ATLAS-CAMPASPE
Mineral Sands Project
ENVIRONMENTAL IMPACT STATEMENT

APPENDIX A 〉 FLORA ASSESSMENT

CRISTAL Resource Strategies

Atlas-Campaspe Mineral Sands Project

Flora Assessment

Prepared by Australian Museum Business Services
for Cristal Mining Australia Limited

Final Report

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Executive Summary

The Atlas-Campaspe Mineral Sands Project (the Project) would involve the open-cut mining of two deposits located on leasehold land approximately 80 kilometres (km) north of the township of Balranald and 135 km south-west of Ivanhoe, New South Wales (NSW). Mining would be undertaken consecutively in each deposit over a period of about 20 years. The Project would also involve the development of supporting infrastructure for the mine (access roads, administration buildings, accommodation, etc.) and the construction of a facility at Ivanhoe for the loading of materials onto trains. Material would be trucked from the mine site to a rail facility at Ivanhoe (the Ivanhoe Rail Facility) along a Mineral Concentrate Transport Route (MCTR). The construction and operation of the Atlas-Campaspe Mine would also require the widening of approximately 37 km of existing public roads and the construction of three corners along the road between the Atlas-Campaspe Mine and Balranald-Ivanhoe Road. The proposed MCTR between the intersection of Hatfield-The Vale Road and Balranald-Ivanhoe Road and the Ivanhoe Rail Facility would be along existing roads and would not involve road widening or realignment works.

This report presents a study of terrestrial flora potentially impacted by the Atlas-Campaspe Mine, performed by Australian Museum Business Services and commissioned by Cristal Mining Australia Limited (Cristal Mining). The purpose of the study is to consider the potential impacts of the Project on terrestrial flora, in particular, threatened species, populations and ecological communities listed on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and/or NSW *Threatened Species Conservation Act 1995* (TSC Act). There are no flora related aspects of the Project that are relevant to the NSW *Fisheries Management Act 1994*.

This report includes the results of comprehensive surveys and assessments undertaken in and around the Atlas-Campaspe Mine, along the MCTR between the Atlas-Campaspe Mine and Balranald-Ivanhoe Road and at the proposed location of the Ivanhoe Rail Facility.

A desktop review and field surveys were performed in order to identify threatened species that may be affected by the Project. The desktop review included a search of the NSW Office of Environment and Heritage (OEH) Atlas of NSW Wildlife and the National Herbarium of NSW (the NSW Herbarium) databases for records of threatened flora which could potentially occur in the Project area, a search of the Commonwealth Department of Sustainability, Environment, Water, Population and Communities Protected Matters Database for matters of national environmental significance which could potentially occur in the Project area, a review of previous vegetation surveys and mapping in the region (including those from Mungo National Park), previous environmental assessments and management plans which had been completed within and surrounding the Project area and an examination of aerial photographs.

Field surveys of the Atlas-Campaspe Mine study area and the MCTR study area were undertaken between May 2011 and April 2012. Surveys of the Ivanhoe Rail Facility study area were undertaken in October 2012. Flora survey work was designed with reference to the relevant guidelines provided by the OEH where possible. Survey effort within the Project area was generally more than the minimum recommendations of the OEH guidelines. Survey techniques included: full floristic 20 x 20 metre (m) vegetation plots, Rapid Data Points, threatened flora transects, and standardised 100 x 20 m population estimates once threatened species were identified. Flora surveys were performed to map the vegetation and assess its condition and targeted searches were conducted at times appropriate for the detection of potentially occurring threatened species.

The results of the database searches indicated that 23 flora species that are listed as threatened on the EPBC Act and/or TSC Act had been recorded within the broad district of the Project areas or were predicted to have potential habitat within these area.

A total of 368 native flora species and 77 introduced species were recorded across the Atlas-Campaspe Mine study area and the MCTR study area. A total of three flora species recorded during the survey work are listed as threatened species under either the TSC Act and/or EPBC Act, namely: *Pterostylis cobarensis* (Cobar Greenhood Orchid) listed as vulnerable under the TSC Act and EPBC Act, *Lepidium monoplocoides* (Winged Peppercress) listed as endangered under the TSC Act and EPBC Act and *Brachyscome papillosa* (Mossgiel Daisy) listed as vulnerable under the TSC Act and EPBC Act.

A total of 75 native species and 11 introduced species were recorded in the Ivanhoe Rail Facility study area.

A total of 14 map units were identified within the Atlas-Campaspe Mine study area and MCTR study area and surrounds, consisting of 13 native vegetation communities and one map unit dominated by introduced species (Cleared land). Two endangered ecological communities (EECs) listed under the TSC Act were recorded, namely *Acacia melvillei Shrubland in the Riverina and Murray-Darling Depression Bioregions Endangered Ecological Community* (*Acacia melvillei* Shrubland EEC) (mapped as Yarran Shrubland) and *Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW Western Slopes Bioregions Endangered Ecological Community* (Sandhill Pine Woodland EEC). The condition of the vegetation ranged from good to poor.

