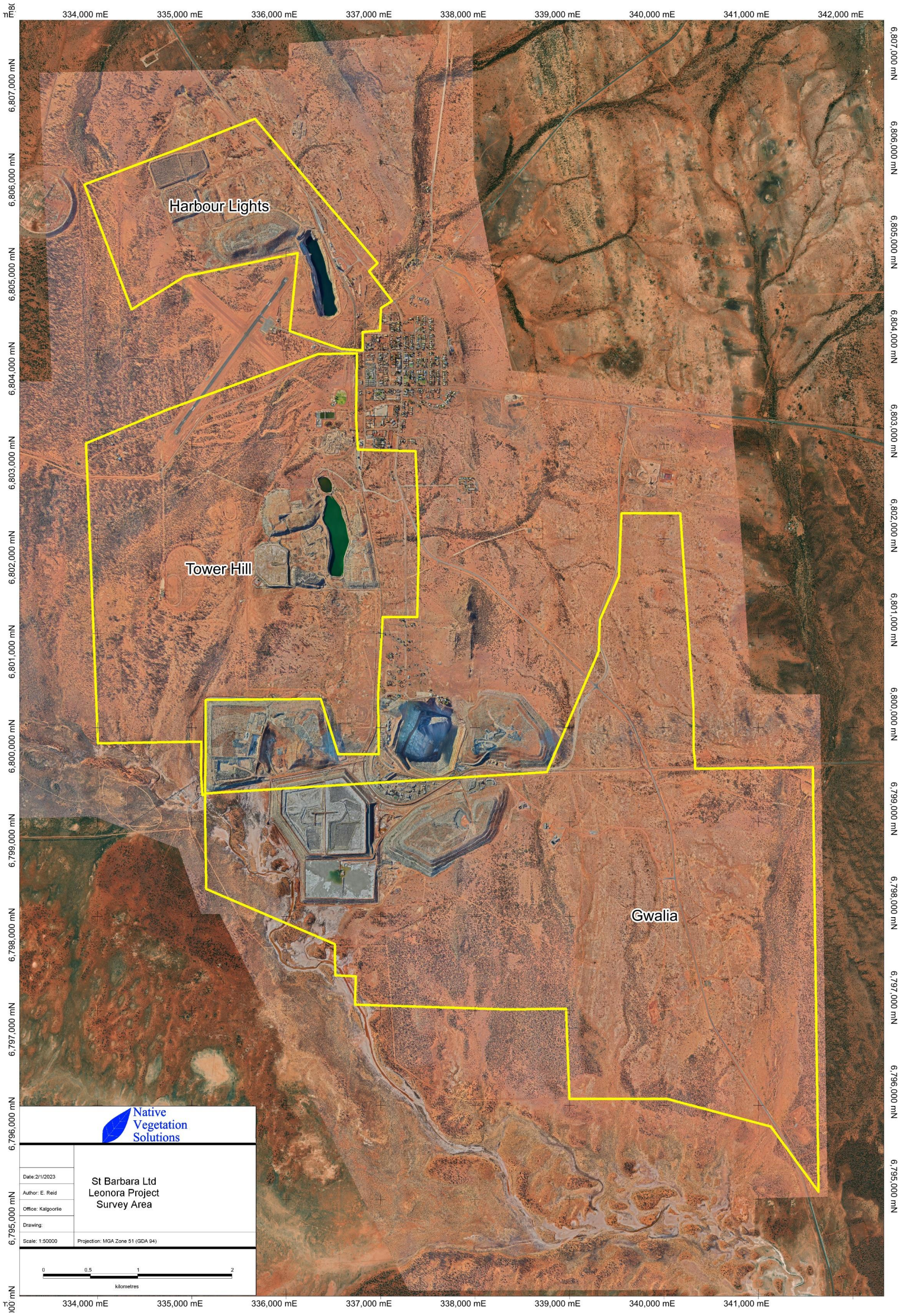
Degraded (5). Basic vegetation structure severely impacted by disturbance.
Scope for regeneration but not to a state approaching good condition without intensive management.
For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial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

Completely Degraded (6). The structure of the vegetation is no longer intact and the area is completely or almost completely without native species.
These areas are often described as 'parkland cleared' with the flora compromising weed or crop species with isolated trees or shrubs.

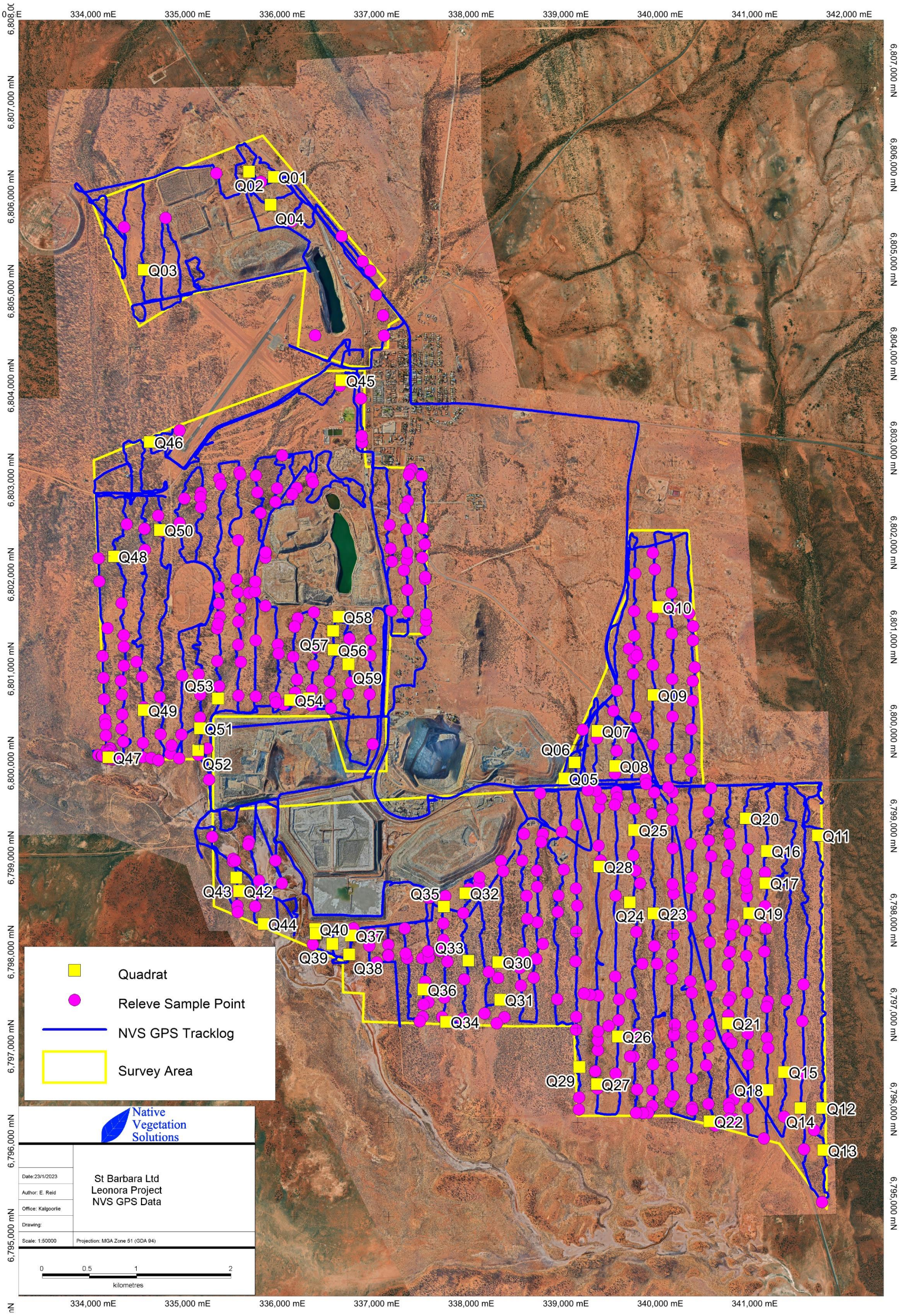
Vegetation Structure Definitions (Muir, 1977)

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

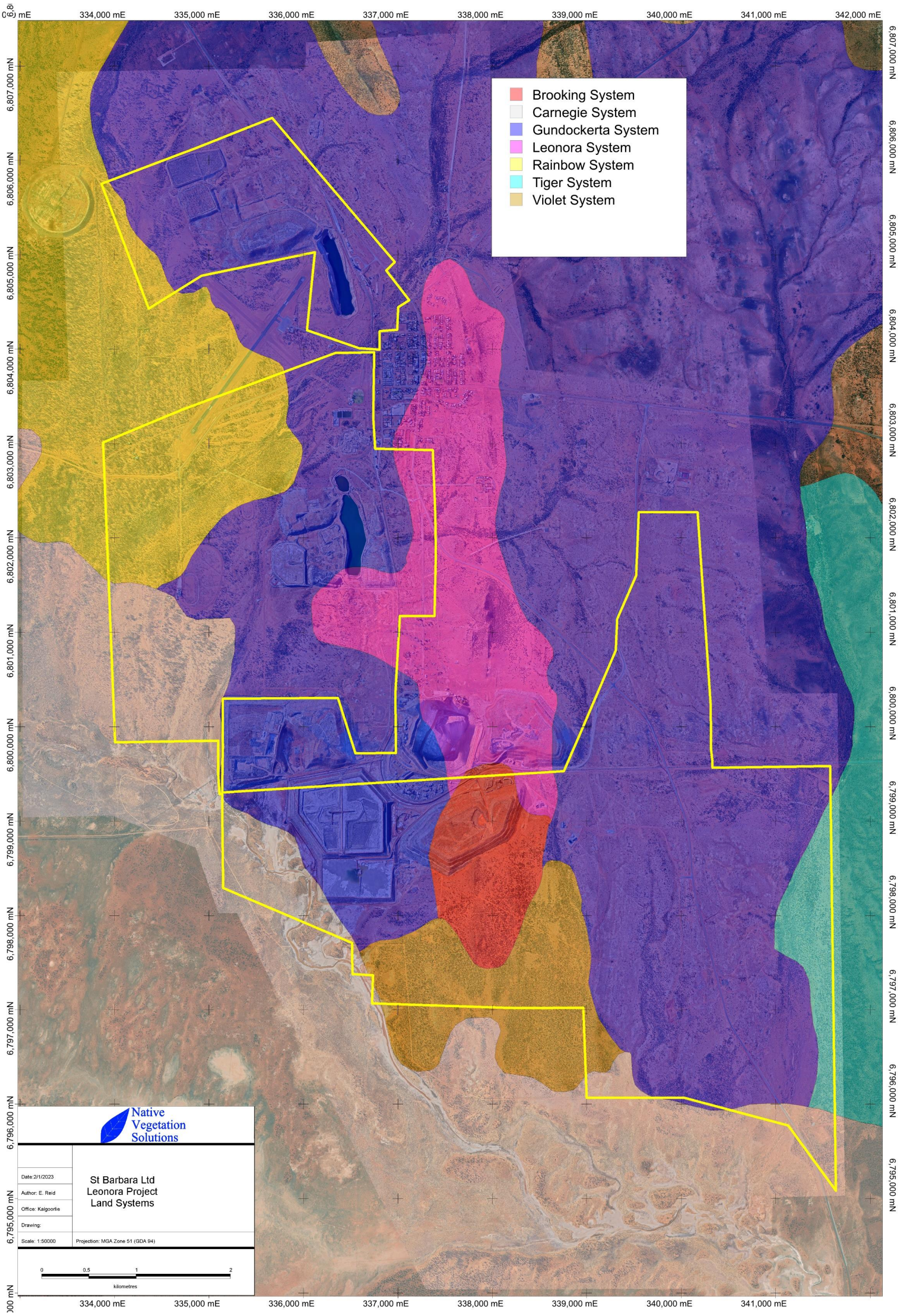
Appendix C - Mapping



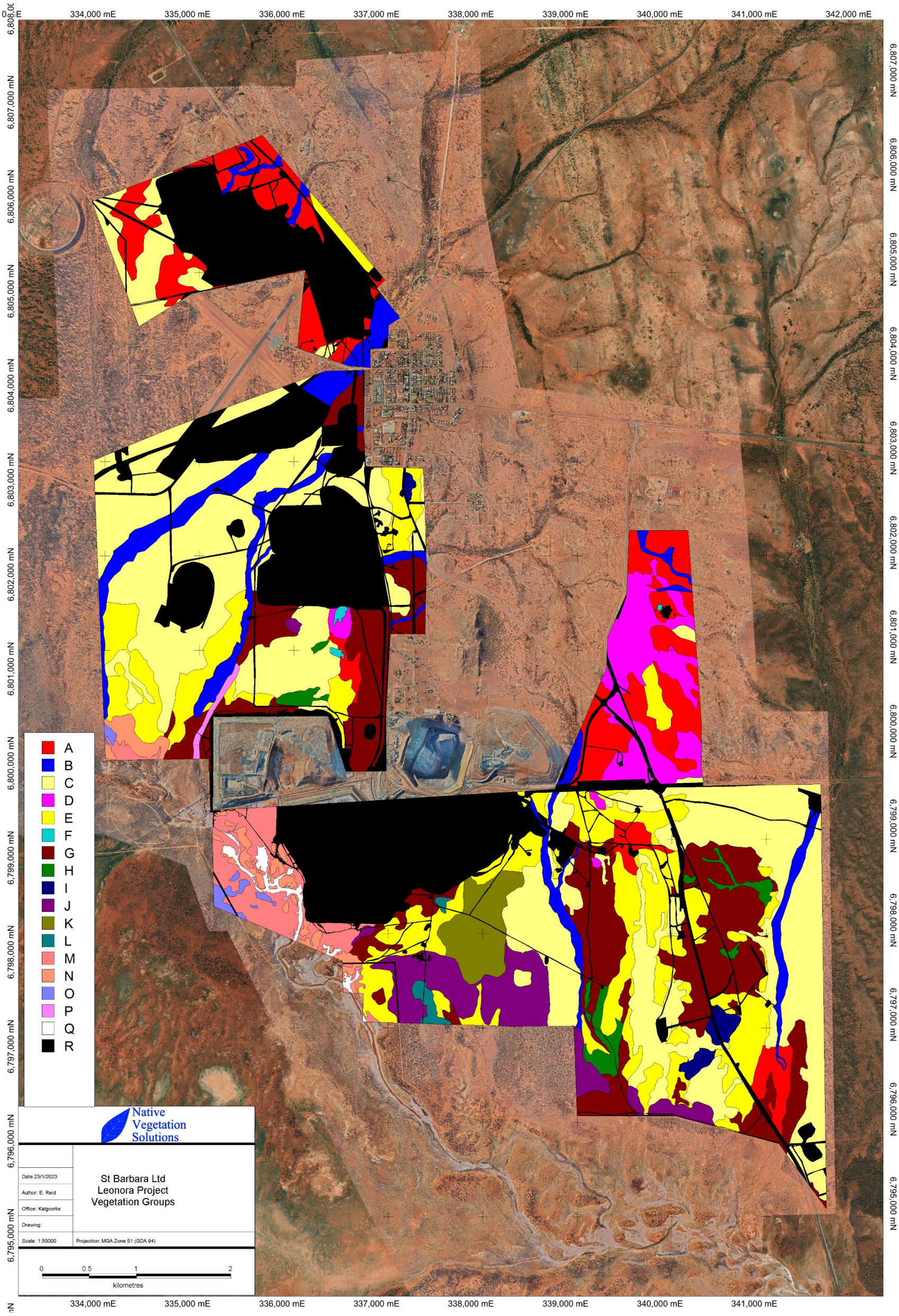
Map 1: Leonora Project Survey Area



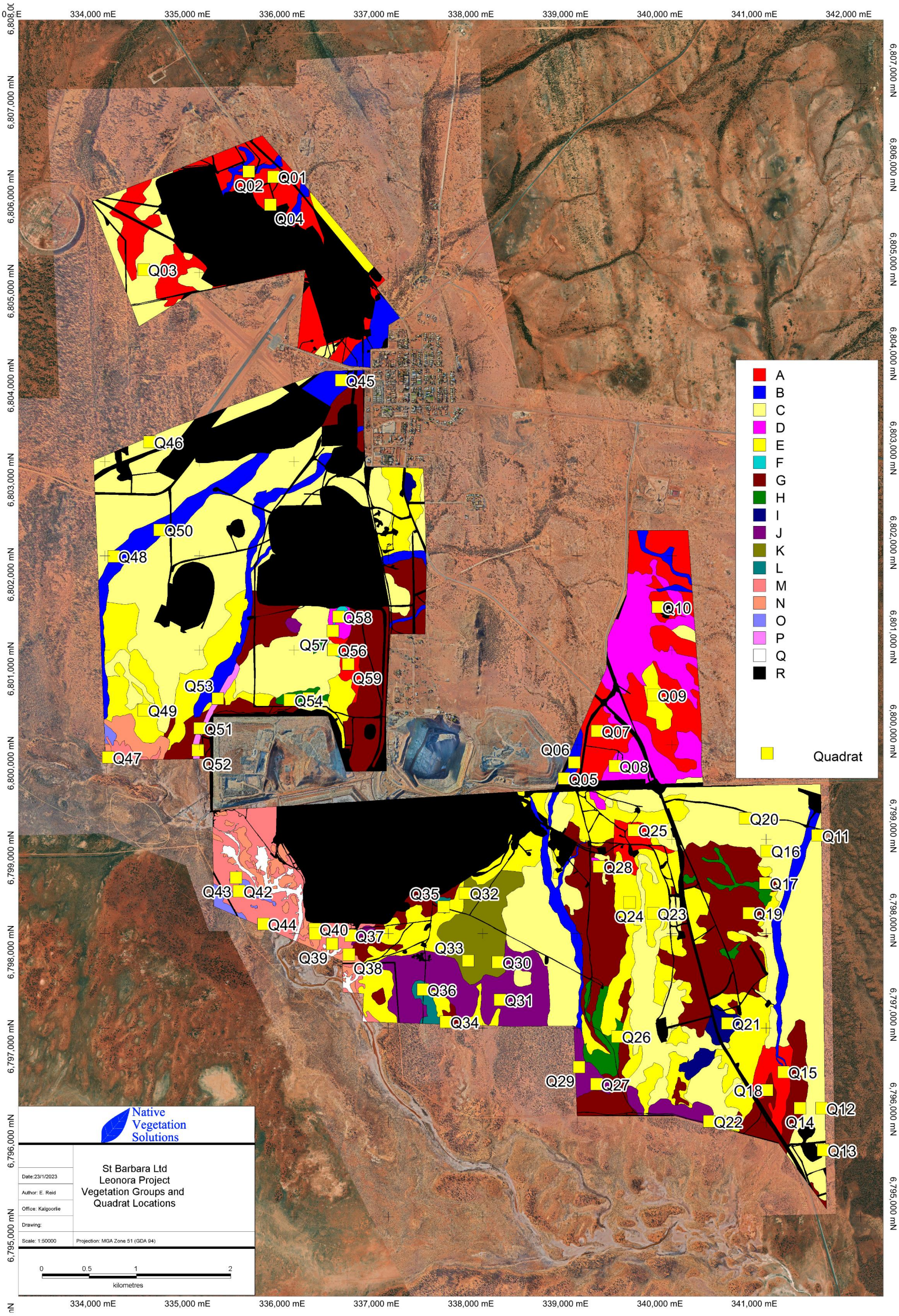
Map 2: NVS GPS Data for the Leonora Project