Two native vegetation map units were described for the Ivanhoe Rail Facility study area. No EEC's were found at this location and the condition of the vegetation was moderate to poor.

Potential impacts on native flora that would occur as a result of the Project include: clearing of vegetation, the removal of threatened species or EEC's or modification of their habitat and alteration to natural flow regimes. A number of indirect impacts, such as fragmentation, edge effects, alteration to natural fire regimes, increased dust and pollution, increased grazing by feral animals and introduction of weeds may also occur as a result of the Project. Approximately 4,158 hectares (ha) of vegetation and 305 ha of cleared land would be removed for the Project. Potential impacts from the Project on threatened flora are likely to include loss of individual occurrences of threatened flora species, loss of potential habitat for threatened flora species and the reduction and fragmentation of threatened ecological communities.

The Project incorporates a number of mitigation and management strategies that would minimise the impacts and risks to flora. These include designing the mine footprint to avoid the majority of an area containing a Black Box Woodland depression, undertaking mining progressively over 20 years, progressive mine rehabilitation to incorporate plant species characteristic of the surrounding vegetation communities, pre-clearance surveys, salvage and relocation of soil and seed to rehabilitation areas; and management of water, dust, weeds, feral animals, stock and fire risk. Once mining is complete, the land levels along the main flow paths would be restored to levels that allow cross drainage to occur.

The Project also incorporates an offset located adjacent to Mungo National Park. The proposed offset would conserve in perpetuity some 16,270 ha of native vegetation communities and 270 ha of cleared land, in similar condition to that of the Atlas-Campaspe Mine area.

Where it was considered that potential impacts on threatened species, populations, or ecological communities could occur as a result of the Project, an assessment of impacts was made. For threatened species listed on the schedules of the TSC Act, the significance of potential impacts was assessed by application of the assessment of significance (also called Seven Part Tests) in accordance with Section 5A of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The significance of potential impacts on relevant matters of national environmental significance was assessed in accordance with the EPBC Act *Significant Impact Guidelines 1.1: Matters of National Environmental Significance* (Department of Environment, Water, Heritage and Arts [DEWHA] 2009) and the Commonwealth requirements specific to the Project. Three species were recorded during the surveys that are listed under the TSC and the EPBC Acts.

A large *Brachyscome papillosa* population was recorded along Magenta Road along the MCTR. The occurrence extended to both sides of the existing road, with plants recorded up to more than 100 m from the road edge. Based on the survey information, this occurrence constitutes a single population of the species. Cristal Mining have committed to not widening the section of road in the area of the *Brachyscome papillosa* population and to sealing the road surface in this area to limit dust impacts on this population. These and other mitigation measures are expected to minimise the impacts of the Project on this species. The assessments undertaken under the TSC Act and EPBC Act found that there would be no significant impact on the population of the *Brachyscome papillosa* from the Project.

Lepidium monoplocoides was identified within the Project area (two individual plants in two different locations identification confirmed by NSW Herbarium and one location identification unconfirmed by NSW Herbarium). The habitat in confirmed locations was in poor condition, suffering major disturbance from livestock and goats and at one location the individual and associated habitat was isolated from other vegetation by cleared land. One additional record, not confirmed by the NSW Herbarium was recorded in the Project area.

A total of 299 individuals of *Lepidium monoplocoides* were recorded at four other locations in the surrounding area (outside of the Project area) and three of these locations would be included in the proposed offset area. An additional five locations in the surrounding area were identified in October 2012 (FloraSearch 2012). Identification of these records has not been confirmed by the NSW Herbarium and no estimates of population size were undertaken.

The occurrences of *Lepidium monoplocoides* are considered to represent a single 'population' in accordance with the *Significant Impact Guidelines 1.1: Matters of National Environmental Significance* (DEWHA 2009). On the basis of this guideline, the species would not be significantly impact by the Project. The NSW definition of a 'population' differs from the Commonwealth definition. Under the NSW assessment, an assumption that each occurrence found in the Project area represents a viable 'local population' (and not an isolated occurrence), would result in a finding of a significant impact on two confirmed local populations of *Lepidium monoplocoides* in accordance with Section 5A of the EP&A Act. Notwithstanding, based on known information about the lifecycle of other *Lepidium* species, the six confirmed local *Lepidium monoplocoides* occurrences could be considered to be part of one population in which case the loss of the species at two sites within the Project area is not likely to have a significant impact on the species.

There is considerable potential to maintain and improve habitat for the occurrence of this species in the proposed offset area, through the removal of stock, control of feral animals and other management measures proposed for the proposed offset area.

Pterostylis cobarensis specimens were collected during targeted searches for threatened flora in the mining leases during ideal survey timing (November) in 2011. At the time, the specimens could not be identified and they were submitted to the NSW Herbarium for identification. The specimens were subsequently identified as *Pterostylis cobarensis* in May 2012. The samples were taken from an area that is well outside the previously reported range for this species so the identification was unexpected. Further surveys in October 2012 located three more occurrences.

Three of the five known occurrences of the *Pterostylis cobarensis* would be removed by the land clearance required for the Project. The design of the stockpiles would avoid the 4th location of *Pterostylis cobarensis* (comprising of 4 individuals) and provide a 25 m distance between the location the plants were recorded and any surface mine activity. The 5th occurrence (comprising 11 plants) is located within the proposed offset area and the Project would provide a minimum 25 m distance between these two locations and any surface mining activity. In addition, a number of measures aimed at avoiding, minimising or mitigating impacts on this species are described, such as fencing, pre-clearance surveys, collection of soil and plants/bulbs for use in revegetation, and weed management.

Based on current knowledge of the extent of this species in the area the Project would have a significant impact on the known population of *Pterostylis cobarensis*. However, extensive areas of mallee woodland, potential habitat for *Pterostylis cobarensis,* exists in the proposed offset area (12,765 ha). It is possible that the species is more widespread given the connectivity of potential habitat surrounding the Atlas-Campaspe Mine area.

Desktop review identified seven threatened flora species recorded within a 50 km of the Ivanhoe Rail Facility study area. No threatened flora species were recorded in the Ivanhoe Rail Facility study area.

A total of 1,071 ha of *Acacia melvillei* Shrubland EEC (mapped as Yarran Shrubland) was surveyed and mapped for the purpose of this assessment[1].This does not include all of the community that may potentially occur within the region but represents only the occurrence in the area surveyed for this assessment. *Acacia melvillei* Shrubland EEC has not been mapped by others in the vicinity of the Project and proposed offset study areas. Within the Project area approximately 195 ha of *Acacia melvillei* Shrubland EEC would be directly impacted by the Project. Local occurrence is defined by the NSW Department of Environment and Climate Change *Threatened Species Assessment Guidelines: the Assessment of Significance* as the extent of the ecological community that occurs within the study area. In the context of this assessment, the local occurrence is defined as the total area of the EEC known to occur. Under this scenario the outcome of this assessment found the Project would have a significant impact on a local occurrence of this EEC through the removal of large areas of the local occurrence of community and fragmentation of existing stands.

A total of 390 ha of *Acacia melvillei* Shrubland EEC would be maintained and enhanced in the proposed offset area. A further 40 ha within the Atlas-Campaspe Mine study area would be retained during the mining activities. The mapped occurrence of *Acacia melvillei* Shrubland EEC is generally in poor condition. Through removal of grazing pressure from livestock, goats and rabbits and facilitation of regeneration in the proposed offset area, there is significant potential for substantial areas of *Acacia melvillei* Shrubland EEC to improve in the medium to long term.

[1] Porteners et al. (1997) mapped only a small area of this EEC to the far north of the Atlas-Campaspe Mine. These have not been included in estimate of area of local occurrence.

Approximately 3 ha of Sandhill Pine Woodland EEC has been mapped in three locations within the MCTR footprint. The existing road would be widened to approximately 10 m each side from the centreline of the existing road. The margins of the existing road are already heavily disturbed. Local occurrence was defined in the context of this assessment as the total area of the EEC surveyed by this study (21 ha) plus a relatively contiguous area in the surrounding landscape mapped by Porteners et al. (1997) of 2,136 ha. There is a total of 13,868 ha mapped by Porteners et al. (1997) in the Pooncarie region. The assessment found the Project would not have a significant impact on Sandhill Pine Woodland EEC.

The Project would include the preparation of a Biodiversity Management Plan, with measures to minimise impacts of vegetation clearance, reduce impacts on threatened species and ecological communities, provide fencing and livestock removal, control weeds and feral animals, water management and minimise impacts through vehicle management, fire management, dust and pollution control and post-mine rehabilitation.

The proposed offset area contains representatives of most vegetation types that would be impacted as a result of the Project. The area of vegetation in the proposed offset is greater than that which would be cleared, and a number of management measures would be implemented to enhance the flora values of the proposed offset area. These measures would include the removal of the impacts of grazing through fencing to excluding livestock and goats, control of weeds and rabbits, managing bushfire and the protection and enhancement of habitat for threatened flora species and ecological communities. Management measures would be monitored and independent audits would report on the progress of the management measures.