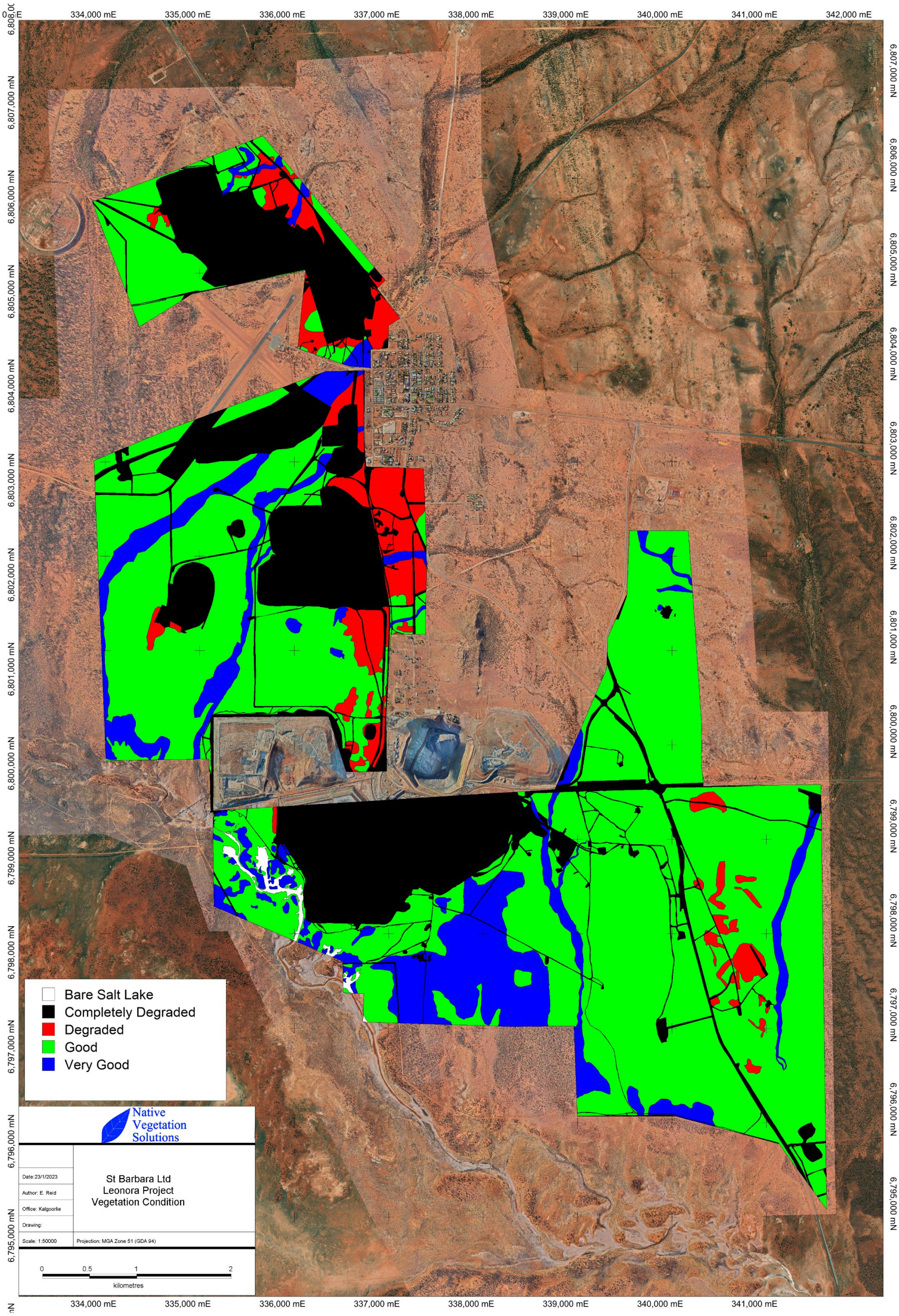
Map 3: Land Systems for the Leonora Project



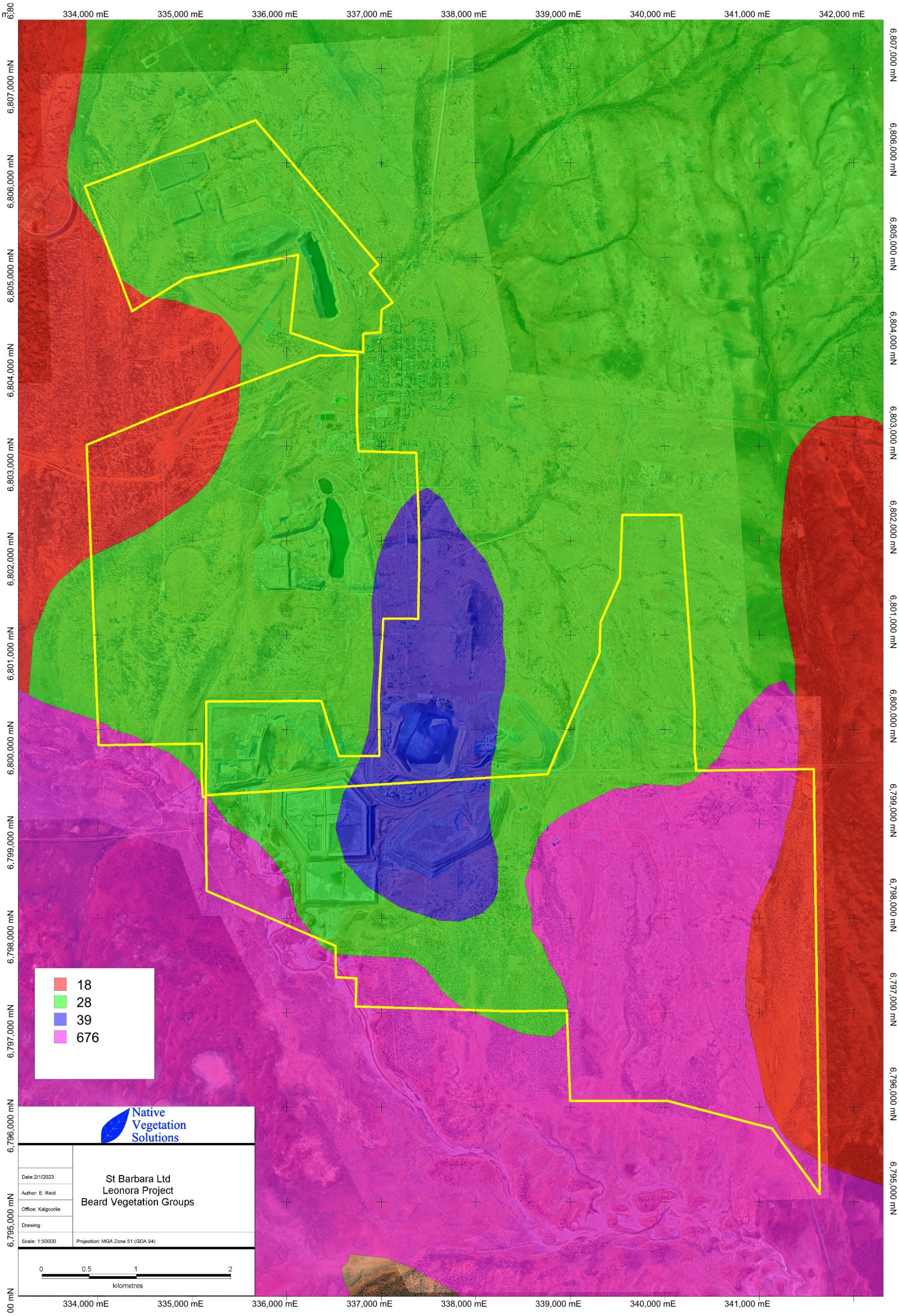
Map 4: Vegetation Groups for the Leonora Project



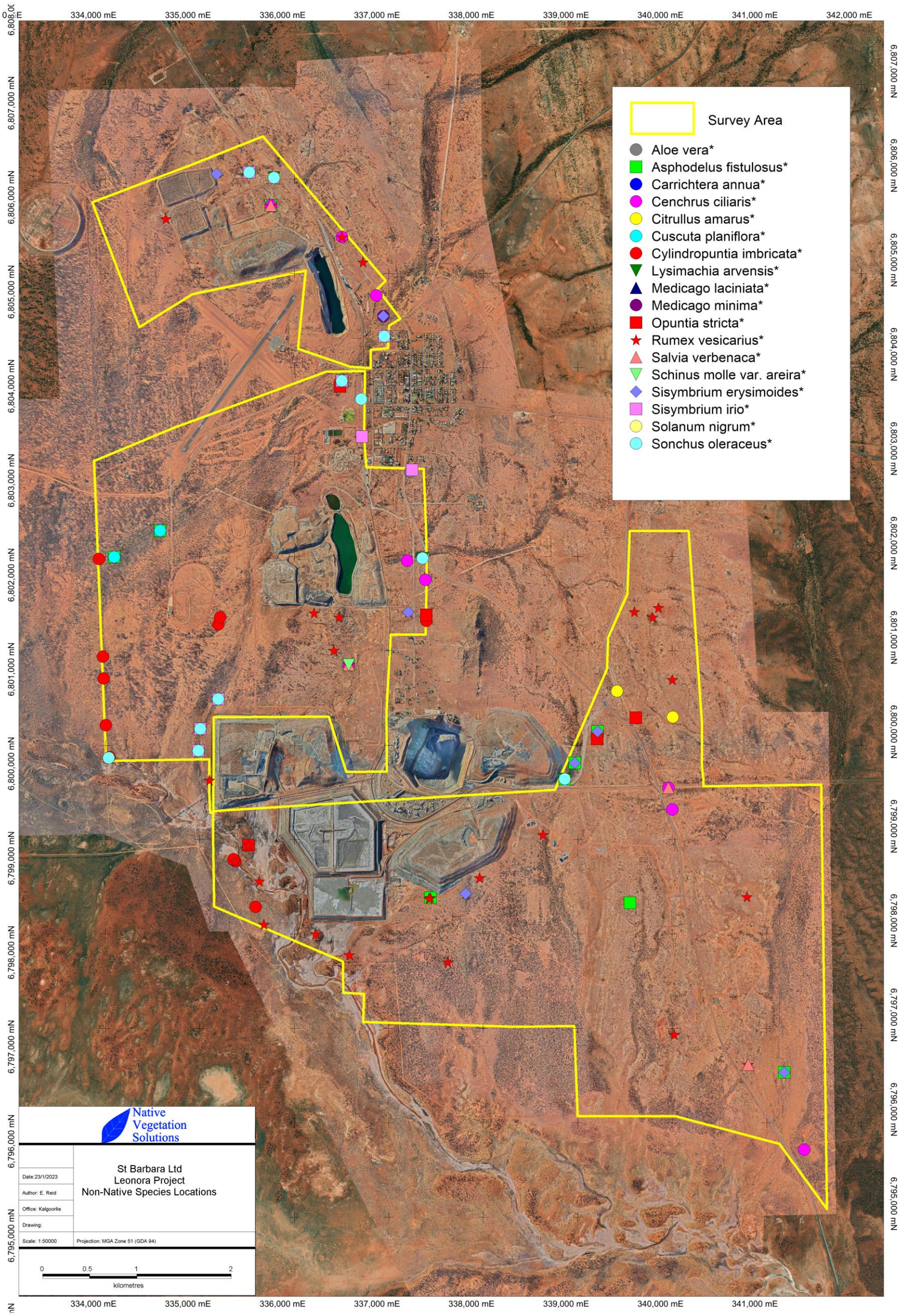
Map 5: Vegetation Groups and Quadrat Locations for the Leonora Project



Map 6: Vegetation Condition for the Leonora Project



Map 7: Beard Vegetation mapping for the Leonora Project



Map 8: Non-Native Species recorded in the Leonora Project

Appendix D – Priority Flora Recorded During the Survey

No Threatened or Priority Flora were recorded in the Survey Area.

Appendix E - Species Recorded During the September 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	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30
Aizoaceae	*Disphyma*	*Disphyma crassifolium*																		*								*				
Aizoaceae	*Gunniopsis*	*Gunniopsis quadrifida*																														
Amaranthaceae	*Ptilotus*	*Ptilotus divaricatus*															*															
Amaranthaceae	*Ptilotus*	*Ptilotus exaltatus*																														
Amaranthaceae	*Ptilotus*	*Ptilotus gaudichaudii*																					*									
Amaranthaceae	*Ptilotus*	*Ptilotus helipteroides*		*								*															*					
Amaranthaceae	*Ptilotus*	*Ptilotus obovatus*	*	*	*	*	*	*	*	*	*		*	*	*			*	*		*	*	*	*	*	*	*	*	*	*	*	*
Amaranthaceae	*Ptilotus*	*Ptilotus roei*										*											*									
Amaranthaceae	*Ptilotus*	*Ptilotus schwartzii*										*											*									
Anacardiaceae	*Schinus*	*Schinus molle* var. *areira*																														
Apocynaceae	*Leichhardtia*	*Leichhardtia australis*	*		*				*		*	*											*	*					*		*	
Asparagaceae	*Thysanotus*	*Thysanotus manglesianus*																						*					*		*	
Asphodelaceae	*Asphodelus*	*Asphodelus fistulosus**		*		*	*	*	*								*									*					
Asteraceae	*Brachyscome*	*Brachyscome ciliaris*				*	*														*				*	*						
Asteraceae	*Brachyscome*	*Brachyscome iberidifolia*											*	*																		
Asteraceae	*Calocephalus*	*Calocephalus knappii*		*																												
Asteraceae	*Calotis*	*Calotis hispidula*														*			*	*	*							*				
Asteraceae	*Calotis*	*Calotis multicaulis*						*																		*						
Asteraceae	*Cephalipterum*	*Cephalipterum drummondii*						*			*										*				*	*	*			*		
Asteraceae	*Chrysocephalum*	*Chrysocephalum puteale*																					*									
Asteraceae	*Cratystylis*	*Cratystylis subspinescens*															*		*		*				*			*				
Asteraceae	*Erymophyllum*	*Erymophyllum ramosum* subsp. *ramosum*														*				*												
Asteraceae	*Gnephosis*	*Gnephosis brevifolia*															*															
Asteraceae	*Helipterum*	*Helipterum craspedioides*																					*									
Asteraceae	*Isoetopsis*	*Isoetopsis graminifolia*																														*
Asteraceae	*Podolepis*	*Podolepis canescens*																														
Asteraceae	*Podolepis*	*Podolepis capillaris*															*											*				
Asteraceae	*Podolepis*	*Podolepis lessonii*																*														
Asteraceae	*Rhodanthe*	*Rhodanthe floribunda*			*																											
Asteraceae	*Rhodanthe*	*Rhodanthe maryonii*						*				*											*									
Asteraceae	*Rhodanthe*	*Rhodanthe propinqua*									*	*	*	*																		
Asteraceae	*Rhodanthe*	*Rhodanthe charsleyae*	*	*	*								*	*	*											*						
Asteraceae	*Schoenia*	*Schoenia cassiniana*																														
Asteraceae	*Senecio*	*Senecio glossanthus*																	*									*				
Asteraceae	*Sonchus*	*Sonchus oleraceus**	*	*			*																									
Asteraceae	*Sondottia*	*Sondottia connata*																														
Asteraceae	*Vittadinia*	*Vittadinia sulcata*																														
Asteraceae	*Walshia*	*Walshia kendallii*																														
Brassicaceae	*Carrichtera*	*Carrichtera annua**	*				*																									
Brassicaceae	*Lepidium*	*Lepidium oxytrichum*		*		*													*							*		*				
Brassicaceae	*Lepidium*	*Lepidium platypetalum*																												*		
Brassicaceae	*Sisymbrium*	*Sisymbrium erysimoides**						*	*								*															
Brassicaceae	*Sisymbrium*	*Sisymbrium irio**		*																												
Brassicaceae	*Stenopetalum*	*Stenopetalum salicola*																														
Campanulaceae	*Wahlenbergia*	*Wahlenbergia gracilenta*					*																									
Campanulaceae	*Wahlenbergia*	*Wahlenbergia tumidifructa*																														
Chenopodiaceae	*Atriplex*	*Atriplex bunburyana*	*			*			*		*	*					*				*				*			*				
Chenopodiaceae	*Atriplex*	*Atriplex codonocarpa*					*									*	*		*	*								*				
Chenopodiaceae	*Atriplex*	*Atriplex vesicaria*				*																						*				
Chenopodiaceae	*Didymanthus*	*Didymanthus roei*																														
Chenopodiaceae	*Dysphania*	*Dysphania kalpari*		*																												
Chenopodiaceae	*Enchylaena*	*Enchylaena tomentosa* var. *tomentosa*				*		*	*	*	*					*			*	*						*		*	*	*	*	
Chenopodiaceae	*Maireana*	*Maireana amoena*																														
Chenopodiaceae	*Maireana*	*Maireana carnosa*																														
Chenopodiaceae	*Maireana*	*Maireana georgei*	*			*			*					*	*												*					
Chenopodiaceae	*Maireana*	*Maireana glomerifolia*									*																					
Chenopodiaceae	*Maireana*	*Maireana pyramidata*		*		*		*	*	*	*					*	*		*	*	*			*	*	*	*	*	*	*	*	
Chenopodiaceae	*Maireana*	*Maireana sedifolia*	*							*		*															*				*		
Chenopodiaceae	*Maireana*	*Maireana thesioides*												*	*									*					*		*	*
Chenopodiaceae	*Maireana*	*Maireana tomentosa*	*			*			*		*					*	*		*	*	*							*		*		
Chenopodiaceae	*Maireana*	*Maireana trichoptera*	*								*										*						*					
Chenopodiaceae	*Maireana*	*Maireana triptera*	*			*			*	*	*	*					*	*	*	*	*	*			*	*	*	*		*		
Chenopodiaceae	*Rhagodia*	*Rhagodia drummondii*						*	*	*				*	*									*					*	*	*	*

Family	Genus	Taxon	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30
Chenopodiaceae	*Rhagodia*	*Rhagodia eremaea*		*			*		*																							
Chenopodiaceae	*Salsola*	*Salsola australis*																														
Chenopodiaceae	*Sclerolaena*	*Sclerolaena cuneata*										*							*									*				
Chenopodiaceae	*Sclerolaena*	*Sclerolaena densiflora*	*			*										*				*												
Chenopodiaceae	*Sclerolaena*	*Sclerolaena diacantha*	*		*	*	*	*	*	*	*	*				*	*			*	*		*		*		*			*		
Chenopodiaceae	*Sclerolaena*	*Sclerolaena drummondii*																														
Chenopodiaceae	*Sclerolaena*	*Sclerolaena eriacantha*				*											*								*							
Chenopodiaceae	*Sclerolaena*	*Sclerolaena patenticuspis*			*											*	*		*	*								*				
Chenopodiaceae	*Tecticornia*	*Tecticornia disarticulata*																	*									*				
Chenopodiaceae	*Tecticornia*	*Tecticornia indica* subsp. *bidens*																														
Chenopodiaceae	*Tecticornia*	*Tecticornia pruinosa*																														
Chenopodiaceae	*Tecticornia*	*Tecticornia undulata*																														
Convolvulaceae	*Cuscuta*	*Cuscuta planiflora**		*																												
Crassulaceae	*Crassula*	*Crassula colorata* var. *acuminata*		*																												*
Fabaceae	*Acacia*	*Acacia aneura*	*	*	*	*	*	*		*	*	*	*	*				*				*	*	*	*	*	*		*	*	*	*
Fabaceae	*Acacia*	*Acacia burkittii*																														
Fabaceae	*Acacia*	*Acacia caesaneura*					*	*			*			*	*							*		*					*		*	*
Fabaceae	*Acacia*	*Acacia craspedocarpa*					*	*	*				*	*	*			*						*					*		*	*
Fabaceae	*Acacia*	*Acacia duriuscula*																														
Fabaceae	*Acacia*	*Acacia incurvaneura*	*	*			*															*										
Fabaceae	*Acacia*	*Acacia mulganeura*			*			*					*	*	*		*									*						*
Fabaceae	*Acacia*	*Acacia pteraneura*				*				*																				*		
Fabaceae	*Acacia*	*Acacia quadrimarginea*																					*									
Fabaceae	*Acacia*	*Acacia ramulosa* var. *ramulosa*										*												*					*		*	
Fabaceae	*Acacia*	*Acacia sibirica*																								*						
Fabaceae	*Acacia*	*Acacia tetragonophylla*	*	*	*	*	*	*	*		*	*	*	*	*		*	*				*	*	*	*				*		*	*
Fabaceae	*Medicago*	*Medicago minima**																														
Fabaceae	*Senna*	*Senna artemisioides* subsp. *×sturtii*							*	*	*	*																		*		
Fabaceae	*Senna*	*Senna artemisioides* subsp. *artemisioides*							*												*				*							
Fabaceae	*Senna*	*Senna artemisioides* subsp. *filifolia*	*							*	*				*		*							*					*	*	*	*
Fabaceae	*Senna*	*Senna cardiosperma*																									*					
Fabaceae	*Senna*	*Senna charlesiana*																														
Fabaceae	*Senna*	*Senna glutinosa* subsp. *chatelainiana*							*	*																				*		
Fabaceae	*Senna*	*Senna sp.* Meekatharra	*																													
Frankeniaceae	*Frankenia*	*Frankenia cinerea*								*	*					*	*			*								*		*		
Frankeniaceae	*Frankenia*	*Frankenia interioris*															*															
Frankeniaceae	*Frankenia*	*Frankenia laxiflora*																														
Frankeniaceae	*Frankenia*	*Frankenia pauciflora* var. *pauciflora*																														
Geraniaceae	*Erodium*	*Erodium crinitum*																						*					*		*	
Geraniaceae	*Erodium*	*Erodium cygnorum*	*	*	*	*	*	*			*	*	*	*	*			*			*		*	*	*	*	*		*		*	
Goodeniaceae	*Goodenia*	*Goodenia havilandii*		*																												*
Goodeniaceae	*Goodenia*	*Goodenia rosea*													*								*	*					*		*	
Goodeniaceae	*Goodenia*	*Goodenia sp.* Midwest		*				*	*	*	*	*				*	*		*	*	*				*	*	*	*		*		
Goodeniaceae	*Scaevola*	*Scaevola spinescens*	*	*					*	*	*				*										*	*	*		*	*	*	
Haloragaceae	*Haloragis*	*Haloragis gossei*																											*		*	
Haloragaceae	*Haloragis*	*Haloragis trigonocarpa*																														
Hemerocallidaceae	*Dianella*	*Dianella revoluta* var. *divaricata*												*	*							*		*					*		*	*
Lamiaceae	*Salvia*	*Salvia verbenaca**	*			*																										
Lamiaceae	*Teucrium*	*Teucrium teucriflorum*		*	*		*						*	*	*			*				*										*
Loranthaceae	*Amyema*	*Amyema fitzgeraldii*																														
Malvaceae	*Abutilon*	*Abutilon cryptopetalum*			*																											
Malvaceae	*Abutilon*	*Abutilon otocarpum*		*																												
Malvaceae	*Abutilon*	*Abutilon oxycarpum*		*																												
Malvaceae	*Brachychiton*	*Brachychiton gregorii*																					*									
Malvaceae	*Sida*	*Sida calyxhymenia*	*																			*	*		*							*
Malvaceae	*Sida*	*Sida ectogama*						*	*									*				*			*							*
Malvaceae	*Sida*	*Sida intricata*				*																										
Malvaceae	*Sida*	*Sida sp.* Excedentifolia	*			*																										
Malvaceae	*Sida*	*Sida sp.* Golden calyces glabrous					*	*	*			*						*				*										*
Montiaceae	*Calandrinia*	*Calandrinia creethae*																														
Montiaceae	*Calandrinia*	*Calandrinia eremaea*		*		*											*												*		*	
Montiaceae	*Calandrinia*	*Calandrinia eremaea sans lat*										*																				
Montiaceae	*Calandrinia*	*Calandrinia polyandra*				*			*							*	*			*						*	*	*				
Myrtaceae	*Eucalyptus*	*Eucalyptus camaldulensis* subsp. *obtusa*																														
Myrtaceae	*Melaleuca*	*Melaleuca interioris*																														

Family	Genus	Taxon	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30
Myrtaceae	*Melaleuca*	*Melaleuca sheathiana*																														
Pittosporaceae	*Pittosporum*	*Pittosporum angustifolium*			*																											
Plantaginaceae	*Plantago*	*Plantago turrifera*																														
Poaceae	*Aristida*	*Aristida contorta*																						*		*			*		*	
Poaceae	*Austrostipa*	*Austrostipa elegantissima*																	*									*				
Poaceae	*Austrostipa*	*Austrostipa nitida*				*						*						*											*			
Poaceae	*Cenchrus*	*Cenchrus ciliaris**	*			*	*																									
Poaceae	*Enneapogon*	*Enneapogon caerulescens*										*																				
Poaceae	*Eragrostis*	*Eragrostis eriopoda*										*			*		*					*		*					*		*	
Poaceae	*Eriachne*	*Eriachne flaccida*										*																				
Poaceae	*Eriachne*	*Eriachne mucronata*																					*									
Poaceae	*Eriachne*	*Eriachne pulchella* subsp. *pulchella*									*																					
Poaceae	*Monachather*	*Monachather paradoxus*																	*									*				
Polygonaceae	*Rumex*	*Rumex vesicarius**	*	*		*						*																				
Primulaceae	*Lysimachia*	*Lysimachia arvensis**	*	*			*																									
Proteaceae	*Grevillea*	*Grevillea berryana*																				*										
Proteaceae	*Hakea*	*Hakea preissii*	*			*			*	*											*					*	*	*		*		
Proteaceae	*Hakea*	*Hakea recurva* subsp. *recurva*												*																		
Pteridaceae	*Cheilanthes*	*Cheilanthes sieberi* subsp. *sieberi*		*								*											*									*
Rubiaceae	*Psydrax*	*Psydrax rigidula*												*																		
Rubiaceae	*Psydrax*	*Psydrax suaveolens*																														
Rutaceae	*Phebalium*	*Phebalium lepidotum*																									*					
Santalaceae	*Exocarpos*	*Exocarpos aphyllus*													*																	
Santalaceae	*Santalum*	*Santalum lanceolatum*																*														
Santalaceae	*Santalum*	*Santalum spicatum*												*	*																	
Sapindaceae	*Dodonaea*	*Dodonaea rigida*																														
Scrophulariaceae	*Eremophila*	*Eremophila clarkei*																														*
Scrophulariaceae	*Eremophila*	*Eremophila compacta*				*								*	*	*		*		*		*		*					*		*	
Scrophulariaceae	*Eremophila*	*Eremophila forrestii* subsp. *forrestii*									*	*										*		*					*		*	
Scrophulariaceae	*Eremophila*	*Eremophila glandulifera*			*																		*									
Scrophulariaceae	*Eremophila*	*Eremophila latrobei* subsp. *latrobei*																														*
Scrophulariaceae	*Eremophila*	*Eremophila maculata* subsp. *brevifolia*																		*												
Scrophulariaceae	*Eremophila*	*Eremophila metallicorum*			*			*	*	*	*		*	*											*					*		
Scrophulariaceae	*Eremophila*	*Eremophila miniata*																											*		*	
Scrophulariaceae	*Eremophila*	*Eremophila oldfieldii* subsp. *angustifolia*	*							*																				*		
Scrophulariaceae	*Eremophila*	*Eremophila oppositifolia* subsp. *angustifolia*	*																													
Scrophulariaceae	*Eremophila*	*Eremophila pantonii*																														
Scrophulariaceae	*Eremophila*	*Eremophila platycalyx* subsp. Leonora	*	*	*	*		*				*	*	*				*							*							
Scrophulariaceae	*Eremophila*	*Eremophila scoparia*																														
Scrophulariaceae	*Eremophila*	*Eremophila youngii* subsp. *youngii*															*		*		*							*				
Scrophulariaceae	*Myoporum*	*Myoporum montanum*																														
Solanaceae	*Lycium*	*Lycium australe*																														
Solanaceae	*Nicotiana*	*Nicotiana rosulata*		*			*						*	*																		
Solanaceae	*Solanum*	*Solanum lasiophyllum*	*			*					*			*				*			*		*		*							
Solanaceae	*Solanum*	*Solanum nigrum**		*																												
Solanaceae	*Solanum*	*Solanum nummularium*																														
Stylidiaceae	*Stylidium*	*Stylidium ?sp 111-5*																					*									
Zygophyllaceae	*Roepera*	*Roepera eremaea*	*									*														*						

Family	Genus	Taxon	Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38	Q39	Q40	Q41	Q42	Q43	Q44	Q45	Q46	Q47	Q48	Q49	Q50	Q51	Q52	Q53	Q54	Q55	Q56	Q57	Q58	Q59
Aizoaceae	*Disphyma*	*Disphyma crassifolium*							*					*	*																
Aizoaceae	*Gunniopsis*	*Gunniopsis quadrifida*											*	*	*								*	*	*						
Amaranthaceae	*Ptilotus*	*Ptilotus divaricatus*																													
Amaranthaceae	*Ptilotus*	*Ptilotus exaltatus*		*													*														
Amaranthaceae	*Ptilotus*	*Ptilotus gaudichaudii*																													
Amaranthaceae	*Ptilotus*	*Ptilotus helipteroides*			*																							*		*	
Amaranthaceae	*Ptilotus*	*Ptilotus obovatus*	*	*	*	*	*	*										*			*		*	*	*	*	*		*		*
Amaranthaceae	*Ptilotus*	*Ptilotus roei*																										*		*	
Amaranthaceae	*Ptilotus*	*Ptilotus schwartzii*			*													*										*		*	
Anacardiaceae	*Schinus*	*Schinus molle* var. *areira*																													*
Apocynaceae	*Leichhardtia*	*Leichhardtia australis*	*			*													*		*		*	*	*			*		*	
Asparagaceae	*Thysanotus*	*Thysanotus manglesianus*	*																												
Asphodelaceae	*Asphodelus*	*Asphodelus fistulosus**															*			*		*									*
Asteraceae	*Brachyscome*	*Brachyscome ciliaris*															*														*
Asteraceae	*Brachyscome*	*Brachyscome iberidifolia*																													
Asteraceae	*Calocephalus*	*Calocephalus knappii*																													
Asteraceae	*Calotis*	*Calotis hispidula*																								*	*				
Asteraceae	*Calotis*	*Calotis multicaulis*																													
Asteraceae	*Cephalipterum*	*Cephalipterum drummondii*																			*								*		
Asteraceae	*Chrysocephalum*	*Chrysocephalum puteale*																													
Asteraceae	*Cratystylis*	*Cratystylis subspinescens*				*								*	*	*					*					*	*				
Asteraceae	*Erymophyllum*	*Erymophyllum ramosum* subsp. *ramosum*																													
Asteraceae	*Gnephosis*	*Gnephosis brevifolia*																	*												
Asteraceae	*Helipterum*	*Helipterum craspedioides*																													
Asteraceae	*Isoetopsis*	*Isoetopsis graminifolia*																													
Asteraceae	*Podolepis*	*Podolepis canescens*																		*		*									
Asteraceae	*Podolepis*	*Podolepis capillaris*																													
Asteraceae	*Podolepis*	*Podolepis lessonii*																													
Asteraceae	*Rhodanthe*	*Rhodanthe floribunda*																													
Asteraceae	*Rhodanthe*	*Rhodanthe maryonii*																										*		*	
Asteraceae	*Rhodanthe*	*Rhodanthe propinqua*																		*	*	*						*		*	
Asteraceae	*Rhodanthe*	*Rhodanthe charsleyae*															*			*		*			*						*
Asteraceae	*Schoenia*	*Schoenia cassiniana*																				*									
Asteraceae	*Senecio*	*Senecio glossanthus*												*	*		*		*							*	*				
Asteraceae	*Sonchus*	*Sonchus oleraceus**															*		*				*	*	*						
Asteraceae	*Sondottia*	*Sondottia connata*														*															
Asteraceae	*Vittadinia*	*Vittadinia sulcata*																		*		*									
Asteraceae	*Walshia*	*Walshia kendallii*																		*		*									
Brassicaceae	*Carrichtera*	*Carrichtera annua**																													
Brassicaceae	*Lepidium*	*Lepidium oxytrichum*			*																					*	*				*
Brassicaceae	*Lepidium*	*Lepidium platypetalum*																											*		
Brassicaceae	*Sisymbrium*	*Sisymbrium erysimoides**		*																											
Brassicaceae	*Sisymbrium*	*Sisymbrium irio**															*						*	*	*						
Brassicaceae	*Stenopetalum*	*Stenopetalum salicola*														*															
Campanulaceae	*Wahlenbergia*	*Wahlenbergia gracilenta*																		*		*									
Campanulaceae	*Wahlenbergia*	*Wahlenbergia tumidifructa*																		*		*			*						
Chenopodiaceae	*Atriplex*	*Atriplex bunburyana*		*		*		*													*		*	*	*			*		*	*
Chenopodiaceae	*Atriplex*	*Atriplex codonocarpa*																								*	*				
Chenopodiaceae	*Atriplex*	*Atriplex vesicaria*		*										*	*								*	*	*						*
Chenopodiaceae	*Didymanthus*	*Didymanthus roei*														*															
Chenopodiaceae	*Dysphania*	*Dysphania kalpari*																													
Chenopodiaceae	*Enchylaena*	*Enchylaena tomentosa* var. *tomentosa*	*	*		*													*		*		*	*	*	*	*		*		*
Chenopodiaceae	*Maireana*	*Maireana amoena*												*	*																
Chenopodiaceae	*Maireana*	*Maireana carnosa*							*																						
Chenopodiaceae	*Maireana*	*Maireana georgei*		*				*											*					*	*						*
Chenopodiaceae	*Maireana*	*Maireana glomerifolia*																													
Chenopodiaceae	*Maireana*	*Maireana pyramidata*	*	*		*	*	*		*			*						*		*		*	*	*	*	*		*		*
Chenopodiaceae	*Maireana*	*Maireana sedifolia*				*	*	*																				*	*	*	
Chenopodiaceae	*Maireana*	*Maireana thesioides*	*																												
Chenopodiaceae	*Maireana*	*Maireana tomentosa*		*			*	*													*		*	*	*	*	*		*		*
Chenopodiaceae	*Maireana*	*Maireana trichoptera*						*																							
Chenopodiaceae	*Maireana*	*Maireana triptera*		*		*	*	*	*												*					*	*	*	*	*	*
Chenopodiaceae	*Rhagodia*	*Rhagodia drummondii*	*	*	*	*	*	*										*											*		
Chenopodiaceae	*Rhagodia*	*Rhagodia eremaea*		*															*												
Chenopodiaceae	*Salsola*	*Salsola australis*											*																		
Chenopodiaceae	*Sclerolaena*	*Sclerolaena cuneata*						*													*		*	*	*	*	*	*		*	

Family	Genus	Taxon	Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38	Q39	Q40	Q41	Q42	Q43	Q44	Q45	Q46	Q47	Q48	Q49	Q50	Q51	Q52	Q53	Q54	Q55	Q56	Q57	Q58	Q59
Chenopodiaceae	*Sclerolaena*	*Sclerolaena densiflora*																													*
Chenopodiaceae	*Sclerolaena*	*Sclerolaena diacantha*		*			*	*	*					*	*				*		*		*	*	*			*	*	*	*
Chenopodiaceae	*Sclerolaena*	*Sclerolaena drummondii*							*					*	*																
Chenopodiaceae	*Sclerolaena*	*Sclerolaena eriacantha*																													*
Chenopodiaceae	*Sclerolaena*	*Sclerolaena patenticuspis*							*					*	*								*	*	*	*	*				
Chenopodiaceae	*Tecticornia*	*Tecticornia disarticulata*																								*	*				*
Chenopodiaceae	*Tecticornia*	*Tecticornia indica* subsp. *bidens*							*		*	*		*	*	*			*												
Chenopodiaceae	*Tecticornia*	*Tecticornia pruinosa*							*		*	*											*	*							
Chenopodiaceae	*Tecticornia*	*Tecticornia undulata*							*		*	*		*	*	*			*				*	*							
Convolvulaceae	*Cuscuta*	*Cuscuta planiflora**																		*		*									
Crassulaceae	*Crassula*	*Crassula colorata* var. *acuminata*																		*		*									
Fabaceae	*Acacia*	*Acacia aneura*	*	*	*					*							*			*	*	*						*	*	*	*
Fabaceae	*Acacia*	*Acacia burkittii*																					*	*	*						
Fabaceae	*Acacia*	*Acacia caesaneura*	*	*									*						*												
Fabaceae	*Acacia*	*Acacia craspedocarpa*	*			*											*	*			*				*						
Fabaceae	*Acacia*	*Acacia duriuscula*				*	*	*																							
Fabaceae	*Acacia*	*Acacia incurvaneura*															*			*		*									
Fabaceae	*Acacia*	*Acacia mulganeura*		*	*												*	*	*	*	*	*									
Fabaceae	*Acacia*	*Acacia pteraneura*															*												*		*
Fabaceae	*Acacia*	*Acacia quadrimarginea*		*	*																										
Fabaceae	*Acacia*	*Acacia ramulosa* var. *ramulosa*	*																									*		*	
Fabaceae	*Acacia*	*Acacia sibirica*																													
Fabaceae	*Acacia*	*Acacia tetragonophylla*	*	*	*												*			*	*	*			*			*		*	*
Fabaceae	*Medicago*	*Medicago minima**															*														
Fabaceae	*Senna*	*Senna artemisioides* subsp. *×sturtii*																										*	*	*	
Fabaceae	*Senna*	*Senna artemisioides* subsp. *artemisioides*			*																										
Fabaceae	*Senna*	*Senna artemisioides* subsp. *filifolia*	*			*		*																					*		*
Fabaceae	*Senna*	*Senna cardiosperma*																							*						
Fabaceae	*Senna*	*Senna charlesiana*		*			*	*										*			*										
Fabaceae	*Senna*	*Senna glutinosa* subsp. *chatelainiana*																											*		
Fabaceae	*Senna*	*Senna sp.* Meekatharra			*																										
Frankeniaceae	*Frankenia*	*Frankenia cinerea*																											*		
Frankeniaceae	*Frankenia*	*Frankenia interioris*																													
Frankeniaceae	*Frankenia*	*Frankenia laxiflora*																	*												
Frankeniaceae	*Frankenia*	*Frankenia pauciflora* var. *pauciflora*							*					*	*	*															
Geraniaceae	*Erodium*	*Erodium crinitum*	*																												
Geraniaceae	*Erodium*	*Erodium cygnorum*	*	*	*		*	*									*	*	*	*	*	*			*			*		*	*
Goodeniaceae	*Goodenia*	*Goodenia havilandii*			*															*		*									
Goodeniaceae	*Goodenia*	*Goodenia rosea*	*																												
Goodeniaceae	*Goodenia*	*Goodenia sp.* Midwest															*				*				*	*	*	*	*	*	
Goodeniaceae	*Scaevola*	*Scaevola spinescens*	*	*		*	*	*		*			*	*	*				*				*	*	*				*		
Haloragaceae	*Haloragis*	*Haloragis gossei*	*																												
Haloragaceae	*Haloragis*	*Haloragis trigonocarpa*						*																							
Hemerocallidaceae	*Dianella*	*Dianella revoluta* var. *divaricata*	*															*													
Lamiaceae	*Salvia*	*Salvia verbenaca**																													*
Lamiaceae	*Teucrium*	*Teucrium teucriiflorum*		*																	*										
Loranthaceae	*Amyema*	*Amyema fitzgeraldii*																*													
Malvaceae	*Abutilon*	*Abutilon cryptopetalum*																													
Malvaceae	*Abutilon*	*Abutilon otocarpum*																													
Malvaceae	*Abutilon*	*Abutilon oxycarpum*																													
Malvaceae	*Brachychiton*	*Brachychiton gregorii*																													
Malvaceae	*Sida*	*Sida calyxhymenia*																													
Malvaceae	*Sida*	*Sida ectogama*	*	*	*																*										
Malvaceae	*Sida*	*Sida intricata*																													*
Malvaceae	*Sida*	*Sida sp.* Excedentifolia																													*
Malvaceae	*Sida*	*Sida sp.* Golden calyces glabrous																										*		*	
Montiaceae	*Calandrinia*	*Calandrinia creethae*																		*		*			*						
Montiaceae	*Calandrinia*	*Calandrinia eremaea*	*			*				*			*	*	*		*		*	*	*	*		*	*						*
Montiaceae	*Calandrinia*	*Calandrinia eremaea sans lat*																										*		*	
Montiaceae	*Calandrinia*	*Calandrinia polyandra*																	*		*			*	*						*
Myrtaceae	*Eucalyptus*	*Eucalyptus camaldulensis* subsp. *obtusa*															*						*	*							
Myrtaceae	*Melaleuca*	*Melaleuca interioris*								*			*						*					*	*						
Myrtaceae	*Melaleuca*	*Melaleuca sheathiana*											*	*	*				*					*	*						
Pittosporaceae	*Pittosporum*	*Pittosporum angustifolium*																													
Plantaginaceae	*Plantago*	*Plantago turrifera*																		*		*									
Poaceae	*Aristida*	*Aristida contorta*	*							*			*																		