An arrangement would be made within 12 months of the Project being approved so that the proposed offset area is conserved and managed in perpetuity. The proposed offset area occurs in close proximity to the Project area and adjoins Mungo National Park.

It is considered that the Project meets the standard in the requirements of the Director-General of the NSW Department of Planning and Infrastructure for the Project because flora biodiversity in the region would be maintained and improved in the medium to long-term. The proposed offset area contains a similar suite of flora species and vegetation communities to those in most of the disturbance area. The proposed offset area contains threatened species and ecological communities and proposed conservation management actions would mean that the proposed offset area meets the ‘maintain or improve’ test. For example, the proposed offset area would represent a new protected area in the region and would conserve in perpetuity habitat for threatened species. Control of goats and rabbits (combined with stock removal) is expected to facilitate the most significant improvement to flora in the proposed offset area compared to all other management actions. The proposed offset area would help to maintain the long-term viability of vegetation in the locality as it adjoins existing conservation reserves (Mungo National Park; private conservation reserve).

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1 Introduction

1.1 Background

This report presents the aims, methods, results and conclusions of a study of the terrestrial flora associated with an area in south-west New South Wales (NSW) which is the subject of a Development Application. The study was performed by Australian Museum Business Services (AMBS) and was commissioned by Cristal Mining Australia Limited (Cristal Mining), formally known as Bemax Resources Limited (Bemax). The development proposal is known as the Atlas-Campaspe Mineral Sands Project (the Project). The Project would involve the mining of two mineral sands deposits (the Atlas-Campaspe Mine), the construction and operation of associated infrastructure, and post-mining rehabilitation. The Project would also involve the construction and operation of a rail load out facility at Ivanhoe (the Ivanhoe Rail Facility).

A Preliminary Environmental Assessment of the Project (Bemax 2012a) was submitted to the NSW Department of Planning and Infrastructure (DP&I). The DP&I issued Director-General's Requirements (DGRs) for the environmental assessment of the Project.

A Referral to the Minister for Sustainability, Environment, Water, Population and Communities in relation to the Project (Bemax 2012b) was submitted on 27 June 2012 and the Project was declared a 'controlled action' for the purposes of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

This report contains an assessment of potential impacts of the Project on terrestrial flora in accordance with relevant Commonwealth and State planning and environmental legislation. The Project has been declared a State Significant Development (SSD) by the Director-General of the DP&I and will be assessed using the SSD pathway of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The Minister for Planning and Infrastructure will be the consenting authority for this Project.

1.2 Objectives and scope

The primary aim of this assessment is to assess potential impacts on terrestrial flora (in particular, flora of conservation significance) based on the DGRs. Matters of national environmental significance listed under the EPBC Act relevant to terrestrial flora are also assessed in this assessment. Flora of conservation significance are defined in this report as threatened species, populations and ecological communities listed on the Schedules of the NSW *Threatened Species Conservation Act 1995* (TSC Act) and/or are listed as matters of national environmental significance by the EPBC Act. The specific objectives of this assessment are to consider the:

- terrestrial flora known or likely to occur in the area that would be affected by the Project, including flora of conservation significance;
- potential impacts of the Project on those flora;
- proposed impact avoidance and mitigation measures; and
- proposed offset.

The scope of this assessment includes:

- a 'desktop' assessment of existing survey reports and other data regarding the terrestrial flora of the study area;
- field surveys of the terrestrial flora within the study area;
- descriptions and maps of the vegetation associations within the study area, including an assessment of condition;
- a list of plant species found during surveys of the study area, including introduced and weed species;

- the identification of plant species and ecological communities of conservation significance likely to be affected by the Project;
- an assessment of the potential impacts of the Project on native flora;
- assessments of the likely magnitude, nature and significance of impacts of the Project on plant species and ecological communities of conservation significance;
- a discussion of impact avoidance and mitigation measures proposed as part of the Project;
- presentation of a proposed offset in relation to the Project.

1.3 Location

The majority of the Atlas-Campaspe Mine study area is located within the Balranald Local Government Area (LGA) and Lower Murray Darling Catchment Management Area (CMA) (Figure 1). It is covered by the Pooncarie 1:250,000 and Turlee 1:100,000 topographical survey sheets. The Ivanhoe Rail Facility is within the Central Darling LGA and the Lachlan CMA.

The Atlas-Campaspe Mine is situated approximately 80 kilometres (km) north of the township of Balranald and 135 km southwest of Ivanhoe (Figure 1). It is located on leasehold land (Wampo and Boree Plains Stations) currently used for agriculture (mainly grazing, with some cropping). The study area in this location incorporates the proposed extent of surface development and surrounds (Figure 2).

The proposed Mineral Concentrate Transport Route (MCTR) extends from the Atlas-Campaspe Mine to the Ivanhoe Rail Facility. This component of the Project would involve improvements (including widening and some re-alignment) to a 37 km section of existing public roads, extending from the south-eastern end of the Atlas-Campaspe Mine to the Balranald-Ivanhoe Road near the locality of Hatfield (Figure 3). The proposed MCTR between the intersection of Hatfield-The Vale Road and Balranald-Ivanhoe Road and the Ivanhoe Rail Facility would be along existing roads and would not involve road widening or realignment works.

Nearby conservation areas include Mungo National Park to the west of the Atlas-Campaspe Mine, a private conservation area on Boree Plains adjoining the National Park to the east and another private conservation area to the south on Wampo Station (Figure 2). The private conservation areas have been established as Southern Mallee Landuse Agreement Reserves.

The Ivanhoe Rail Facility is located approximately 4.5 km south-west of Ivanhoe, on the southern edge of the Orange-Broken Hill railway (Figure 1).

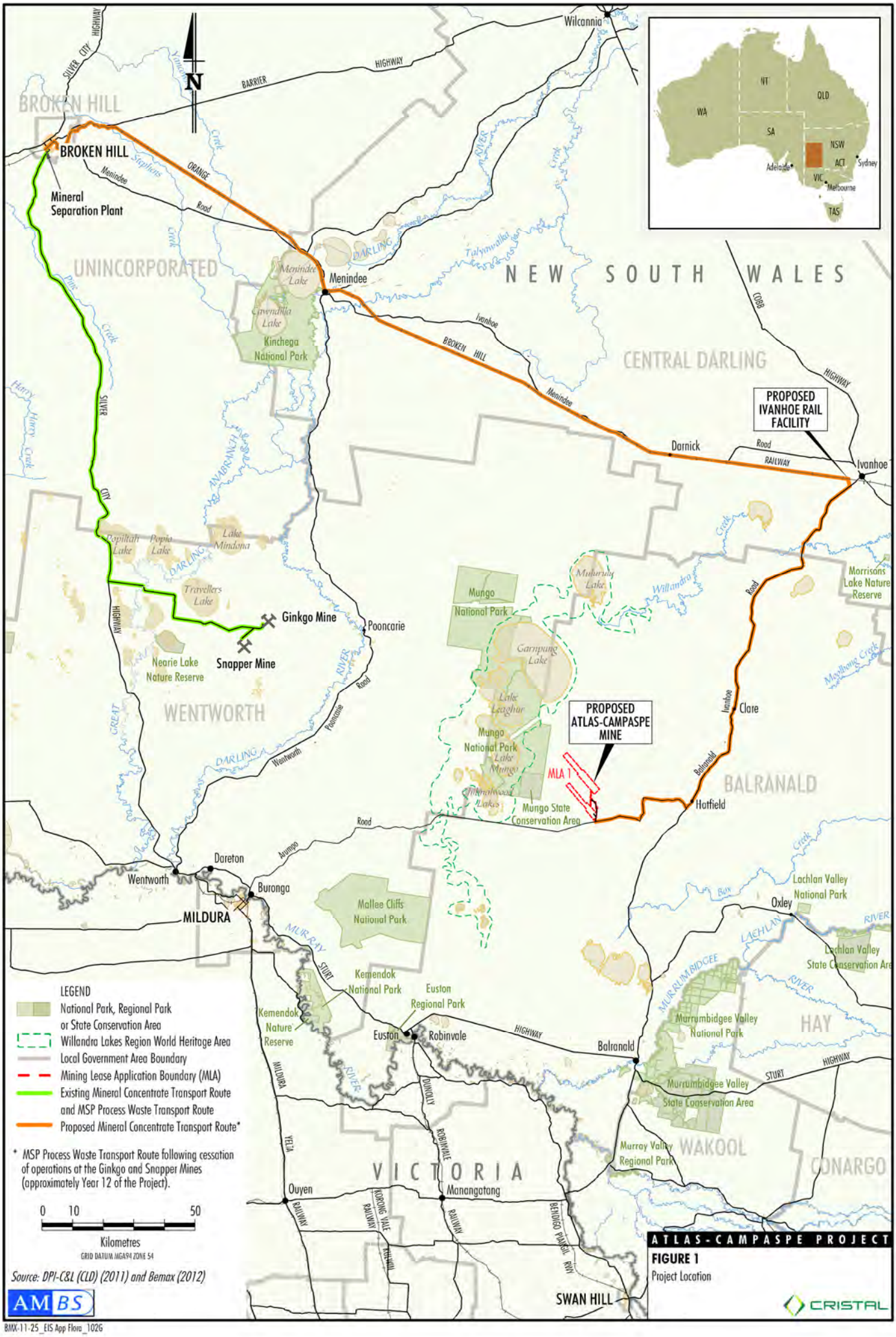
1.4 Proposed development

1.4.1 *Overview*

The Project would involve two main development components:

1. Construction and development of infrastructure for mining operations at the Atlas and Campaspe deposits (the Atlas-Campaspe Mine) (Figures 2 and 3)
2. Construction and operation of the Ivanhoe Rail Facility (Figure 4).