Family	Genus	Taxon	Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38	Q39	Q40	Q41	Q42	Q43	Q44	Q45	Q46	Q47	Q48	Q49	Q50	Q51	Q52	Q53	Q54	Q55	Q56	Q57	Q58	Q59
Poaceae	*Austrostipa*	*Austrostipa elegantissima*																								*	*				
Poaceae	*Austrostipa*	*Austrostipa nitida*												*	*													*	*	*	*
Poaceae	*Cenchrus*	*Cenchrus ciliaris**															*		*				*	*	*						*
Poaceae	*Enneapogon*	*Enneapogon caerulescens*		*				*																				*		*	
Poaceae	*Eragrostis*	*Eragrostis eriopoda*	*											*	*													*		*	
Poaceae	*Eriachne*	*Eriachne flaccida*																										*		*	
Poaceae	*Eriachne*	*Eriachne mucronata*																													
Poaceae	*Eriachne*	*Eriachne pulchella* subsp. *pulchella*												*	*																
Poaceae	*Monachather*	*Monachather paradoxus*																								*	*				
Polygonaceae	*Rumex*	*Rumex vesicarius**		*						*			*			*							*	*	*			*		*	*
Primulaceae	*Lysimachia*	*Lysimachia arvensis**															*						*	*	*						
Proteaceae	*Grevillea*	*Grevillea berryana*																*													
Proteaceae	*Hakea*	*Hakea preissii*		*						*			*																*		*
Proteaceae	*Hakea*	*Hakea recurva* subsp. *recurva*			*																										
Pteridaceae	*Cheilanthes*	*Cheilanthes sieberi* subsp. *sieberi*		*	*													*		*		*						*		*	
Rubiaceae	*Psydrax*	*Psydrax rigidula*			*																										
Rubiaceae	*Psydrax*	*Psydrax suaveolens*	*																												
Rutaceae	*Phebalium*	*Phebalium lepidotum*																													
Santalaceae	*Exocarpos*	*Exocarpos aphyllus*												*	*								*	*	*						
Santalaceae	*Santalum*	*Santalum lanceolatum*																		*		*									
Santalaceae	*Santalum*	*Santalum spicatum*																													
Sapindaceae	*Dodonaea*	*Dodonaea rigida*			*																										
Scrophulariaceae	*Eremophila*	*Eremophila clarkei*			*													*		*		*									
Scrophulariaceae	*Eremophila*	*Eremophila compacta*	*															*			*										*
Scrophulariaceae	*Eremophila*	*Eremophila forrestii* subsp. *forrestii*	*																		*							*		*	
Scrophulariaceae	*Eremophila*	*Eremophila glandulifera*																													
Scrophulariaceae	*Eremophila*	*Eremophila latrobei* subsp. *latrobei*		*	*		*	*																							
Scrophulariaceae	*Eremophila*	*Eremophila maculata* subsp. *brevifolia*																													
Scrophulariaceae	*Eremophila*	*Eremophila metallicorum*	*																										*		
Scrophulariaceae	*Eremophila*	*Eremophila miniata*								*			*	*	*				*												
Scrophulariaceae	*Eremophila*	*Eremophila oldfieldii* subsp. *angustifolia*		*		*	*	*																					*		
Scrophulariaceae	*Eremophila*	*Eremophila oppositifolia* subsp. *angustifolia*																													
Scrophulariaceae	*Eremophila*	*Eremophila pantonii*				*																									
Scrophulariaceae	*Eremophila*	*Eremophila platycalyx* subsp. Leonora					*	*																				*		*	*
Scrophulariaceae	*Eremophila*	*Eremophila scoparia*																								*	*				
Scrophulariaceae	*Eremophila*	*Eremophila youngii* subsp. *youngii*																					*	*		*	*				
Scrophulariaceae	*Myoporum*	*Myoporum montanum*																					*	*							
Solanaceae	*Lycium*	*Lycium australe*												*	*									*	*						
Solanaceae	*Nicotiana*	*Nicotiana rosulata*																													
Solanaceae	*Solanum*	*Solanum lasiophyllum*					*	*															*	*	*						*
Solanaceae	*Solanum*	*Solanum nigrum**																													
Solanaceae	*Solanum*	*Solanum nummularium*				*																									
Stylidiaceae	*Stylidium*	*Stylidium ?sp 111-5*																													
Zygophyllaceae	*Roepera*	*Roepera eremaea*												*	*													*		*	

Species List per Vegetation Group (Opportunistically sampled species not captured in quadrats identified in Bold type)

Family	Genus	Taxon	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Aizoaceae	*Disphyma*	*Disphyma crassifolium*	*						*	*					*		*	
Aizoaceae	*Gunniopsis*	*Gunniopsis quadrifida*														*	*	*
Amaranthaceae	*Ptilotus*	*Ptilotus divaricatus*	*															
Amaranthaceae	*Ptilotus*	*Ptilotus exaltatus*		*									*					
Amaranthaceae	*Ptilotus*	*Ptilotus gaudichaudii*									*							
Amaranthaceae	*Ptilotus*	*Ptilotus helipteroides*	*	*				*					*					
Amaranthaceae	*Ptilotus*	*Ptilotus obovatus*	*	*	*	*	*		*	*	*	*	*	*				*
Amaranthaceae	*Ptilotus*	*Ptilotus roei*						*			*							
Amaranthaceae	*Ptilotus*	*Ptilotus schwartzii*			*			*			*		*					
Anacardiaceae	*Schinus*	*Schinus molle* var. *areira*	*															
Apiaceae	***Daucus***	***Daucus glochidiatus***		*														
Apocynaceae	*Leichhardtia*	*Leichhardtia australis*	*		*		*	*			*	*		*		*		*
Asparagaceae	*Thysanotus*	*Thysanotus manglesianus*										*						
Asphodelaceae	***Aloe***	***Aloe vera****					*											
Asphodelaceae	*Asphodelus*	*Asphodelus fistulosus**	*	*			*											
Asteraceae	*Brachyscome*	*Brachyscome ciliaris*	*	*			*		*									
Asteraceae	*Brachyscome*	*Brachyscome iberidifolia*			*													
Asteraceae	*Calocephalus*	*Calocephalus knappii*		*														
Asteraceae	*Calotis*	*Calotis hispidula*							*	*								
Asteraceae	*Calotis*	*Calotis multicaulis*		*			*											
Asteraceae	*Cephalipterum*	*Cephalipterum drummondii*	*	*	*	*	*		*									
Asteraceae	*Chrysocephalum*	*Chrysocephalum puteale*									*							
Asteraceae	*Cratystylis*	*Cratystylis subspinescens*	*				*		*	*				*	*		*	
Asteraceae	*Erymophyllum*	*Erymophyllum ramosum* subsp. *ramosum*							*									
Asteraceae	***Gnephosis***	***Gnephosis angianthoides***														*		
Asteraceae	*Gnephosis*	*Gnephosis brevifolia*	*													*		
Asteraceae	*Helipterum*	*Helipterum craspedioides*									*							
Asteraceae	*Isoetopsis*	*Isoetopsis graminifolia*											*					
Asteraceae	***Myriocephalus***	***Myriocephalus oldfieldii***		*														
Asteraceae	***Panaetia***	***Panaetia lessonii***				*												
Asteraceae	*Podolepis*	*Podolepis canescens*		*														
Asteraceae	*Podolepis*	*Podolepis capillaris*	*							*								
Asteraceae	*Podolepis*	*Podolepis lessonii*			*													
Asteraceae	***Rhodanthe***	***Rhodanthe chlorocephala* subsp. *splendida***					*											
Asteraceae	*Rhodanthe*	*Rhodanthe floribunda*	*		*													
Asteraceae	*Rhodanthe*	*Rhodanthe maryonii*		*				*			*							
Asteraceae	***Rhodanthe***	***Rhodanthe oppositifolia* subsp. *oppositifolia***		*														
Asteraceae	*Rhodanthe*	*Rhodanthe propinqua*		*	*		*	*										
Asteraceae	*Rhodanthe*	*Rhodanthe charsleyae*	*	*	*		*											*
Asteraceae	*Schoenia*	*Schoenia cassiniana*		*														
Asteraceae	*Senecio*	*Senecio glossanthus*		*						*						*	*	
Asteraceae	***Senecio***	***Senecio magnificus***	*															
Asteraceae	*Sonchus*	*Sonchus oleraceus**	*	*												*		*
Asteraceae	*Sondottia*	*Sondottia connata*													*			
Asteraceae	*Vittadinia*	*Vittadinia sulcata*		*														
Asteraceae	*Walshia*	*Walshia kendallii*		*														
Brassicaceae	*Carrichtera*	*Carrichtera annua**	*	*														
Brassicaceae	*Lepidium*	*Lepidium oxytrichum*	*	*			*			*			*					
Brassicaceae	*Lepidium*	*Lepidium platypetalum*				*												
Brassicaceae	*Sisymbrium*	*Sisymbrium erysimoides**	*	*									*					
Brassicaceae	*Sisymbrium*	*Sisymbrium irio**		*														*
Brassicaceae	*Stenopetalum*	*Stenopetalum salicola*													*			
Cactaceae	***Cylindropuntia***	***Cylindropuntia imbricata****		*	*		*		*							*	*	
Cactaceae	***Opuntia***	***Opuntia stricta****	*	*					*							*		
Campanulaceae	*Wahlenbergia*	*Wahlenbergia gracilenta*		*														
Campanulaceae	*Wahlenbergia*	*Wahlenbergia tumidifructa*		*														*

Family	Genus	Taxon	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Casuarinaceae	***Casuarina***	***Casuarina pauper***										*						
Chenopodiaceae	*Atriplex*	*Atriplex bunburyana*	*				*	*	*	*			*	*				*
Chenopodiaceae	*Atriplex*	*Atriplex codonocarpa*	*	*					*	*								
Chenopodiaceae	*Atriplex*	*Atriplex vesicaria*	*							*			*				*	*
Chenopodiaceae	*Didymanthus*	*Didymanthus roei*													*			
Chenopodiaceae	*Dysphania*	*Dysphania kalpari*		*														
Chenopodiaceae	*Enchylaena*	*Enchylaena tomentosa* var. *tomentosa*	*	*		*	*		*	*		*	*	*		*		*
Chenopodiaceae	*Maireana*	*Maireana amoena*															*	
Chenopodiaceae	*Maireana*	*Maireana carnosa*													*			
Chenopodiaceae	*Maireana*	*Maireana georgei*	*		*								*	*		*		*
Chenopodiaceae	*Maireana*	*Maireana glomerifolia*					*											
Chenopodiaceae	*Maireana*	*Maireana pyramidata*	*	*	*	*	*		*	*		*	*	*		*		*
Chenopodiaceae	*Maireana*	*Maireana sedifolia*	*			*		*					*	*				
Chenopodiaceae	*Maireana*	*Maireana thesioides*			*							*	*					
Chenopodiaceae	*Maireana*	*Maireana tomentosa*	*			*	*		*	*			*	*				*
Chenopodiaceae	*Maireana*	*Maireana trichoptera*	*				*		*					*				
Chenopodiaceae	*Maireana*	*Maireana triptera*	*		*	*	*	*	*	*			*	*	*			
Chenopodiaceae	*Rhagodia*	*Rhagodia drummondii*	*	*	*	*						*	*	*				
Chenopodiaceae	*Rhagodia*	*Rhagodia eremaea*	*	*									*			*		
Chenopodiaceae	*Salsola*	*Salsola australis*														*		
Chenopodiaceae	*Sclerolaena*	*Sclerolaena cuneata*					*	*		*				*				*
Chenopodiaceae	*Sclerolaena*	*Sclerolaena densiflora*	*						*									
Chenopodiaceae	*Sclerolaena*	*Sclerolaena diacantha*	*	*	*	*	*	*	*		*		*	*	*	*	*	*
Chenopodiaceae	*Sclerolaena*	*Sclerolaena drummondii*													*		*	
Chenopodiaceae	*Sclerolaena*	*Sclerolaena eriacantha*	*				*											
Chenopodiaceae	***Sclerolaena***	***Sclerolaena eurotioides***							*									
Chenopodiaceae	*Sclerolaena*	*Sclerolaena patenticuspis*	*		*				*	*					*		*	*
Chenopodiaceae	*Tecticornia*	*Tecticornia disarticulata*	*							*								
Chenopodiaceae	*Tecticornia*	*Tecticornia indica* subsp. *bidens*													*	*	*	
Chenopodiaceae	*Tecticornia*	*Tecticornia pruinosa*													*	*		*
Chenopodiaceae	*Tecticornia*	*Tecticornia undulata*													*	*	*	*
Convolvulaceae	*Cuscuta*	*Cuscuta planiflora**		*														
Crassulaceae	*Crassula*	*Crassula colorata* var. *acuminata*		*									*					
Cucurbitaceae	***Citrullus***	***Citrullus amarus****	*			*												
Cucurbitaceae	***Cucumis***	***Cucumis myriocarpus****					*											
Fabaceae	*Acacia*	*Acacia aneura*	*	*	*	*	*	*			*	*	*			*		
Fabaceae	*Acacia*	*Acacia burkittii*																*
Fabaceae	*Acacia*	*Acacia caesaneura*		*	*		*					*	*			*		
Fabaceae	*Acacia*	*Acacia craspedocarpa*	*	*	*		*					*	*	*				*
Fabaceae	*Acacia*	*Acacia duriuscula*												*				
Fabaceae	*Acacia*	*Acacia incurvaneura*	*	*	*													
Fabaceae	***Acacia***	***Acacia kempeana***	*															
Fabaceae	***Acacia***	***Acacia masliniana***					*											
Fabaceae	*Acacia*	*Acacia mulganeura*	*	*	*		*						*			*		
Fabaceae	***Acacia***	***Acacia oswaldii***					*											
Fabaceae	*Acacia*	*Acacia pteraneura*	*	*		*												
Fabaceae	*Acacia*	*Acacia quadrimarginea*					*				*		*					
Fabaceae	*Acacia*	*Acacia ramulosa* var. *ramulosa*			*			*				*						
Fabaceae	*Acacia*	*Acacia sibirica*					*											
Fabaceae	*Acacia*	*Acacia tetragonophylla*	*	*	*		*	*			*	*	*					*
Fabaceae	***Acacia***	***Acacia victoriae***							*									
Fabaceae	***Medicago***	***Medicago laciniata****		*														
Fabaceae	*Medicago*	*Medicago minima**		*														
Fabaceae	*Senna*	*Senna artemisioides* subsp. *×sturtii*	*			*	*	*										
Fabaceae	*Senna*	*Senna artemisioides* subsp. *artemisioides*	*				*		*				*					
Fabaceae	*Senna*	*Senna artemisioides* subsp. *filifolia*	*		*	*	*					*	*	*				
Fabaceae	*Senna*	*Senna cardiosperma*	*															*

Family	Genus	Taxon	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Fabaceae	*Senna*	*Senna charlesiana*			*		*						*	*				
Fabaceae	*Senna*	*Senna glutinosa* subsp. *chatelainiana*	*			*												
Fabaceae	*Senna*	*Senna sp.* Meekatharra	*										*					
Frankeniaceae	*Frankenia*	*Frankenia cinerea*	*			*	*		*	*								
Frankeniaceae	*Frankenia*	*Frankenia interioris*	*															
Frankeniaceae	*Frankenia*	*Frankenia laxiflora*														*		
Frankeniaceae	*Frankenia*	*Frankenia pauciflora* var. *pauciflora*													*		*	
Geraniaceae	*Erodium*	*Erodium crinitum*										*						
Geraniaceae	*Erodium*	*Erodium cygnorum*	*	*	*		*	*	*		*	*	*	*		*		*
Goodeniaceae	*Goodenia*	*Goodenia havilandii*		*									*					
Goodeniaceae	*Goodenia*	*Goodenia rosea*			*						*	*						
Goodeniaceae	*Goodenia*	*Goodenia sp.* Midwest	*	*		*	*	*	*	*								*
Goodeniaceae	*Scaevola*	*Scaevola spinescens*	*	*	*	*	*					*	*	*		*	*	*
Haloragaceae	*Haloragis*	*Haloragis gossei*										*						
Haloragaceae	*Haloragis*	*Haloragis trigonocarpa*												*				
Hemerocallidaceae	*Dianella*	*Dianella revoluta* var. *divaricata*			*							*	*					
Lamiaceae	*Salvia*	*Salvia verbenaca**	*															
Lamiaceae	*Teucrium*	*Teucrium teucriiflorum*		*	*		*						*					
Loranthaceae	*Amyema*	*Amyema fitzgeraldii*			*													
Loranthaceae	*Amyema*	*Amyema fitzgeraldii*			*													
Malvaceae	*Abutilon*	*Abutilon cryptopetalum*			*													
Malvaceae	*Abutilon*	*Abutilon otocarpum*		*														
Malvaceae	*Abutilon*	*Abutilon oxycarpum*		*														
Malvaceae	*Brachychiton*	*Brachychiton gregorii*									*							
Malvaceae	*Sida*	*Sida calyxhymenia*	*		*		*				*		*					
Malvaceae	*Sida*	*Sida ectogama*	*	*	*		*					*	*					
Malvaceae	*Sida*	*Sida intricata*	*															
Malvaceae	*Sida*	*Sida sp.* Excedentifolia	*															
Malvaceae	*Sida*	*Sida sp.* Golden calyces glabrous	*	*	*			*					*					
Montiaceae	*Calandrinia*	*Calandrinia creethae*		*														*
Montiaceae	*Calandrinia*	*Calandrinia eremaea*	*	*			*					*		*		*	*	*
Montiaceae	*Calandrinia*	*Calandrinia eremaea sans lat*						*										
Montiaceae	*Calandrinia*	*Calandrinia polyandra*	*				*		*	*						*		*
Myrtaceae	*Eucalyptus*	*Eucalyptus camaldulensis* subsp. *obtusa*		*														*
Myrtaceae	***Eucalyptus***	***Eucalyptus lesouefii***		*														
Myrtaceae	***Eucalyptus***	***Eucalyptus oleosa* subsp. *oleosa***										*						
Myrtaceae	***Eucalyptus***	***Eucalyptus torquata***	*															
Myrtaceae	*Melaleuca*	*Melaleuca interioris*														*		*
Myrtaceae	*Melaleuca*	*Melaleuca sheathiana*														*	*	*
Pittosporaceae	*Pittosporum*	*Pittosporum angustifolium*			*		*											
Plantaginaceae	*Plantago*	*Plantago turrifera*		*														
Poaceae	*Aristida*	*Aristida contorta*					*					*				*		
Poaceae	*Austrostipa*	*Austrostipa elegantissima*								*								
Poaceae	*Austrostipa*	*Austrostipa nitida*	*		*	*		*									*	
Poaceae	*Cenchrus*	*Cenchrus ciliaris**	*	*												*		*
Poaceae	*Enneapogon*	*Enneapogon caerulescens*						*					*	*				
Poaceae	*Eragrostis*	*Eragrostis eriopoda*	*		*			*				*					*	
Poaceae	*Eriachne*	*Eriachne flaccida*						*										
Poaceae	*Eriachne*	*Eriachne mucronata*									*							
Poaceae	*Eriachne*	*Eriachne pulchella* subsp. *pulchella*					*										*	
Poaceae	*Monachather*	*Monachather paradoxus*								*								
Polygonaceae	*Rumex*	*Rumex vesicarius**	*	*				*					*		*	*		*
Primulaceae	*Lysimachia*	*Lysimachia arvensis**	*	*														*
Proteaceae	*Grevillea*	*Grevillea berryana*			*								*					
Proteaceae	*Hakea*	*Hakea preissii*	*			*	*		*	*			*			*		
Proteaceae	*Hakea*	*Hakea recurva* subsp. *recurva*			*								*					
Pteridaceae	*Cheilanthes*	*Cheilanthes sieberi* subsp. *sieberi*		*	*			*			*		*					

Family	Genus	Taxon	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Rubiaceae	*Psydrax*	*Psydrax rigidula*			*								*					
Rubiaceae	*Psydrax*	*Psydrax suaveolens*										*						
Rutaceae	*Phebalium*	*Phebalium lepidotum*	*															
Santalaceae	*Exocarpos*	*Exocarpos aphyllus*			*												*	*
Santalaceae	*Santalum*	*Santalum lanceolatum*		*	*													
Santalaceae	*Santalum*	*Santalum spicatum*			*													
Sapindaceae	***Alectryon***	***Alectryon oleifolius* subsp. *canescens***										*						
Sapindaceae	*Dodonaea*	*Dodonaea rigida*											*					
Scrophulariaceae	*Eremophila*	*Eremophila clarkei*		*	*								*					
Scrophulariaceae	*Eremophila*	*Eremophila compacta*	*		*		*		*			*						
Scrophulariaceae	*Eremophila*	*Eremophila forrestii* subsp. *forrestii*			*		*	*				*						
Scrophulariaceae	*Eremophila*	*Eremophila glandulifera*			*						*							
Scrophulariaceae	*Eremophila*	*Eremophila latrobei* subsp. *latrobei*											*	*				
Scrophulariaceae	***Eremophila***	***Eremophila longifolia***							*									
Scrophulariaceae	*Eremophila*	*Eremophila maculata* subsp. *brevifolia*							*									
Scrophulariaceae	*Eremophila*	*Eremophila metallicorum*	*	*	*	*	*					*						
Scrophulariaceae	*Eremophila*	*Eremophila miniata*										*				*	*	
Scrophulariaceae	*Eremophila*	*Eremophila oldfieldii* subsp. *angustifolia*	*			*							*	*				
Scrophulariaceae	*Eremophila*	*Eremophila oppositifolia* subsp. *angustifolia*	*															
Scrophulariaceae	*Eremophila*	*Eremophila pantonii*												*				
Scrophulariaceae	*Eremophila*	*Eremophila platycalyx* subsp. Leonora	*	*	*		*	*						*				
Scrophulariaceae	*Eremophila*	*Eremophila scoparia*								*								
Scrophulariaceae	*Eremophila*	*Eremophila youngii* subsp. *youngii*	*			*			*	*								*
Scrophulariaceae	*Myoporum*	*Myoporum montanum*																*
Solanaceae	*Lycium*	*Lycium australe*															*	*
Solanaceae	*Nicotiana*	*Nicotiana rosulata*		*	*													
Solanaceae	*Solanum*	*Solanum lasiophyllum*	*		*		*		*		*			*				*
Solanaceae	*Solanum*	*Solanum nigrum**		*														
Solanaceae	*Solanum*	*Solanum nummularium*												*				
Stylidiaceae	*Stylidium*	*Stylidium ?sp 111-5*									*							
Zygophyllaceae	*Roepera*	*Roepera eremaea*	*				*	*									*	

Appendix F - Site Descriptions

Project Name: St Barbara Ltd Leonora Project			
Date:	12/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.316362 -28.863108	**Quadrat:**	Q1
Quadrat size:	20x20		
Vegetation group:	Open mulga over Chenopod shrubland		
WP:	wpt001		
Photo number:		1 and 2	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		No qualifier; common/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:		10	
% 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 %:	V <10	**Crown cover %:**	S 10-30	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eremophila oldfieldii subsp. angustifolia		Senna artemisioides subsp. filifolia		Ptilotus obovatus	
		Eremophila platycalyx subsp. Leonora		Maireana sedifolia	
		Eremophila oppositifolia subsp. angustifolia		Scaevola spinescens	

ALL SPECIES
Eremophila oldfieldii subsp. angustifolia
Senna artemisioides subsp. filifolia
Eremophila platycalyx subsp. Leonora
Eremophila oppositifolia subsp. angustifolia
Ptilotus obovatus
Maireana sedifolia
Scaevola spinescens
Solanum lasiophyllum
Sida calyxhymenia
Maireana tomentosa
Sclerolaena densiflora
Sclerolaena diacantha
Carrichtera annua*
Sonchus oleraceus*
Lysimachia arvensis*
Cenchrus ciliaris*
Acacia aneura
Roepera eremaea
Sida sp. Excedentifolia
Atriplex bunburyana
Maireana georgei
Maireana trichoptera
Hakea preissii
Erodium cygnorum
Rumex vesicarius*
Senna sp. Meekatharra
Leichhardtia australis
Maireana triptera
Acacia tetragonophylla
Acacia incurvaneura
Salvia verbenaca*
Rhodanthe charsleyae
Outside
Eucalyptus torquata
Acacia kempeana
Eremophila compacta
Rhodanthe floribunda

Project Name: St Barbara Ltd Leonora Project			
Date:	12/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.313678 -28.862588	**Quadrat:**	Q2
Quadrat size:	20x20		
Vegetation group:	Creekline Vegetation		
WP:	wpt002		
Photo number:		3	
Landform:		Closed	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		No coarse fragments	
Rock outcrop (abundance/runoff):		No bedrock exposed	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Firm	
% Cover leaf litter:		60	
% Cover bare ground:		45	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	Y Shrub Mallee (< 8m)	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	6-12m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	M 30-70	**Crown cover %:**	S 10-30	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia incurvaneura		Eremophila platycalyx subsp. Leonora		Maireana pyramidata	
Acacia aneura		Acacia tetragonophylla		Rhagodia eremaea	
				Ptilotus obovatus	

ALL SPECIES
Acacia incurvaneura
Acacia aneura
Eremophila platycalyx subsp. Leonora
Acacia tetragonophylla
Maireana pyramidata
Rhagodia eremaea
Ptilotus obovatus
Asphodelus fistulosus*
Lysimachia arvensis*
Sonchus oleraceus*
Sisymbrium irio*
Calandrinia eremaea
Cuscuta planiflora*
Erodium cygnorum
Rhodanthe charsleyae
Nicotiana rosulata
Abutilon otocarpum
Abutilon oxycarpum
Rumex vesicarius*
Calocephalus knappii
Cheilanthes sieberi subsp. sieberi
Lepidium oxytrichum
Solanum nigrum*
Teucrium teucriiflorum
Scaevola spinescens
Goodenia havilandii
Crassula colorata var. acuminata
Ptilotus helipteroides
Dysphania kalpari
Goodenia sp. Midwest
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	12/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.302107 -28.871817	**Quadrat:**	Q3
Quadrat size:	20x20		
Vegetation group:	Mulga woodland		
WP:	wpt005		
Photo number:		4	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		No coarse fragments	
Rock outcrop (abundance/runoff):		No bedrock exposed	
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:	6-12m	**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 platycalyx subsp. Leonora		Teucrium teucriiflorum	
Acacia mulganeura		Acacia tetragonophylla		Ptilotus obovatus	

ALL SPECIES
Acacia aneura
Acacia mulganeura
Eremophila platycalyx subsp. Leonora
Acacia tetragonophylla
Teucrium teucriiflorum
Ptilotus obovatus
Erodium cygnorum
Sclerolaena diacantha
Rhodanthe charsleyae
Eremophila metallicorum
Eremophila glandulifera
Leichhardtia australis
Rhodanthe floribunda
Abutilon cryptopetalum
Pittosporum angustifolium
Sclerolaena patenticuspis
Outside
Acacia craspedocarpa
Nicotiana rosulata
Santalum spicatum
Sida sp. Golden calyces glabrous

Project Name: St Barbara Ltd Leonora Project			
Date:	12/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.315957 -28.865763	**Quadrat:**	Q4
Quadrat size:	20x20		
Vegetation group:	Open mulga over chenopod shrubland		
WP:	wpt008		
Photo number:		7	
Landform:		Flat/Plain	
Land surface/disturbance:		Limited clearing	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Very; abundant/Coarse gravelly; large pebbles/Subrounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
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 pteraneura		Hakea preissii		Maireana pyramidata	
Acacia aneura				Atriplex bunburyana	
				Ptilotus obovatus	

ALL SPECIES
Acacia pteraneura
Acacia aneura
Hakea preissii
Maireana pyramidata
Atriplex bunburyana
Ptilotus obovatus
Maireana triptera
Cenchrus ciliaris*
Sclerolaena diacantha
Maireana tomentosa
Enchylaena tomentosa var. tomentosa
Atriplex vesicaria
Eremophila compacta
Austrostipa nitida
Sclerolaena densiflora
Maireana georgei
Brachyscome ciliaris
Erodium cygnorum
Sida intricata
Sida sp. Excedentifolia
Eremophila platycalyx subsp. Leonora
Rumex vesicarius*
Solanum lasiophyllum
Calandrinia eremaea
Calandrinia polyandra
Asphodelus fistulosus*
Sclerolaena eriacantha
Lepidium oxytrichum
Salvia verbenaca*
Acacia tetragonophylla
Outside
Senecio magnificus

Project Name: St Barbara Ltd Leonora Project			
Date:	13/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.346965 -28.920992	**Quadrat:**	Q5
Quadrat size:	20x20		
Vegetation group:	Creekline vegetation		
WP:	wpt017		
Photo number:		10	
Landform:		Open depression (vale)/Drainage depression	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		No coarse fragments	
Rock outcrop (abundance/runoff):		No bedrock exposed/Rapid	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Firm	
% Cover leaf litter:		20	
% Cover bare ground:		40	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	Y Shrub Mallee (< 8m)	**Growth form:**	S Shrub	**Growth form:**	F Forb
Height:	6-12m	**Height:**	1-3m	**Height:**	0.25-0.5m
Crown cover %:	S 10-30	**Crown cover %:**	V <10	**Crown cover %:**	M 30-70
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia incurvaneura		Acacia tetragonophylla		Lysimachia arvensis*	
Acacia aneura				Sisymbrium erysimoides*	
Acacia caesaneura				Erodium cygnorum	

ALL SPECIES
Acacia incurvaneura
Acacia aneura
Acacia caesaneura
Acacia tetragonophylla
Lysimachia arvensis*
Erodium cygnorum
Asphodelus fistulosus*
Atriplex codonocarpa
Carrichtera annua*
Rhagodia eremaea
Cenchrus ciliaris*
Sonchus oleraceus*
Nicotiana rosulata
Wahlenbergia gracilenta
Brachyscome ciliaris
Ptilotus obovatus
Sclerolaena diacantha
Acacia craspedocarpa
Teucrium teucriiflorum
Sida sp. Golden calyces glabrous
Outside
Rhagodia drummondii
Eremophila metallicorum

Project Name: St Barbara Ltd Leonora Project			
Date:	13/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.348083 -28.919477	**Quadrat:**	Q6
Quadrat size:	20x20		
Vegetation group:	Mulga creekline		
WP:	wpt018		
Photo number:		11	
Landform:		Open depression (vale)/Drainage depression	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Very; abundant/Coarse gravelly; large pebbles/Subrounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/Rapid	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Firm	
% Cover leaf litter:		5	
% Cover bare ground:		45	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	Y Shrub Mallee (< 8m)	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	6-12m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	M 30-70	**Crown cover %:**	S 10-30	**Crown cover %:**	V <10
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Acacia tetragonophylla		Maireana pyramidata	
Acacia mulganeura		Eremophila platycalyx subsp. Leonora		Eremophila metallicorum	
Acacia caesaneura				Ptilotus obovatus	

ALL SPECIES
Acacia aneura
Acacia mulganeura
Acacia caesaneura
Acacia tetragonophylla
Eremophila platycalyx subsp. Leonora
Maireana pyramidata
Eremophila metallicorum
Ptilotus obovatus
Acacia craspedocarpa
Enchylaena tomentosa var. tomentosa
Goodenia sp. Midwest
Calotis multicaulis
Sclerolaena diacantha
Erodium cygnorum
Sida sp. Golden calyces glabrous
Asphodelus fistulosus*
Sisymbrium erysimoides*
Rhagodia drummondii
Sida ectogama
Cephalipterum drummondii
Rhodanthe maryonii
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	13/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.350612 -28.916497	**Quadrat:**	Q7
Quadrat size:	20x20		
Vegetation group:	Open mulga over chenopod shrubland		
WP:	wpt020		
Photo number:	12-13		
Landform:	Flat/Plain		
Land surface/disturbance:	No effective disturbance except grazing by hoofed animals		
Fire History:	Greater than 10 years ago		
Coarse fragments on the surface (abundance/size/shape):	Moderately; many/Coarse gravelly; large pebbles/Subrounded		
Rock outcrop (abundance/runoff):	No bedrock exposed/No runoff		
Soil (profile/field texture/soil surface):	Uniform/Sandy clay loam/Firm		
% Cover leaf litter:	5		
% Cover bare ground:	65		

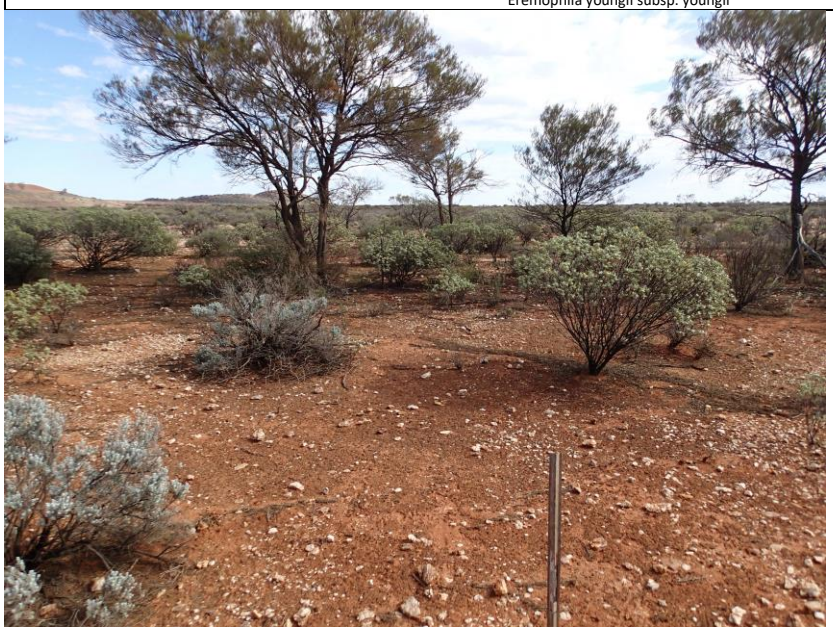
Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	S Shrub	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	3-6m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	S 10-30	**Crown cover %:**	S 10-30	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia craspedocarpa		Scaevola spinescens		Maireana pyramidata	
Hakea preissii		Senna glutinosa subsp. chatelainiana		Ptilotus obovatus	
		Acacia tetragonophylla		Eremophila metallicorum	

ALL SPECIES
Acacia craspedocarpa
Hakea preissii
Scaevola spinescens
Senna glutinosa subsp. chatelainiana
Acacia tetragonophylla
Maireana pyramidata
Ptilotus obovatus
Eremophila metallicorum
Maireana tomentosa
Sida ectogama
Sida sp. Golden calyces glabrous
Maireana triptera
Maireana georgei
Goodenia sp. Midwest
Sclerolaena diacantha
Enchylaena tomentosa var. tomentosa
Leichhardtia australis
Atriplex bunburyana
Rhagodia drummondii
Senna artemisioides subsp. artemisioides
Asphodelus fistulosus*
Rhagodia eremaea
Calandrinia polyandra
Sisymbrium erysimoides*
Senna artemisioides subsp. ×sturtii
Outside
Cephalipterum drummondii

Project Name: St Barbara Ltd Leonora Project			
Date:	13/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.352503 -28.91987	**Quadrat:**	Q8
Quadrat size:	20x20		
Vegetation group:	Mulga over Senna shrubland		
WP:	wpt023		
Photo number:		17	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		No qualifier; common/Coarse gravelly; large pebbles/Subrounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Firm	
% Cover leaf litter:		5	
% 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 %:**	V <10
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Senna artemisioides subsp. ×sturtii		Maireana sedifolia	
		Eremophila oldfieldii subsp. angustifolia		Maireana triptera	

ALL SPECIES
Acacia aneura
Senna artemisioides subsp. ×sturtii
Eremophila oldfieldii subsp. angustifolia
Maireana sedifolia
Maireana triptera
Ptilotus obovatus
Maireana pyramidata
Rhagodia drummondii
Enchylaena tomentosa var. tomentosa
Scaevola spinescens
Sclerolaena diacantha
Frankenia cinerea
Eremophila metallicorum
Goodenia sp. Midwest
Acacia pteraneura
Senna artemisioides subsp. filifolia
Senna glutinosa subsp. chatelainiana
Hakea preissii
Outside
Eremophila youngii subsp. youngii



Project Name: St Barbara Ltd Leonora Project			
Date:	13/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.356747 -28.913132	**Quadrat:**	Q9
Quadrat size:	20x20		
Vegetation group:	Mulga over chenopod		
WP:	wpt040		
Photo number:		18-19	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		No qualifier; common/Coarse gravelly; large pebbles/Subrounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
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:	6-12m	**Height:**	1-3m	**Height:**	0.25-0.5m
Crown cover %:	V <10	**Crown cover %:**	V <10	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Acacia tetragonophylla		Frankenia cinerea	
Acacia caesaneura		Scaevola spinescens		Maireana pyramidata	
		Senna artemisioides subsp. filifolia		Atriplex bunburyana	

ALL SPECIES
Acacia aneura
Acacia caesaneura
Acacia tetragonophylla
Scaevola spinescens
Senna artemisioides subsp. filifolia
Frankenia cinerea
Maireana pyramidata
Atriplex bunburyana
Ptilotus obovatus
Maireana triptera
Maireana trichoptera
Rhodanthe propinqua
Cephalipterum drummondii
Erodium cygnorum
Solanum lasiophyllum
Goodenia sp. Midwest
Maireana glomerifolia
Sclerolaena diacantha
Eremophila metallicorum
Eriachne pulchella subsp. pulchella
Senna artemisioides subsp. ×sturtii
Maireana tomentosa
Eremophila forrestii subsp. forrestii
Enchylaena tomentosa var. tomentosa
Leichhardtia australis
Outside
Pittosporum angustifolium
Hakea preissii
Acacia oswaldii

Project Name: St Barbara Ltd Leonora Project			
Date:	13/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.357402 -28.904742	**Quadrat:**	Q10
Quadrat size:	20x20		
Vegetation group:	Mulga over ironstone quartz outcrop		
WP:	wpt043		
Photo number:		20	
Landform:		Hillock/Mound	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		20-30cm	
Rock outcrop (abundance/runoff):		50%	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Hard setting	
% Cover leaf litter:		5	
% 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 %:**	V <10
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Acacia ramulosa var. ramulosa		Senna artemisioides subsp. ×sturtii	
				Eremophila forrestii subsp. forrestii	
				Eremophila platycalyx subsp. Leonora	

ALL SPECIES
Acacia aneura
Acacia ramulosa var. ramulosa
Senna artemisioides subsp. ×sturtii
Eremophila forrestii subsp. forrestii
Eremophila platycalyx subsp. Leonora
Erodium cygnorum
Goodenia sp. Midwest
Sclerolaena cuneata
Sclerolaena diacantha
Rhodanthe propinqua
Leichhardtia australis
Atriplex bunburyana
Ptilotus helipteroides
Rumex vesicarius*
Cheilanthes sieberi subsp. sieberi
Roepera eremaea
Austrostipa nitida
Enneapogon caerulescens
Rhodanthe maryonii
Sida sp. Golden calyces glabrous
Acacia tetragonophylla
Ptilotus schwartzii
Ptilotus roei
Eragrostis eriopoda
Eriachne flaccida
Maireana sedifolia
Maireana triptera
Calandrinia eremaea sans lat
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	13/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.374397 -28.926763	**Quadrat:**	Q11
Quadrat size:	20x20		
Vegetation group:	Mulga woodland		
WP:	wpt061		
Photo number:		22	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Very slightly; very few/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:		10	
% Cover bare ground:		65	

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:**	0.25-0.5m
Crown cover %:	S 10-30	**Crown cover %:**		**Crown cover %:**	V <10
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Acacia tetragonophylla		Eremophila metallicorum	
Acacia mulganeura		Eremophila platycalyx subsp. Leonora		Ptilotus obovatus	
Acacia craspedocarpa					

ALL SPECIES
Acacia aneura
Acacia mulganeura
Acacia craspedocarpa
Acacia tetragonophylla
Eremophila platycalyx subsp. Leonora
Eremophila metallicorum
Ptilotus obovatus
Teucrium teucriiflorum
Brachyscome iberidifolia
Rhodanthe charsleyae
Erodium cygnorum
Rhodanthe propinqua
Nicotiana rosulata
Outside
Acacia ramulosa var. ramulosa
Dianella revoluta var. divaricata
Eremophila compacta
Hakea recurva subsp. recurva
Ptilotus schwartzii
Santalum spicatum
Psydrax rigidula

Project Name: St Barbara Ltd Leonora Project			
Date:	13/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.37444 -28.952827	**Quadrat:**	Q12
Quadrat size:	20x20		
Vegetation group:	Mulga woodland		
WP:	wpt062		
Photo number:		23	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Medium gravelly; medium pebbles/Rounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Firm	
% Cover leaf litter:		15	
% 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:**	0.25-0.5m
Crown cover %:	S 10-30	**Crown cover %:**		**Crown cover %:**	V <10
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Acacia tetragonophylla		Eremophila metallicorum	
Acacia mulganeura		Eremophila platycalyx subsp. Leonora		Ptilotus obovatus	
Acacia craspedocarpa					

ALL SPECIES
Acacia aneura
Acacia mulganeura
Acacia craspedocarpa
Acacia tetragonophylla
Eremophila platycalyx subsp. Leonora
Eremophila metallicorum
Ptilotus obovatus
Teucrium teucriiflorum
Brachyscome iberidifolia
Rhodanthe charsleyae
Erodium cygnorum
Rhodanthe propinqua
Nicotiana rosulata
Hakea recurva subsp. recurva
Dianella revoluta var. divaricata
Acacia caesaneura
Solanum lasiophyllum
Maireana georgei
Eremophila compacta
Santalum spicatum
Rhagodia drummondii
Maireana thesioides
Psydrax rigidula
Outside
Maireana pyramidata

Project Name: St Barbara Ltd Leonora Project			
Date:	13/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.374525 -28.956852	**Quadrat:**	Q13
Quadrat size:	20x20		
Vegetation group:	Mulga woodland		
WP:	wpt064		
Photo number:		no pic	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Medium gravelly; medium pebbles/Rounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
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:	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 %:**	V <10	**Crown cover %:**	V <10
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia caesaneura		Scaevola spinescens		Eremophila compacta	
Acacia mulganeura		Exocarpos aphyllus		Eragrostis eriopoda	
Acacia craspedocarpa		Acacia tetragonophylla		Ptilotus obovatus	

ALL SPECIES
Acacia caesaneura
Acacia mulganeura
Acacia craspedocarpa
Scaevola spinescens
Exocarpos aphyllus
Acacia tetragonophylla
Eremophila compacta
Eragrostis eriopoda
Ptilotus obovatus
Goodenia rosea
Rhodanthe charsleyae
Maireana thesioides
Maireana georgei
Senna artemisioides subsp. filifolia
Erodium cygnorum
Dianella revoluta var. divaricata
Santalum spicatum
Rhagodia drummondii
Teucrium teucriiflorum
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	13/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.372083 -28.952807	**Quadrat:**	Q14
Quadrat size:	20x20		
Vegetation group:	Open low chenopod shrubland		
WP:	wpt067		
Photo number:	25		
Landform:	Flat/Plain		
Land surface/disturbance:	No effective disturbance except grazing by hoofed animals		
Fire History:	Greater than 10 years ago		
Coarse fragments on the surface (abundance/size/shape):	No qualifier; common/Medium gravelly; medium pebbles/Subrounded		
Rock outcrop (abundance/runoff):	No bedrock exposed/No runoff		
Soil (profile/field texture/soil surface):	Uniform/Sandy clay loam/Firm		
% Cover leaf litter:	<5		
% Cover bare ground:	90		