The proposed life of the Project is approximately 20 years, commencing approximately 1 July 2013 or when necessary approvals are in place.



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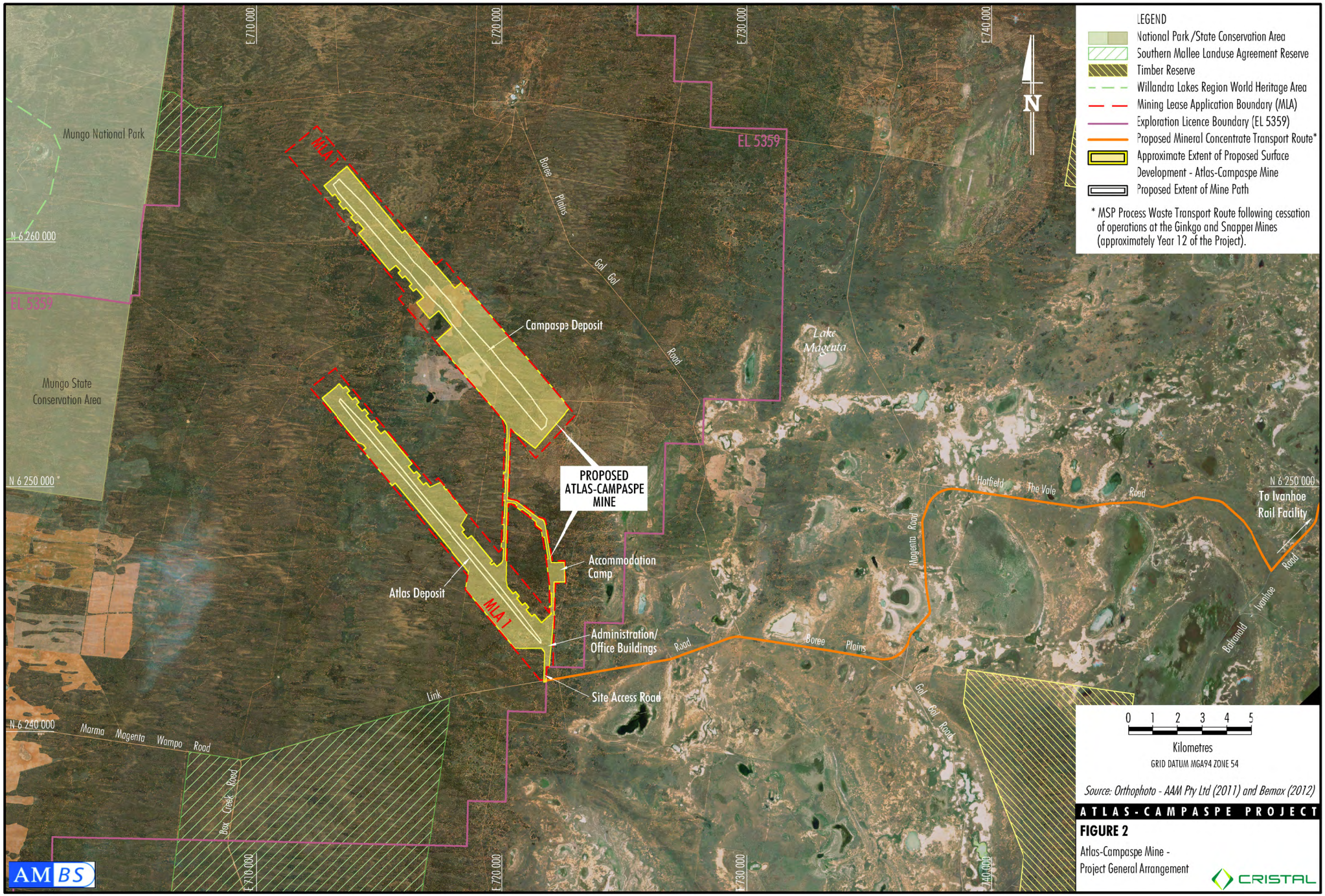

ATLAS-CAMPASPE PROJECT

FIGURE 2

Atlas-Campaspe Mine - Project General Arrangement

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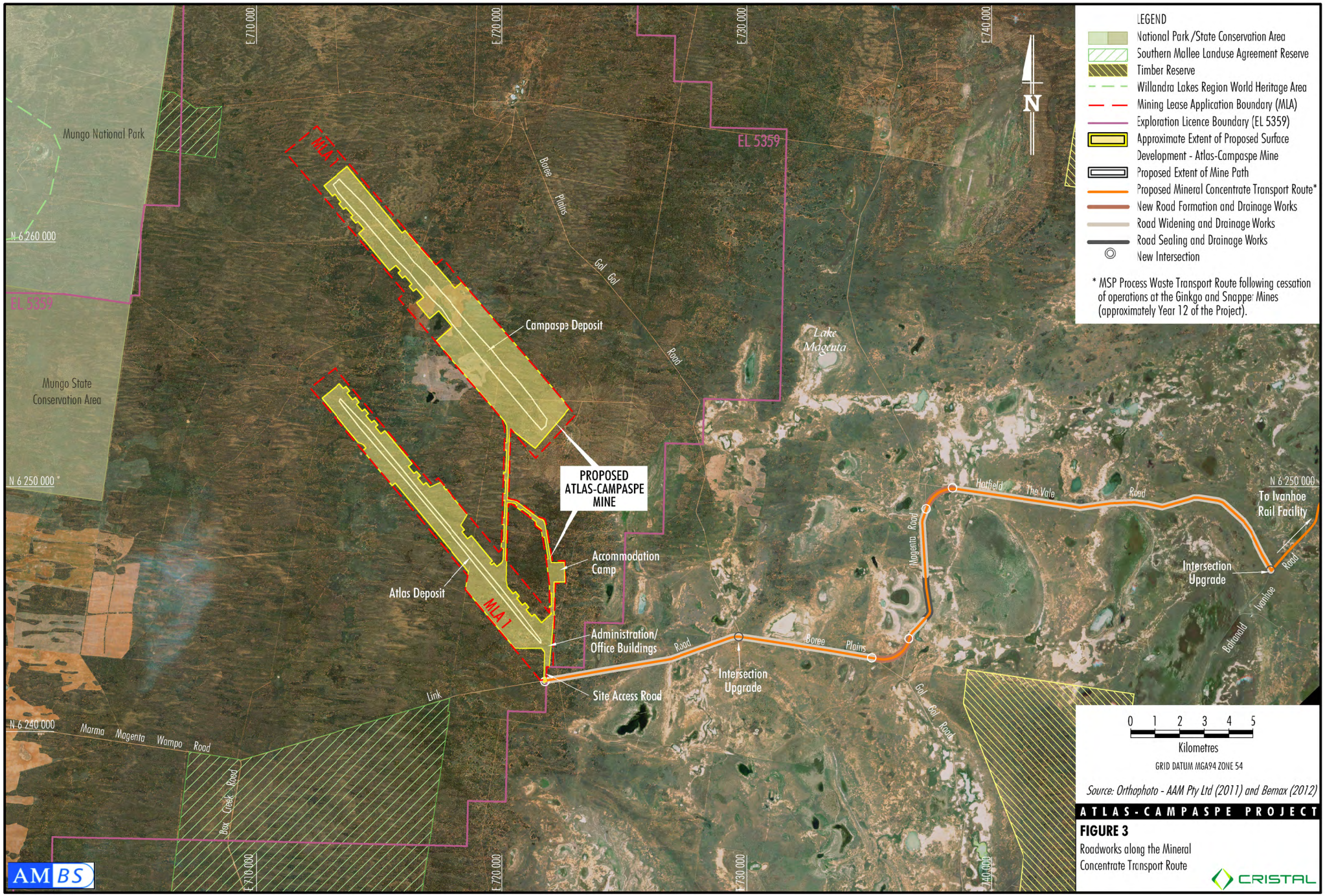