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:		**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:		**Height:**	0.5-1m	**Height:**	0.25-0.5m
Crown cover %:		**Crown cover %:**	V <10	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
		Maireana pyramidata		Frankenia cinerea	
				Maireana tomentosa	

ALL SPECIES
Maireana pyramidata
Frankenia cinerea
Maireana tomentosa
Goodenia sp. Midwest
Sclerolaena diacantha
Atriplex codonocarpa
Sclerolaena densiflora
Calandrinia polyandra
Enchylaena tomentosa var. tomentosa
Eremophila compacta
Sclerolaena patenticuspis
Erymophyllum ramosum subsp. ramosum
Calotis hispidula
Outside
Hakea preissii

Project Name: St Barbara Ltd Leonora Project			
Date:	13/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.370353 -28.949332	**Quadrat:**	Q15
Quadrat size:	20x20		
Vegetation group:	Open mulga Creekline over chenopod		
WP:	wpt072		
Photo number:	26		
Landform:	Open depression (vale)/Drainage depression		
Land surface/disturbance:	No effective disturbance except grazing by hoofed animals		
Fire History:	Greater than 10 years ago		
Coarse fragments on the surface (abundance/size/shape):	Moderately; many/Coarse gravelly; large pebbles/Rounded		
Rock outcrop (abundance/runoff):	No bedrock exposed/No runoff		
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:**	S Shrub	**Growth form:**	S Shrub
Height:	3-6m	**Height:**	1-3m	**Height:**	0.25-0.5m
Crown cover %:	S 10-30	**Crown cover %:**	V <10	**Crown cover %:**	V <10
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia mulganeura		Eremophila youngii subsp. youngii		Cratystylis subspinescens	
				Frankenia cinerea	

ALL SPECIES
Acacia mulganeura
Eremophila youngii subsp. youngii
Cratystylis subspinescens
Frankenia cinerea
Goodenia sp. Midwest
Senna artemisioides subsp. filifolia
Maireana triptera
Podolepis capillaris
Maireana tomentosa
Sclerolaena diacantha
Asphodelus fistulosus*
Atriplex codonocarpa
Acacia tetragonophylla
Calandrinia eremaea
Calandrinia polyandra
Eragrostis eriopoda
Maireana pyramidata
Sclerolaena eriacantha
Sisymbrium erysimoides*
Sclerolaena patenticuspis
Atriplex bunburyana
Ptilotus divaricatus
Frankenia interioris
Gnephosis brevifolia
Outside
Disphyma crassifolium

Project Name: St Barbara Ltd Leonora Project			
Date:	14/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.368845 -28.928178	**Quadrat:**	Q16
Quadrat size:	20x20		
Vegetation group:	mulga woodland		
WP:	wpt074		
Photo number:		28	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Very; abundant/Coarse gravelly; large pebbles/Subrounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
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:**	0.25-0.5m
Crown cover %:	S 10-30	**Crown cover %:**	S 10-30	**Crown cover %:**	V <10
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Eremophila platycalyx subsp. Leonora		Eremophila compacta	
		Acacia tetragonophylla		Ptilotus obovatus	
				Sida sp. Golden calyces glabrous	

ALL SPECIES
Acacia aneura
Eremophila platycalyx subsp. Leonora
Acacia tetragonophylla
Eremophila compacta
Ptilotus obovatus
Sida sp. Golden calyces glabrous
Podolepis lessonii
Teucrium teucriiflorum
Santalum lanceolatum
Erodium cygnorum
Solanum lasiophyllum
Acacia craspedocarpa
Sida ectogama
Austrostipa nitida
Maireana triptera
Outside
Cephalipterum drummondii

Project Name: St Barbara Ltd Leonora Project			
Date:	14/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.368625 -28.931255	**Quadrat:**	Q17
Quadrat size:	20x20		
Vegetation group:	Eremophila youngii over chenopod and Tecticornia		
WP:	wpt076		
Photo number:		29	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Medium gravelly; medium pebbles/Subrounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Surface crust	
% Cover leaf litter:		15	
% Cover bare ground:		55	

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 %:**	V <10	**Crown cover %:**	M 30-70
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eremophila youngii subsp. youngii		Cratystylis subspinescens		Tecticornia disarticulata	
		Maireana pyramidata			

ALL SPECIES
Eremophila youngii subsp. youngii
Cratystylis subspinescens
Maireana pyramidata
Tecticornia disarticulata
Ptilotus obovatus
Goodenia sp. Midwest
Austrostipa elegantissima
Enchylaena tomentosa var. tomentosa
Senecio glossanthus
Maireana triptera
Sclerolaena cuneata
Sclerolaena patenticuspis
Monachather paradoxus
Maireana tomentosa
Lepidium oxytrichum
Calotis hispidula
Atriplex codonocarpa
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	14/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.368545 -28.951028	**Quadrat:**	Q18
Quadrat size:	20x20		
Vegetation group:	Low open shrubland		
WP:	wpt084		
Photo number:	30		
Landform:	Flat/Plain		
Land surface/disturbance:	No effective disturbance except grazing by hoofed animals		
Fire History:	Greater than 10 years ago		
Coarse fragments on the surface (abundance/size/shape):	Moderately; many/Coarse gravelly; large pebbles/Subrounded		
Rock outcrop (abundance/runoff):	No bedrock exposed/No runoff		
Soil (profile/field texture/soil surface):	Uniform/Sandy clay loam/Firm		
% Cover leaf litter:	5		
% Cover bare ground:	85		

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:		**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:		**Height:**	0.5-1m	**Height:**	0.25-0.5m
Crown cover %:		**Crown cover %:**	V <10	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
		Maireana pyramidata		Frankenia cinerea	
				Maireana tomentosa	

ALL SPECIES
Maireana pyramidata
Frankenia cinerea
Maireana tomentosa
Goodenia sp. Midwest
Sclerolaena diacantha
Atriplex codonocarpa
Sclerolaena densiflora
Calandrinia polyandra
Enchylaena tomentosa var. tomentosa
Eremophila compacta
Sclerolaena patenticuspis
Erymophyllum ramosum subsp. ramosum
Calotis hispidula
Maireana triptera
Disphyma crassifolium
Eremophila maculata subsp. brevifolia
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	14/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.366825 -28.934115	**Quadrat:**	Q19
Quadrat size:	20x20		
Vegetation group:	open low chenopod shrubland		
WP:	wpt093		
Photo number:		31	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Coarse gravelly; large pebbles/Subrounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
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:**	S Shrub	**Growth form:**	S Shrub
Height:	3-6m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	I <1	**Crown cover %:**	I <1	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Hakea preissii		Eremophila youngii subsp. youngii		Maireana pyramidata	
				Cratystylis subspinescens	
				Maireana triptera	

ALL SPECIES
Hakea preissii
Eremophila youngii subsp. youngii
Maireana pyramidata
Cratystylis subspinescens
Maireana triptera
Sclerolaena diacantha
Maireana tomentosa
Ptilotus obovatus
Goodenia sp. Midwest
Atriplex bunburyana
Senna artemisioides subsp. artemisioides
Brachyscome ciliaris
Calotis hispidula
Solanum lasiophyllum
Cephalipterum drummondii
Maireana trichoptera
Erodium cygnorum
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	14/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.366558 -28.925045	**Quadrat:**	Q20
Quadrat size:	20x20		
Vegetation group:	Mulga woodland		
WP:	wpt099		
Photo number:		32	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Coarse gravelly; large pebbles/Subangular	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
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:	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 %:**	I <1	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia caesaneura		Grevillea berryana		Dianella revoluta var. divaricata	
Acacia aneura				Eremophila compacta	
Acacia incurvaneura				Acacia tetragonophylla	

ALL SPECIES
Acacia caesaneura
Acacia aneura
Acacia incurvaneura
Grevillea berryana
Dianella revoluta var. divaricata
Eremophila compacta
Acacia tetragonophylla
Eremophila forrestii subsp. forrestii
Ptilotus obovatus
Sida ectogama
Sida sp. Golden calyces glabrous
Sida calyxhymenia
Teucrium teucriiflorum
Maireana triptera
Eragrostis eriopoda
Outside
Eremophila platycalyx subsp. Leonora
Acacia craspedocarpa

Project Name: St Barbara Ltd Leonora Project			
Date:	14/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.364332 -28.944615	**Quadrat:**	Q21
Quadrat size:	20x20		
Vegetation group:	Acacia quadrimarginea over rocky plain		
WP:	wpt111		
Photo number:		35	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Cobbly; or cobbles/Subangular tabular	
Rock outcrop (abundance/runoff):		Very rocky/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:**	S Shrub	**Growth form:**	S Shrub
Height:	3-6m	**Height:**	0.5-1m	**Height:**	0.25-0.5m
Crown cover %:	S 10-30	**Crown cover %:**	V <10	**Crown cover %:**	V <10
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia quadrimarginea		Eremophila glandulifera		Ptilotus obovatus	
Acacia aneura				Ptilotus schwartzii	

ALL SPECIES
Acacia quadrimarginea
Acacia aneura
Eremophila glandulifera
Ptilotus obovatus
Ptilotus schwartzii
Eriachne mucronata
Brachychiton gregorii
Ptilotus gaudichaudii
Goodenia rosea
Sclerolaena diacantha
Cheilanthes sieberi subsp. sieberi
Solanum lasiophyllum
Erodium cygnorum
Leichhardtia australis
Rhodanthe maryonii
Sida calyxhymenia
Acacia tetragonophylla
Helipterum craspedioides
Chrysocephalum puteale
Stylidium ?sp 111-5
Ptilotus roei
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	14/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.362205 -28.95395	**Quadrat:**	Q22
Quadrat size:	20x20		
Vegetation group:	Mulga over Eremophila Forrestii and Eremophila compacta		
WP:	wpt120		
Photo number:		36	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		No coarse fragments	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
Soil (profile/field texture/soil surface):		Uniform/Sandy loam/Loose	
% Cover leaf litter:		35	
% Cover bare ground:		45	

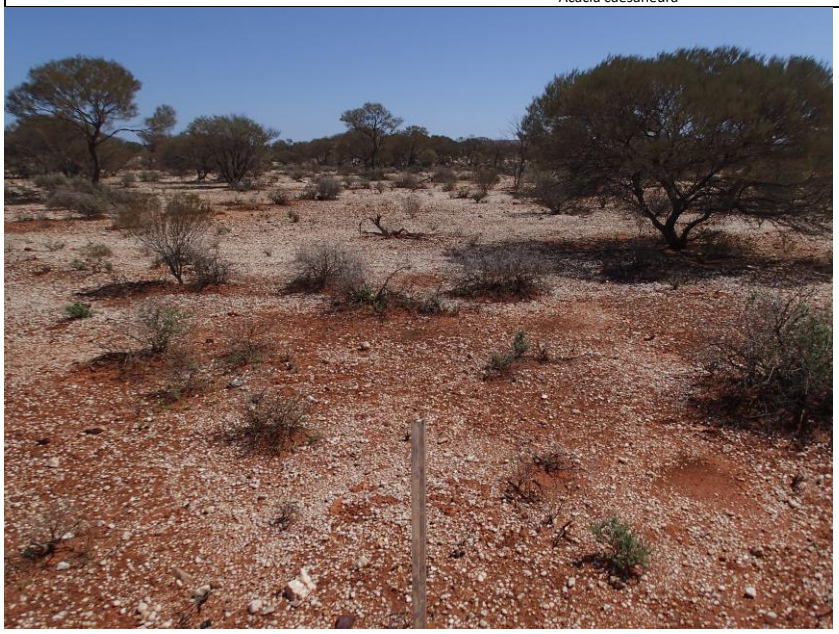
Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	S Shrub	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	6-12m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	M 30-70	**Crown cover %:**	S 10-30	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia caesaneura		Acacia tetragonophylla		Eremophila compacta	
Acacia aneura		Eremophila forrestii subsp. forrestii		Eragrostis eriopoda	
Acacia craspedocarpa				Ptilotus obovatus	

ALL SPECIES
Acacia caesaneura
Acacia aneura
Acacia craspedocarpa
Acacia tetragonophylla
Eremophila forrestii subsp. forrestii
Eremophila compacta
Eragrostis eriopoda
Ptilotus obovatus
Dianella revoluta var. divaricata
Maireana thesioides
Leichhardtia australis
Rhagodia drummondii
Aristida contorta
Maireana pyramidata
Goodenia rosea
Erodium crinitum
Erodium cygnorum
Thysanotus manglesianus
Senna artemisioides subsp. filifolia
Acacia ramulosa var. ramulosa
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:		**Botanist:**	Eren Reid
Location:	GDA94 121.356405 -28.934007	**Quadrat:**	Q23
Quadrat size:	20x20		
Vegetation group:	Mulga over chenopod and sclerophyll shrubland		
WP:	wpt165		
Photo number:		40	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Very; abundant/Coarse gravelly; large pebbles/Subrounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
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:**	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		Senna artemisioides subsp. artemisioides		Maireana pyramidata	
				Cratystylis subspinescens	
				Maireana triptera	

ALL SPECIES
Acacia aneura
Senna artemisioides subsp. artemisioides
Maireana pyramidata
Cratystylis subspinescens
Maireana triptera
Ptilotus obovatus
Erodium cygnorum
Sclerolaena diacantha
Eremophila platycalyx subsp. Leonora
Eremophila metallicorum
Solanum lasiophyllum
Atriplex bunburyana
Sida calyxhymenia
Sclerolaena eriacantha
Cephalipterum drummondii
Goodenia sp. Midwest
Sida ectogama
Brachyscome ciliaris
Acacia tetragonophylla
Scaevola spinescens
Outside
Acacia caesaneura



Project Name: St Barbara Ltd Leonora Project			
Date:	14/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.353875 -28.932923	**Quadrat:**	Q24
Quadrat size:	20x20		
Vegetation group:	Mulga over chenopod		
WP:	wpt181		
Photo number:		41 & 42	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Very; abundant/Coarse gravelly; large pebbles/Subrounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
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:**	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 sibirica		Maireana pyramidata	
Acacia mulganeura		Hakea preissii		Maireana triptera	

ALL SPECIES
Acacia aneura
Acacia mulganeura
Acacia sibirica
Hakea preissii
Maireana pyramidata
Maireana triptera
Scaevola spinescens
Cephalipterum drummondii
Erodium cygnorum
Enchylaena tomentosa var. tomentosa
Roepera eremaea
Brachyscome ciliaris
Calotis multicaulis
Rhodanthe charsleyae
Calandrinia polyandra
Ptilotus obovatus
Aristida contorta
Goodenia sp. Midwest
Lepidium oxytrichum
Asphodelus fistulosus*
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	14/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.354457 -28.926007	**Quadrat:**	Q25
Quadrat size:	20x20		
Vegetation group:	Open mulga over chenopod		
WP:	wpt185		
Photo number:		43	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Very; abundant/Coarse gravelly; large pebbles/Subrounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
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:	3-6m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	I <1	**Crown cover %:**	V <10	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Hakea preissii		Maireana pyramidata	
				Maireana triptera	
				Phebalium lepidotum	

ALL SPECIES
Acacia aneura
Hakea preissii
Maireana pyramidata
Maireana triptera
Phebalium lepidotum
Scaevola spinescens
Maireana sedifolia
Maireana georgei
Sclerolaena diacantha
Goodenia sp. Midwest
Cephalipterum drummondii
Ptilotus helipteroides
Senna cardiosperma
Ptilotus obovatus
Calandrinia polyandra
Maireana trichoptera
Erodium cygnorum
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	14/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.352363 -28.945712	**Quadrat:**	Q26
Quadrat size:	20x20		
Vegetation group:	Erem young over chenopod and Tecticornia		
WP:	wpt194		
Photo number:	44		
Landform:	Flat/Plain		
Land surface/disturbance:	No effective disturbance		
Fire History:	Greater than 10 years ago		
Coarse fragments on the surface (abundance/size/shape):	Very; abundant/Coarse gravelly; large pebbles/Subangular		
Rock outcrop (abundance/runoff):	No bedrock exposed/No runoff		
Soil (profile/field texture/soil surface):	Uniform/Sandy clay loam/Firm		
% Cover leaf litter:	5		
% Cover bare ground:	60		

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 %:	I <1	**Crown cover %:**	V <10	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eremophila youngii subsp. youngii		Maireana pyramidata		Disphyma crassifolium	
Hakea preissii		Cratystylis subspinescens		Tecticornia disarticulata	

ALL SPECIES
Eremophila youngii subsp. youngii
Hakea preissii
Maireana pyramidata
Cratystylis subspinescens
Disphyma crassifolium
Tecticornia disarticulata
Atriplex vesicaria
Ptilotus obovatus
Goodenia sp. Midwest
Austrostipa elegantissima
Enchylaena tomentosa var. tomentosa
Senecio glossanthus
Maireana triptera
Sclerolaena cuneata
Sclerolaena patenticuspis
Monachather paradoxus
Maireana tomentosa
Lepidium oxytrichum
Calotis hispidula
Atriplex codonocarpa
Atriplex bunburyana
Podolepis capillaris
Calandrinia polyandra
Frankenia cinerea
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	14/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.350025 -28.950238	**Quadrat:**	Q27
Quadrat size:	20x20		
Vegetation group:	Mulga over Eremophila forrestii and grassland		
WP:	wpt197		
Photo number:		45	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		No coarse fragments	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
Soil (profile/field texture/soil surface):		Uniform/Sandy loam/Loose	
% Cover leaf litter:		15	
% Cover bare ground:		45	

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 %:	M 30-70	**Crown cover %:**	S 10-30	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia caesaneura		Acacia tetragonophylla		Eremophila compacta	
Acacia aneura		Eremophila forrestii subsp. forrestii		Eragrostis eriopoda	
Acacia craspedocarpa				Ptilotus obovatus	

ALL SPECIES
Acacia caesaneura
Acacia aneura
Acacia craspedocarpa
Acacia tetragonophylla
Eremophila forrestii subsp. forrestii
Eremophila compacta
Eragrostis eriopoda
Ptilotus obovatus
Dianella revoluta var. divaricata
Maireana thesioides
Leichhardtia australis
Rhagodia drummondii
Aristida contorta
Maireana pyramidata
Goodenia rosea
Erodium crinitum
Erodium cygnorum
Thysanotus manglesianus
Senna artemisioides subsp. filifolia
Acacia ramulosa var. ramulosa
Calandrinia eremaea
Scaevola spinescens
Eremophila miniata
Enchylaena tomentosa var. tomentosa
Haloragis gossei
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	14/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.350622 -28.929467	**Quadrat:**	Q28
Quadrat size:	20x20		
Vegetation group:	Mulga over Senna shrubland		
WP:	wpt206		
Photo number:		46 & 47	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Coarse gravelly; large pebbles/Subangular tabular	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
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:	6-12m	**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		Senna artemisioides subsp. ×sturtii		Maireana sedifolia	
		Eremophila oldfieldii subsp. angustifolia		Maireana triptera	
				Ptilotus obovatus	

ALL SPECIES
Acacia aneura
Senna artemisioides subsp. ×sturtii
Eremophila oldfieldii subsp. angustifolia
Maireana sedifolia
Maireana triptera
Ptilotus obovatus
Maireana pyramidata
Rhagodia drummondii
Enchylaena tomentosa var. tomentosa
Scaevola spinescens
Sclerolaena diacantha
Frankenia cinerea
Eremophila metallicorum
Goodenia sp. Midwest
Acacia pteraneura
Senna artemisioides subsp. filifolia
Senna glutinosa subsp. chatelainiana
Hakea preissii
Maireana tomentosa
Lepidium platypetalum
Austrostipa nitida
Cephalipterum drummondii
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	14/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.348148 -28.948588	**Quadrat:**	Q29
Quadrat size:	20x20		
Vegetation group:	Mulga over Eremophila forrestii		
WP:	wpt220		
Photo number:		48	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		No coarse fragments	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
Soil (profile/field texture/soil surface):		Uniform/Sandy 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 %:	M 30-70	**Crown cover %:**	S 10-30	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia caesaneura		Acacia tetragonophylla		Eremophila compacta	
Acacia aneura		Eremophila forrestii subsp. forrestii		Eragrostis eriopoda	
Acacia craspedocarpa				Ptilotus obovatus	

ALL SPECIES
Acacia caesaneura
Acacia aneura
Acacia craspedocarpa
Acacia tetragonophylla
Eremophila forrestii subsp. forrestii
Eremophila compacta
Eragrostis eriopoda
Ptilotus obovatus
Dianella revoluta var. divaricata
Maireana thesioides
Leichhardtia australis
Rhagodia drummondii
Aristida contorta
Maireana pyramidata
Goodenia rosea
Erodium crinitum
Erodium cygnorum
Thysanotus manglesianus
Senna artemisioides subsp. filifolia
Acacia ramulosa var. ramulosa
Eremophila miniata
Enchylaena tomentosa var. tomentosa
Haloragis gossei
Scaevola spinescens
Calandrinia eremaea
Outside
Eucalyptus oleosa subsp. oleosa

Project Name: St Barbara Ltd Leonora Project			
Date:	15/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.339487 -28.938457	**Quadrat:**	Q30
Quadrat size:	20x20		
Vegetation group:	Mulga woodland over ironstone hillslopes		
WP:	wpt246		
Photo number:		49	
Landform:		Simple slope/Hillslope	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Medium gravelly; medium pebbles/Subangular tabular	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Firm	
% Cover leaf litter:		30	
% Cover bare ground:		60	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	Y Shrub Mallee (< 8m)	**Growth form:**	S Shrub	**Growth form:**	S Shrub
Height:	6-12m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	S 10-30	**Crown cover %:**	V <10	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia caesaneura		Acacia tetragonophylla		Eremophila latrobei subsp. latrobei	
Acacia mulganeura				Sida ectogama	
Acacia craspedocarpa				Ptilotus obovatus	

ALL SPECIES
Acacia caesaneura
Acacia mulganeura
Acacia craspedocarpa
Acacia tetragonophylla
Eremophila latrobei subsp. latrobei
Sida ectogama
Ptilotus obovatus
Acacia aneura
Eremophila clarkei
Sida sp. Golden calyces glabrous
Teucrium teucriiflorum
Cheilanthes sieberi subsp. sieberi
Maireana thesioides
Senna artemisioides subsp. filifolia
Sida calyxhymenia
Rhagodia drummondii
Dianella revoluta var. divaricata
Goodenia havilandii
Isoetopsis graminifolia
Crassula colorata var. acuminata
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	15/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.339685 -28.942046	**Quadrat:**	Q31
Quadrat size:	20x20		
Vegetation group:	Mulga over Eremophila forrestii		
WP:	wpt248		
Photo number:		50	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		No coarse fragments	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
Soil (profile/field texture/soil surface):		Uniform/Sandy loam/Loose	
% Cover leaf litter:		20	
% Cover bare ground:		65	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	M Tree Mallee (> 8m)	**Growth form:**		**Growth form:**	
Height:	6-12m	**Height:**		**Height:**	
Crown cover %:	S 10-30	**Crown cover %:**		**Crown cover %:**	
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia caesaneura		Acacia tetragonophylla		Eremophila compacta	
Acacia aneura		Eremophila forrestii subsp. forrestii		Eragrostis eriopoda	
Acacia craspedocarpa				Ptilotus obovatus	

ALL SPECIES
Acacia caesaneura
Acacia aneura
Acacia craspedocarpa
Acacia tetragonophylla
Eremophila forrestii subsp. forrestii
Eremophila compacta
Eragrostis eriopoda
Ptilotus obovatus
Dianella revoluta var. divaricata
Maireana thesioides
Leichhardtia australis
Rhagodia drummondii
Aristida contorta
Maireana pyramidata
Goodenia rosea
Erodium crinitum
Erodium cygnorum
Thysanotus manglesianus
Senna artemisioides subsp. filifolia
Acacia ramulosa var. ramulosa
Eremophila metallicorum
Enchylaena tomentosa var. tomentosa
Haloragis gossei
Scaevola spinescens
Sida ectogama
Calandrinia eremaea
Psydrax suaveolens
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	15/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.336042 -28.931813	**Quadrat:**	Q32
Quadrat size:	20x20		
Vegetation group:	Mulga over bif		
WP:	wpt255		
Photo number:		55-57	
Landform:		Crest/Hill Crest	
Land surface/disturbance:		Limited clearing	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Very; abundant/Stony; stones/Angular tabular	
Rock outcrop (abundance/runoff):		Very rocky/Rapid	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Firm	
% Cover leaf litter:		25	
% 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 %:**	V <10	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Eremophila oldfieldii subsp. angustifolia		Eremophila latrobei subsp. latrobei	
Acacia caesaneura		Senna charlesiana		Ptilotus obovatus	
Acacia mulganeura		Acacia tetragonophylla		Maireana pyramidata	

ALL SPECIES
Acacia aneura
Acacia caesaneura
Acacia mulganeura
Eremophila oldfieldii subsp. angustifolia
Senna charlesiana
Acacia tetragonophylla
Eremophila latrobei subsp. latrobei
Ptilotus obovatus
Maireana pyramidata
Atriplex bunburyana
Sisymbrium erysimoides*
Maireana triptera
Maireana georgei
Maireana tomentosa
Enchylaena tomentosa var. tomentosa
Scaevola spinescens
Cheilanthes sieberi subsp. sieberi
Erodium cygnorum
Rhagodia drummondii
Teucrium teucriiflorum
Sclerolaena diacantha
Ptilotus exaltatus
Hakea preissii
Atriplex vesicaria
Enneapogon caerulescens
Rhagodia eremaea
Rumex vesicarius*
Acacia quadrimarginea
Sida ectogama
Outside
Senna artemisioides subsp. artemisioides
Dodonaea rigida
Grevillea berryana

Project Name: St Barbara Ltd Leonora Project			
Date:	15/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.336265 -28.938267	**Quadrat:**	Q33
Quadrat size:	20x20		
Vegetation group:	Mulga on bif		
WP:	wpt258		
Photo number:		58	
Landform:		Crest/Hill Crest	
Land surface/disturbance:		Limited clearing	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Very; abundant/Stony; stones/Angular tabular	
Rock outcrop (abundance/runoff):		Very rocky/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:	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		Acacia tetragonophylla		Eremophila latrobei subsp. latrobei	
Acacia quadrimarginea				Ptilotus schwartzii	
Acacia mulganeura				Ptilotus obovatus	

ALL SPECIES
Acacia aneura
Acacia quadrimarginea
Acacia mulganeura
Acacia tetragonophylla
Eremophila latrobei subsp. latrobei
Ptilotus schwartzii
Ptilotus obovatus
Erodium cygnorum
Cheilanthes sieberi subsp. sieberi
Psydrax rigidula
Dodonaea rigida
Lepidium oxytrichum
Eremophila clarkei
Goodenia havilandii
Ptilotus helipteroides
Senna sp. Meekatharra
Hakea recurva subsp. recurva
Senna artemisioides subsp. artemisioides
Rhagodia drummondii
Sida ectogama
Outside
Scaevola spinescens
Maireana sedifolia

Project Name: St Barbara Ltd Leonora Project			
Date:	15/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.333738 -28.944087	**Quadrat:**	Q34
Quadrat size:	20x20		
Vegetation group:	Ac duriuscula on sand plain and chenopod shrubland.		
WP:	wpt262		
Photo number:		59	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		No coarse fragments	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
Soil (profile/field texture/soil surface):		Uniform/Sandy loam/Loose	
% Cover leaf litter:		30	
% Cover bare ground:		65	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	Y Shrub Mallee (< 8m)	**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 duriuscula		Eremophila pantonii		Maireana sedifolia	
Acacia craspedocarpa		Eremophila oldfieldii subsp. angustifolia		Ptilotus obovatus	
		Senna artemisioides subsp. filifolia		Maireana triptera	

ALL SPECIES
Acacia duriuscula
Acacia craspedocarpa
Eremophila pantonii
Eremophila oldfieldii subsp. angustifolia
Senna artemisioides subsp. filifolia
Maireana sedifolia
Ptilotus obovatus
Maireana triptera
Solanum nummularium
Calandrinia eremaea
Atriplex bunburyana
Scaevola spinescens
Rhagodia drummondii
Maireana pyramidata
Enchylaena tomentosa var. tomentosa
Cratystylis subspinescens
Leichhardtia australis
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	15/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.33369 -28.93309	**Quadrat:**	Q35
Quadrat size:	20x20		
Vegetation group:	Ac duriuscula over Maireana sedifolia and Scaevola spinescens on rocky substrate		
WP:	wpt270		
Photo number:		60	
Landform:		Hillock/Mound	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		No qualifier; common/Bouldery; or boulders/Subangular tabular	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
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:	Y Shrub Mallee (< 8m)	**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 duriuscula		Eremophila oldfieldii subsp. angustifolia		Maireana sedifolia	
				Ptilotus obovatus	
				Scaevola spinescens	

ALL SPECIES
Acacia duriuscula
Eremophila oldfieldii subsp. angustifolia
Maireana sedifolia
Ptilotus obovatus
Scaevola spinescens
Sclerolaena diacantha
Eremophila platycalyx subsp. Leonora
Maireana pyramidata
Maireana triptera
Erodium cygnorum
Eremophila latrobei subsp. latrobei
Senna charlesiana
Rhagodia drummondii
Maireana tomentosa
Solanum lasiophyllum
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	15/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.331312 -28.940967	**Quadrat:**	Q36
Quadrat size:	20x20		
Vegetation group:	Ac duriuscula over Maireana sedifolia and Scaevola spinescens		
WP:	wpt278		
Photo number:		61	
Landform:		Hillock/Mound	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Cobbly; or cobbles/Subangular tabular	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
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:	Y Shrub Mallee (< 8m)	**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 duriuscula		Eremophila oldfieldii subsp. angustifolia		Maireana sedifolia	
				Ptilotus obovatus	
				Scaevola spinescens	

ALL SPECIES
Acacia duriuscula
Eremophila oldfieldii subsp. angustifolia
Maireana sedifolia
Ptilotus obovatus
Scaevola spinescens
Sclerolaena diacantha
Eremophila platycalyx subsp. Leonora
Maireana pyramidata
Maireana triptera
Erodium cygnorum
Eremophila latrobei subsp. latrobei
Senna charlesiana
Rhagodia drummondii
Maireana tomentosa
Solanum lasiophyllum
Senna artemisioides subsp. filifolia
Enneapogon caerulescens
Haloragis trigonocarpa
Atriplex bunburyana
Sclerolaena cuneata
Maireana trichoptera
Maireana georgei
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	15/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.323544 -28.935713	**Quadrat:**	Q37
Quadrat size:	20x20		
Vegetation group:	Tecticornia shrubland		
WP:	wpt293		
Photo number:	72		
Landform:	Flat/Plain		
Land surface/disturbance:	Limited clearing		
Fire History:	Greater than 10 years ago		
Coarse fragments on the surface (abundance/size/shape):	Very; abundant/Coarse gravelly; large pebbles/Subrounded		
Rock outcrop (abundance/runoff):	No bedrock exposed/No runoff		
Soil (profile/field texture/soil surface):	Uniform/Silty clay loam/Firm		
% Cover leaf litter:	<5		
% Cover bare ground:	90		

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:		**Growth form:**		**Growth form:**	C Chenopod shrub
Height:		**Height:**		**Height:**	0.25-0.5m
Crown cover %:		**Crown cover %:**		**Crown cover %:**	V <10
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
				Tecticornia undulata	
				Tecticornia indica subsp. bidens	
				Tecticornia pruinosa	

ALL SPECIES
Tecticornia undulata
Tecticornia indica subsp. bidens
Tecticornia pruinosa
Disphyma crassifolium
Sclerolaena diacantha
Frankenia pauciflora var. pauciflora
Maireana triptera
Sclerolaena patenticuspis
Sclerolaena drummondii
Maireana carnosa
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	15/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.32335 -28.937525	**Quadrat:**	Q38
Quadrat size:	20x20		
Vegetation group:	Mulga over Melaleuca interioris Eremophila miniata sand dune		
WP:	wpt294		
Photo number:		73-74-75	
Landform:		Dune rise	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		No coarse fragments	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
Soil (profile/field texture/soil surface):		Uniform/Sandy loam/Loose	
% 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 %:	V <10	**Crown cover %:**	S 10-30	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Melaleuca interioris		Scaevola spinescens	
		Hakea preissii			
		Eremophila miniata			

ALL SPECIES
Acacia aneura
Melaleuca interioris
Hakea preissii
Eremophila miniata
Scaevola spinescens
Rumex vesicarius*
Maireana pyramidata
Calandrinia eremaea
Aristida contorta
Outside
Tecticornia pruinosa
Tecticornia undulata

Project Name: St Barbara Ltd Leonora Project			
Date:	15/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.321543 -28.936477	**Quadrat:**	Q39
Quadrat size:	20x20		
Vegetation group:	Tecticornia shrubland		
WP:	wpt295		
Photo number:	76		
Landform:	Closed depression/Playa		
Land surface/disturbance:	No effective disturbance except grazing by hoofed animals		
Fire History:	Greater than 10 years ago		
Coarse fragments on the surface (abundance/size/shape):	No coarse fragments		
Rock outcrop (abundance/runoff):	No bedrock exposed/No runoff		
Soil (profile/field texture/soil surface):	Uniform/Silty clay loam/Firm		
% Cover leaf litter:	5		
% Cover bare ground:	60		

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:		**Growth form:**		**Growth form:**	C Chenopod shrub
Height:		**Height:**		**Height:**	0.25-0.5m
Crown cover %:		**Crown cover %:**		**Crown cover %:**	M 30-70
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
				Tecticornia indica subsp. bidens	
				Tecticornia undulata	
				Tecticornia pruinosa	

ALL SPECIES
Tecticornia indica subsp. bidens
Tecticornia undulata
Tecticornia pruinosa
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	15/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.319675 -28.935043	**Quadrat:**	Q40
Quadrat size:	20x20		
Vegetation group:	Tecticornia shrubland		
WP:	wpt296		
Photo number:	77		
Landform:	Closed depression/Playa		
Land surface/disturbance:	No effective disturbance		
Fire History:	Greater than 10 years ago		
Coarse fragments on the surface (abundance/size/shape):	No coarse fragments		
Rock outcrop (abundance/runoff):	No bedrock exposed/No runoff		
Soil (profile/field texture/soil surface):	Uniform/Silty clay loam/Firm		
% Cover leaf litter:	5		
% Cover bare ground:	60		

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:		**Growth form:**		**Growth form:**	C Chenopod shrub
Height:		**Height:**		**Height:**	0.25-0.5m
Crown cover %:		**Crown cover %:**		**Crown cover %:**	M 30-70
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
				Tecticornia indica subsp. bidens	
				Tecticornia undulata	
				Tecticornia pruinosa	

ALL SPECIES
Tecticornia indica subsp. bidens
Tecticornia undulata
Tecticornia pruinosa
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	15/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.31971 -28.935485	**Quadrat:**	Q41
Quadrat size:	20x20		
Vegetation group:	Mulga over Melaleuca interioris and Eremophila miniata		
WP:	wpt297		
Photo number:		78	
Landform:		Hillock/Dune*	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		No coarse fragments	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
Soil (profile/field texture/soil surface):		Uniform/Sandy loam/Loose	
% 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:	3-6m	**Height:**	1-3m	**Height:**	0.5-1m
Crown cover %:	V <10	**Crown cover %:**	S 10-30	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia caesaneura		Melaleuca interioris		Scaevola spinescens	
		Hakea preissii			
		Eremophila miniata			

ALL SPECIES
Acacia caesaneura
Melaleuca interioris
Hakea preissii
Eremophila miniata
Scaevola spinescens
Rumex vesicarius*
Maireana pyramidata
Calandrinia eremaea
Aristida contorta
Salsola australis
Melaleuca sheathiana
Gunniopsis quadrifida
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	15/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.311482 -28.931313	**Quadrat:**	Q42
Quadrat size:	20x20		
Vegetation group:	Melaleuca sheathiana over Cratystylis subspinescens and Tecticornia		
WP:	wpt302		
Photo number:		79	
Landform:		Hillock/Dune*	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		No coarse fragments	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
Soil (profile/field texture/soil surface):		Uniform/Sandy loam/Loose	
% 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:	1-3m	**Height:**	0.5-1m	**Height:**	0.25-0.5m
Crown cover %:	V <10	**Crown cover %:**	S 10-30	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Melaleuca sheathiana		Cratystylis subspinescens		Tecticornia indica subsp. bidens	
				Tecticornia undulata	
				Atriplex vesicaria	

ALL SPECIES
Melaleuca sheathiana
Cratystylis subspinescens
Tecticornia indica subsp. bidens
Tecticornia undulata
Atriplex vesicaria
Sclerolaena diacantha
Sclerolaena drummondii
Eragrostis eriopoda
Maireana amoena
Scaevola spinescens
Sclerolaena patenticuspis
Disphyma crassifolium
Frankenia pauciflora var. pauciflora
Roepera eremaea
Lycium australe
Exocarpos aphyllus
Eremophila miniata
Austrostipa nitida
Calandrinia eremaea
Gunniopsis quadrifida
Eriachne pulchella subsp. pulchella
Senecio glossanthus
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	15/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.311213 -28.930015	**Quadrat:**	Q43
Quadrat size:	20x20		
Vegetation group:	Melaleuca sheathiana over Cratystylis subspinescens and Tecticornia		
WP:	wpt303		
Photo number:		80-81	
Landform:		Hillock/Dune*	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		No coarse fragments	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
Soil (profile/field texture/soil surface):		Uniform/Sandy loam/Loose	
% 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:	1-3m	**Height:**	0.5-1m	**Height:**	0.25-0.5m
Crown cover %:	V <10	**Crown cover %:**	S 10-30	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Melaleuca sheathiana		Cratystylis subspinescens		Tecticornia indica subsp. bidens	
				Tecticornia undulata	
				Atriplex vesicaria	

ALL SPECIES
Melaleuca sheathiana
Cratystylis subspinescens
Tecticornia indica subsp. bidens
Tecticornia undulata
Atriplex vesicaria
Sclerolaena diacantha
Sclerolaena drummondii
Eragrostis eriopoda
Maireana amoena
Scaevola spinescens
Sclerolaena patenticuspis
Disphyma crassifolium
Frankenia pauciflora var. pauciflora
Roepera eremaea
Lycium australe
Exocarpos aphyllus
Eremophila miniata
Austrostipa nitida
Calandrinia eremaea
Gunniopsis quadrifida
Eriachne pulchella subsp. pulchella
Senecio glossanthus
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	15/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.314113 -28.934488	**Quadrat:**	Q44
Quadrat size:	20x20		
Vegetation group:	Tecticornia shrubland		
WP:	wpt309		
Photo number:	84		
Landform:	Closed depression/Playa		
Land surface/disturbance:	No effective disturbance		
Fire History:	Greater than 10 years ago		
Coarse fragments on the surface (abundance/size/shape):	No coarse fragments		
Rock outcrop (abundance/runoff):	No bedrock exposed/No runoff		
Soil (profile/field texture/soil surface):	Uniform/Silty clay loam/Firm		
% Cover leaf litter:	5		
% Cover bare ground:	55		

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:		**Growth form:**		**Growth form:**	C Chenopod shrub
Height:		**Height:**		**Height:**	0.25-0.5m
Crown cover %:		**Crown cover %:**		**Crown cover %:**	M 30-70
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
				Tecticornia undulata	
				Tecticornia indica subsp. bidens	
				Frankenia pauciflora var. pauciflora	

ALL SPECIES
Tecticornia undulata
Tecticornia indica subsp. bidens
Frankenia pauciflora var. pauciflora
Stenopetalum salicola
Cratystylis subspinescens
Sondottia connata
Didymanthus roei
Rumex vesicarius*
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	16/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.323392 -28.882643	**Quadrat:**	Q45
Quadrat size:	20x20		
Vegetation group:	Creekline Vegetation		
WP:	wpt343		
Photo number:		89	
Landform:		Open depression (vale)/Drainage depression	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Coarse gravelly; large pebbles/Subrounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/Slow	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Firm	
% Cover leaf litter:		10	
% Cover bare ground:		75	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	T Tree	**Growth form:**	S Shrub	**Growth form:**	F Forb
Height:	6-12m	**Height:**	1-3m	**Height:**	0.25-0.5m
Crown cover %:	I <1	**Crown cover %:**	S 10-30	**Crown cover %:**	V <10
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eucalyptus camaldulensis subsp. obtusa		Acacia tetragonophylla		Rhodanthe charsleyae	
Acacia incurvaneura					
Acacia mulganeura					

ALL SPECIES
Eucalyptus camaldulensis subsp. obtusa
Acacia incurvaneura
Acacia mulganeura
Acacia tetragonophylla
Rhodanthe charsleyae
Goodenia sp. Midwest
Sisymbrium irio*
Acacia pteraneura
Sonchus oleraceus*
Cenchrus ciliaris*
Erodium cygnorum
Acacia craspedocarpa
Medicago minima*
Lysimachia arvensis*
Asphodelus fistulosus*
Calandrinia eremaea
Acacia aneura
Senecio glossanthus
Brachyscome ciliaris
Ptilotus exaltatus
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	16/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.30249 -28.88828	**Quadrat:**	Q46
Quadrat size:	20x20		
Vegetation group:	Mulga woodland		
WP:	wpt346		
Photo number:		91	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Slightly; few/Medium gravelly; medium pebbles/Subrounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Firm	
% Cover leaf litter:		10	
% Cover bare ground:		65	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	Y Shrub Mallee (< 8m)	**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 mulganeura		Grevillea berryana		Eremophila compacta	
Acacia craspedocarpa					

ALL SPECIES
Acacia mulganeura
Acacia craspedocarpa
Grevillea berryana
Eremophila compacta
Ptilotus obovatus
Ptilotus schwartzii
Amyema fitzgeraldii
Erodium cygnorum
Cheilanthes sieberi subsp. sieberi
Dianella revoluta var. divaricata
Eremophila clarkei
Rhagodia drummondii
Senna charlesiana
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	16/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.297512 -28.918365	**Quadrat:**	Q47
Quadrat size:	20x20		
Vegetation group:	Mulga over Melaleuca interioris and Eremophila miniata		
WP:	wpt382		
Photo number:	96		
Landform:	Hillock/Dune*		
Land surface/disturbance:	No effective disturbance except grazing by hoofed animals		
Fire History:	Greater than 10 years ago		
Coarse fragments on the surface (abundance/size/shape):	No coarse fragments		
Rock outcrop (abundance/runoff):	No bedrock exposed/No runoff		
Soil (profile/field texture/soil surface):	Uniform/Sandy loam/Loose		
% Cover leaf litter:	5		
% 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 mulganeura		Eremophila miniata		Scaevola spinescens	
Acacia caesaneura		Melaleuca interioris		Tecticornia undulata	
				Tecticornia indica subsp. bidens	

ALL SPECIES
Acacia mulganeura
Acacia caesaneura
Eremophila miniata
Melaleuca interioris
Scaevola spinescens
Tecticornia undulata
Tecticornia indica subsp. bidens
Rhagodia eremaea
Maireana pyramidata
Gnephosis brevifolia
Calandrinia eremaea
Calandrinia polyandra
Sclerolaena diacantha
Maireana georgei
Cenchrus ciliaris*
Frankenia laxiflora
Leichhardtia australis
Enchylaena tomentosa var. tomentosa
Melaleuca sheathiana
Senecio glossanthus
Sonchus oleraceus*
Erodium cygnorum
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	16/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.29843 -28.899157	**Quadrat:**	Q48
Quadrat size:	20x20		
Vegetation group:	Creekline Vegetation		
WP:	wpt393		
Photo number:		98	
Landform:		Open depression (vale)/Drainage depression	
Land surface/disturbance:		No effective disturbance	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		No coarse fragments	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Cracking	
% Cover leaf litter:		10	
% Cover bare ground:		60	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	Y Shrub Mallee (< 8m)	**Growth form:**	S Shrub	**Growth form:**	F Forb
Height:	6-12m	**Height:**	1-3m	**Height:**	<0.25m
Crown cover %:	S 10-30	**Crown cover %:**	S 10-30	**Crown cover %:**	M 30-70
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Acacia tetragonophylla		Rhodanthe charsleyae	
Acacia incurvaneura				Erodium cygnorum	
Acacia mulganeura					

ALL SPECIES
Acacia aneura
Acacia incurvaneura
Acacia mulganeura
Acacia tetragonophylla
Rhodanthe charsleyae
Erodium cygnorum
Podolepis canescens
Cuscuta planiflora*
Wahlenbergia gracilenta
Asphodelus fistulosus*
Calandrinia eremaea
Eremophila clarkei
Cheilanthes sieberi subsp. sieberi
Walshia kendallii
Vittadinia sulcata
Rhodanthe propinqua
Goodenia havilandii
Calandrinia creethae
Wahlenbergia tumidifructa
Plantago turrifera
Crassula colorata var. acuminata
Santalum lanceolatum
Outside
Schoenia cassiniana

Project Name: St Barbara Ltd Leonora Project			
Date:	16/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.301422 -28.913897	**Quadrat:**	Q49
Quadrat size:	20x20		
Vegetation group:	Mulga over chenopod shrubland		
WP:	wpt400		
Photo number:		101	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Medium gravelly; medium pebbles/Rounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
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 %:**	I <1	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Acacia tetragonophylla		Maireana pyramidata	
Acacia craspedocarpa				Maireana triptera	
Acacia mulganeura				Cratystylis subspinescens	

ALL SPECIES
Acacia aneura
Acacia craspedocarpa
Acacia mulganeura
Acacia tetragonophylla
Maireana pyramidata
Maireana triptera
Cratystylis subspinescens
Ptilotus obovatus
Eremophila compacta
Atriplex bunburyana
Erodium cygnorum
Rhodanthe propinqua
Sclerolaena diacantha
Sclerolaena cuneata
Maireana tomentosa
Eremophila forrestii subsp. forrestii
Cephalipterum drummondii
Goodenia sp. Midwest
Calandrinia eremaea
Calandrinia polyandra
Enchylaena tomentosa var. tomentosa
Senna charlesiana
Sida ectogama
Leichhardtia australis
Teucrium teucriiflorum
Outside
Eremophila metallicorum
Acacia quadrimarginea
Acacia caesaneura
Frankenia cinerea

Project Name: St Barbara Ltd Leonora Project			
Date:	16/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.303447 -28.896702	**Quadrat:**	Q50
Quadrat size:	20x20		
Vegetation group:	Creekline vegetation		
WP:	wpt410		
Photo number:		102	
Landform:		Open depression (vale)/Drainage depression	
Land surface/disturbance:		No effective disturbance	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		No coarse fragments	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Cracking	
% Cover leaf litter:		10	
% Cover bare ground:		60	

Tallest stratum		Mid-stratum		Lower stratum	
Growth form:	Y Shrub Mallee (< 8m)	**Growth form:**	S Shrub	**Growth form:**	F Forb
Height:	6-12m	**Height:**	1-3m	**Height:**	<0.25m
Crown cover %:	S 10-30	**Crown cover %:**	S 10-30	**Crown cover %:**	M 30-70
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Acacia tetragonophylla		Rhodanthe charsleyae	
Acacia incurvaneura				Erodium cygnorum	
Acacia mulganeura					

ALL SPECIES
Acacia aneura
Acacia incurvaneura
Acacia mulganeura
Acacia tetragonophylla
Rhodanthe charsleyae
Erodium cygnorum
Podolepis canescens
Cuscuta planiflora*
Wahlenbergia gracilenta
Asphodelus fistulosus*
Calandrinia eremaea
Eremophila clarkei
Cheilanthes sieberi subsp. sieberi
Walshia kendallii
Vittadinia sulcata
Rhodanthe propinqua
Goodenia havilandii
Calandrinia creethae
Wahlenbergia tumidifructa
Plantago turrifera
Crassula colorata var. acuminata
Santalum lanceolatum
Schoenia cassiniana
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	16/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.307497 -28.915712	**Quadrat:**	Q51
Quadrat size:	20x20		
Vegetation group:	Acacia burkittii creekline vegetation		
WP:	wpt424		
Photo number:	103		
Landform:	Open depression (vale)/Drainage depression		
Land surface/disturbance:	No effective disturbance except grazing by hoofed animals		
Fire History:	Greater than 10 years ago		
Coarse fragments on the surface (abundance/size/shape):	Moderately; many/Coarse gravelly; large pebbles/Subrounded		
Rock outcrop (abundance/runoff):	No bedrock exposed/No runoff		
Soil (profile/field texture/soil surface):	Uniform/Sandy clay loam/Firm		
% Cover leaf litter:	10		
% Cover bare ground:	55		

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 burkittii		Myoporum montanum		Atriplex bunburyana	
		Scaevola spinescens		Tecticornia pruinosa	
				Tecticornia undulata	

ALL SPECIES
Acacia burkittii
Myoporum montanum
Scaevola spinescens
Atriplex bunburyana
Tecticornia pruinosa
Tecticornia undulata
Rumex vesicarius*
Lysimachia arvensis*
Cenchrus ciliaris*
Sisymbrium irio*
Enchylaena tomentosa var. tomentosa
Eremophila youngii subsp. youngii
Sonchus oleraceus*
Maireana tomentosa
Maireana pyramidata
Atriplex vesicaria
Eucalyptus camaldulensis subsp. obtusa
Sclerolaena cuneata
Sclerolaena diacantha
Sclerolaena patenticuspis
Gunniopsis quadrifida
Leichhardtia australis
Ptilotus obovatus
Solanum lasiophyllum
Exocarpos aphyllus
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	16/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.307248 -28.917792	**Quadrat:**	Q52
Quadrat size:	20x20		
Vegetation group:	Acacia burkittii creekline vegetation		
WP:	wpt426		
Photo number:	104		
Landform:	Open depression (vale)/Drainage depression		
Land surface/disturbance:	No effective disturbance except grazing by hoofed animals		
Fire History:	Greater than 10 years ago		
Coarse fragments on the surface (abundance/size/shape):	No qualifier; common/Bouldery; or boulders/Subrounded		
Rock outcrop (abundance/runoff):	No bedrock exposed/No runoff		
Soil (profile/field texture/soil surface):	Uniform/Sandy clay loam/Firm		
% Cover leaf litter:	10		
% Cover bare ground:	55		

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 burkittii		Myoporum montanum		Atriplex bunburyana	
		Scaevola spinescens		Tecticornia pruinosa	
				Tecticornia undulata	

ALL SPECIES
Acacia burkittii
Myoporum montanum
Scaevola spinescens
Atriplex bunburyana
Tecticornia pruinosa
Tecticornia undulata
Rumex vesicarius*
Lysimachia arvensis*
Cenchrus ciliaris*
Sisymbrium irio*
Enchylaena tomentosa var. tomentosa
Eremophila youngii subsp. youngii
Sonchus oleraceus*
Maireana tomentosa
Maireana pyramidata
Atriplex vesicaria
Eucalyptus camaldulensis subsp. obtusa
Sclerolaena cuneata
Sclerolaena diacantha
Sclerolaena patenticuspis
Gunniopsis quadrifida
Leichhardtia australis
Ptilotus obovatus
Solanum lasiophyllum
Exocarpos aphyllus
Maireana georgei
Lycium australe
Melaleuca interioris
Melaleuca sheathiana
Calandrinia eremaea
Calandrinia polyandra
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	16/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.30949 -28.912877	**Quadrat:**	Q53
Quadrat size:	20x20		
Vegetation group:	Acacia burkittii creekline vegetation		
WP:	wpt429		
Photo number:	105		
Landform:	Open depression (vale)/Drainage depression		
Land surface/disturbance:	No effective disturbance except grazing by hoofed animals		
Fire History:	Greater than 10 years ago		
Coarse fragments on the surface (abundance/size/shape):	No qualifier; common/Bouldery; or boulders/Subrounded		
Rock outcrop (abundance/runoff):	No bedrock exposed/No runoff		
Soil (profile/field texture/soil surface):	Uniform/Sandy clay loam/Firm		
% Cover leaf litter:	10		
% Cover bare ground:	55		

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 burkittii		Acacia craspedocarpa		Atriplex bunburyana	
		Scaevola spinescens		Senna cardiosperma	
		Acacia tetragonophylla			

ALL SPECIES
Acacia burkittii
Acacia craspedocarpa
Scaevola spinescens
Acacia tetragonophylla
Atriplex bunburyana
Senna cardiosperma
Rumex vesicarius*
Lysimachia arvensis*
Cenchrus ciliaris*
Sisymbrium irio*
Enchylaena tomentosa var. tomentosa
Rhodanthe charsleyae
Sonchus oleraceus*
Maireana tomentosa
Maireana pyramidata
Atriplex vesicaria
Goodenia sp. Midwest
Sclerolaena cuneata
Sclerolaena diacantha
Sclerolaena patenticuspis
Gunniopsis quadrifida
Leichhardtia australis
Ptilotus obovatus
Solanum lasiophyllum
Exocarpos aphyllus
Maireana georgei
Lycium australe
Melaleuca interioris
Melaleuca sheathiana
Calandrinia eremaea
Calandrinia polyandra
Calandrinia creethae
Wahlenbergia tumidifructa
Erodium cygnorum
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	16/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.317306 -28.913124	**Quadrat:**	Q54
Quadrat size:	20x20		
Vegetation group:	Eremophila youngii over Eremophila scoparia over Tecticornia shrubland		
WP:	wpt470		
Photo number:		107	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Medium gravelly; medium pebbles/Subrounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Surface crust	
% Cover leaf litter:		15	
% Cover bare ground:		55	

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 %:**	V <10	**Crown cover %:**	M 30-70
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eremophila youngii subsp. youngii		Cratystylis subspinescens		Tecticornia disarticulata	
		Maireana pyramidata			
		Eremophila scoparia			

ALL SPECIES
Eremophila youngii subsp. youngii
Cratystylis subspinescens
Maireana pyramidata
Eremophila scoparia
Tecticornia disarticulata
Ptilotus obovatus
Goodenia sp. Midwest
Austrostipa elegantissima
Enchylaena tomentosa var. tomentosa
Senecio glossanthus
Maireana triptera
Sclerolaena cuneata
Sclerolaena patenticuspis
Monachather paradoxus
Maireana tomentosa
Lepidium oxytrichum
Calotis hispidula
Atriplex codonocarpa
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	16/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.319353 -28.912977	**Quadrat:**	Q55
Quadrat size:	20x20		
Vegetation group:	Eremophila youngii over Eremophila scoparia over Tecticornia shrubland		
WP:	wpt484		
Photo number:		108	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Medium gravelly; medium pebbles/Subrounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Surface crust	
% Cover leaf litter:		15	
% Cover bare ground:		55	

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 %:**	V <10	**Crown cover %:**	M 30-70
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Eremophila youngii subsp. youngii		Cratystylis subspinescens		Tecticornia disarticulata	
		Maireana pyramidata			
		Eremophila scoparia			

ALL SPECIES
Eremophila youngii subsp. youngii
Cratystylis subspinescens
Maireana pyramidata
Eremophila scoparia
Tecticornia disarticulata
Ptilotus obovatus
Goodenia sp. Midwest
Austrostipa elegantissima
Enchylaena tomentosa var. tomentosa
Senecio glossanthus
Maireana triptera
Sclerolaena cuneata
Sclerolaena patenticuspis
Monachather paradoxus
Maireana tomentosa
Lepidium oxytrichum
Calotis hispidula
Atriplex codonocarpa
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	16/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.322124 -28.908388	**Quadrat:**	Q56
Quadrat size:	20x20		
Vegetation group:	Mulga over Quartz outcrop		
WP:	wpt489		
Photo number:		109	
Landform:		Hillock/Mound	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Stony; stones/Subangular	
Rock outcrop (abundance/runoff):		No bedrock exposed/Very rapid	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Hard setting	
% Cover leaf litter:		5	
% 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 %:**	V <10
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Acacia ramulosa var. ramulosa		Senna artemisioides subsp. ×sturtii	
				Eremophila forrestii subsp. forrestii	
				Eremophila platycalyx subsp. Leonora	

ALL SPECIES
Acacia aneura
Acacia ramulosa var. ramulosa
Senna artemisioides subsp. ×sturtii
Eremophila forrestii subsp. forrestii
Eremophila platycalyx subsp. Leonora
Erodium cygnorum
Goodenia sp. Midwest
Sclerolaena cuneata
Sclerolaena diacantha
Rhodanthe propinqua
Leichhardtia australis
Atriplex bunburyana
Ptilotus helipteroides
Rumex vesicarius*
Cheilanthes sieberi subsp. sieberi
Roepera eremaea
Austrostipa nitida
Enneapogon caerulescens
Rhodanthe maryonii
Sida sp. Golden calyces glabrous
Acacia tetragonophylla
Ptilotus schwartzii
Ptilotus roei
Eragrostis eriopoda
Eriachne flaccida
Maireana sedifolia
Maireana triptera
Calandrinia eremaea sans lat
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	16/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.32209 -28.906573	**Quadrat:**	Q57
Quadrat size:	20x20		
Vegetation group:	Mulga over Senna Shrubland		
WP:	wpt490		
Photo number:		110	
Landform:		Hillock/Mound	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Cobbly; or cobbles/Subangular	
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:**	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 %:**	V <10
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Senna artemisioides subsp. ×sturtii		Maireana sedifolia	
		Eremophila oldfieldii subsp. angustifolia		Maireana triptera	
				Ptilotus obovatus	

ALL SPECIES
Acacia aneura
Senna artemisioides subsp. ×sturtii
Eremophila oldfieldii subsp. angustifolia
Maireana sedifolia
Maireana triptera
Ptilotus obovatus
Maireana pyramidata
Rhagodia drummondii
Enchylaena tomentosa var. tomentosa
Scaevola spinescens
Sclerolaena diacantha
Frankenia cinerea
Eremophila metallicorum
Goodenia sp. Midwest
Acacia pteraneura
Senna artemisioides subsp. filifolia
Senna glutinosa subsp. chatelainiana
Hakea preissii
Maireana tomentosa
Lepidium platypetalum
Austrostipa nitida
Cephalipterum drummondii
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	16/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.32274 -28.905232	**Quadrat:**	Q58
Quadrat size:	20x20		
Vegetation group:	Mulga over Quartz outcrop		
WP:	wpt491		
Photo number:		111	
Landform:		Hillock/Mound	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Moderately; many/Stony; stones/Subangular	
Rock outcrop (abundance/runoff):		Rockland/Very rapid	
Soil (profile/field texture/soil surface):		Uniform/Sandy clay loam/Hard setting	
% Cover leaf litter:		5	
% 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 %:**	V <10
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia aneura		Acacia ramulosa var. ramulosa		Senna artemisioides subsp. ×sturtii	
				Eremophila forrestii subsp. forrestii	
				Eremophila platycalyx subsp. Leonora	

ALL SPECIES
Acacia aneura
Acacia ramulosa var. ramulosa
Senna artemisioides subsp. ×sturtii
Eremophila forrestii subsp. forrestii
Eremophila platycalyx subsp. Leonora
Erodium cygnorum
Goodenia sp. Midwest
Sclerolaena cuneata
Sclerolaena diacantha
Rhodanthe propinqua
Leichhardtia australis
Atriplex bunburyana
Ptilotus helipteroides
Rumex vesicarius*
Cheilanthes sieberi subsp. sieberi
Roepera eremaea
Austrostipa nitida
Enneapogon caerulescens
Rhodanthe maryonii
Sida sp. Golden calyces glabrous
Acacia tetragonophylla
Ptilotus schwartzii
Ptilotus roei
Eragrostis eriopoda
Eriachne flaccida
Maireana sedifolia
Maireana triptera
Calandrinia eremaea sans lat
Outside

Project Name: St Barbara Ltd Leonora Project			
Date:	16/09/2022	**Botanist:**	Eren Reid
Location:	GDA94 121.323712 -28.909788	**Quadrat:**	Q59
Quadrat size:	20x20		
Vegetation group:	Open mulga over chenopod		
WP:	wpt493		
Photo number:		112	
Landform:		Flat/Plain	
Land surface/disturbance:		No effective disturbance except grazing by hoofed animals	
Fire History:		Greater than 10 years ago	
Coarse fragments on the surface (abundance/size/shape):		Very; abundant/Coarse gravelly; large pebbles/Subrounded	
Rock outcrop (abundance/runoff):		No bedrock exposed/No runoff	
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 %:	V <10	**Crown cover %:**	V <10	**Crown cover %:**	S 10-30
Dominant taxa:		**Dominant taxa:**		**Dominant taxa:**	
Acacia pteraneura		Hakea preissii		Maireana pyramidata	
Acacia aneura				Atriplex bunburyana	
				Ptilotus obovatus	

ALL SPECIES
Acacia pteraneura
Acacia aneura
Hakea preissii
Maireana pyramidata
Atriplex bunburyana
Ptilotus obovatus
Maireana triptera
Cenchrus ciliaris*
Sclerolaena diacantha
Maireana tomentosa
Enchylaena tomentosa var. tomentosa
Atriplex vesicaria
Eremophila compacta
Austrostipa nitida
Sclerolaena densiflora
Maireana georgei
Brachyscome ciliaris
Erodium cygnorum
Sida intricata
Sida sp. Excedentifolia
Eremophila platycalyx subsp. Leonora
Rumex vesicarius*
Solanum lasiophyllum
Calandrinia eremaea
Calandrinia polyandra
Asphodelus fistulosus*
Sclerolaena eriacantha
Lepidium oxytrichum
Salvia verbenaca*
Acacia tetragonophylla
Senna artemisioides subsp. filifolia
Schinus molle var. areira
Rhodanthe charsleyae
Tecticornia disarticulata
Outside