ATLAS-CAMPASPE PROJECT

FIGURE 3

Roadworks along the Mineral Concentrate Transport Route

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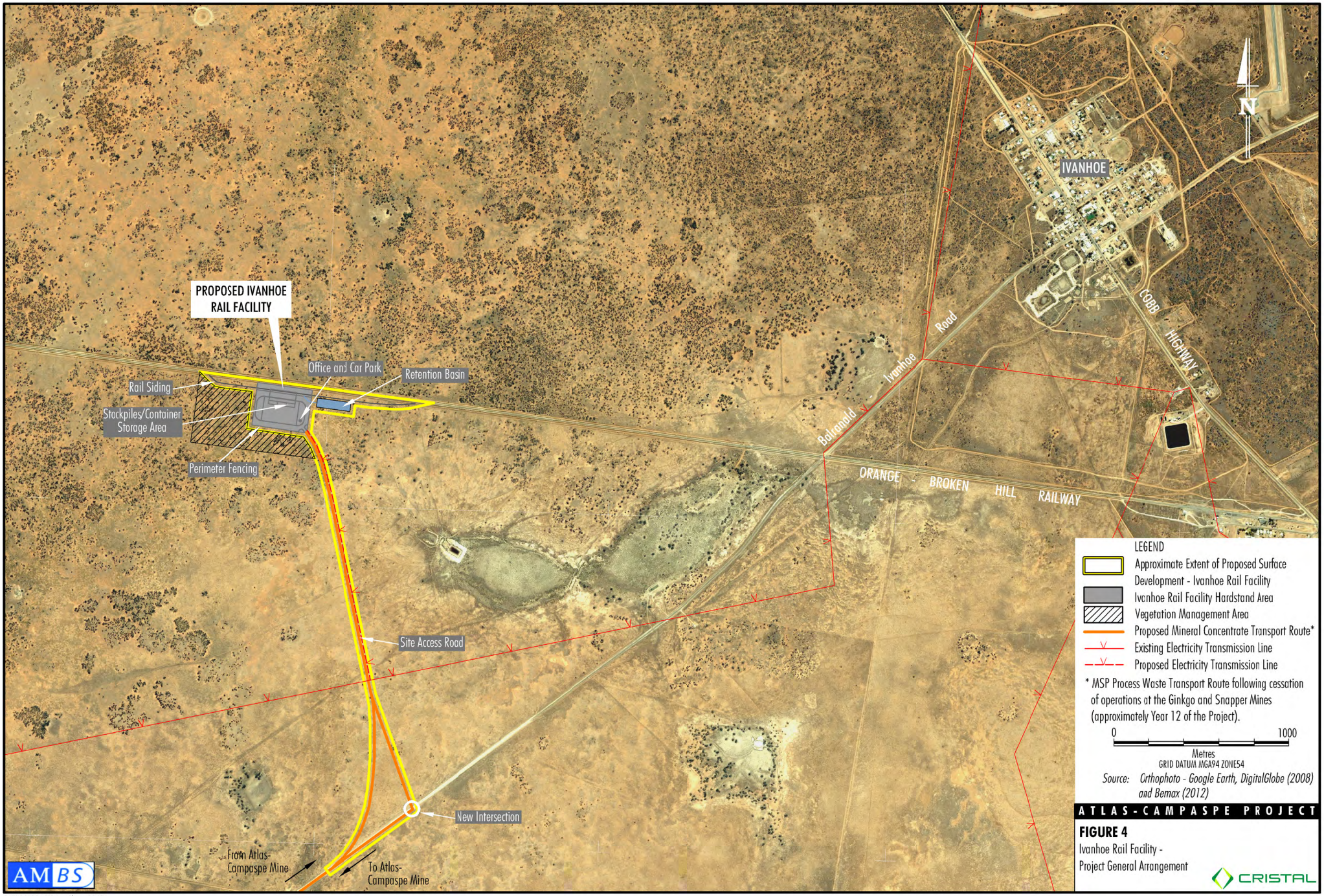

ATLAS-CAMPASPE PROJECT

FIGURE 4

Ivanhoe Rail Facility - Project General Arrangement

CRISTAL

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The activities associated with the development of the Project are summarised below.

1.4.2 Atlas-Campaspe Mine

- Ongoing exploration activities.
- Sequential development and operation of two separate mineral sands ore extraction areas within the Mining Lease Application (MLA) 1 area.
- Use of conventional mobile equipment to mine and place mineral sands ore into dry mining unit(s)[2] at a maximum ore production rate of up to 7.2 million tonnes per annum.
- Mineral processing infrastructure including the primary gravity concentration unit, salt washing facility and a wet high intensity magnetic separation circuit.
- Mineral concentrate stockpiles and materials handling infrastructure (e.g. towers and stackers).
- Progressive backfilling of mine voids with overburden behind the advancing ore extraction areas or in overburden emplacements adjacent to the mine path.
- Placement of sand residues and coarse rejects (and Broken Hill Mineral Separate Plant [MSP] process wastes[3]) following mineral processing to either the active mining area (behind the advancing ore extraction area) or in sand residue dams.
- Development of a groundwater borefield at the Atlas deposit localised dewatering systems (bores, spearfields and trenches) at both the Atlas and Campaspe deposits, including associated pump and pipeline systems.
- Reverse osmosis (RO) plant to supply the salt washing facility and potable water.
- Progressive development of water storage dams, sediment basins, pumps, pipelines and other water management equipment and structures.
- Administration/office buildings, car parking facilities, workshop and stores.
- On-site accommodation camp.
- Sewage treatment plant.
- Diesel powered generators, electricity distribution station and associated internal electricity transmission lines.
- Site access road, internal access roads and haul roads.
- Roadworks along the proposed MCTR to the Ivanhoe Rail Facility (Figure 3).
- Transport of mineral concentrates along the MCTR to the Ivanhoe Rail Facility.
- Road transport of MSP process waste[3] in sealed storage containers from the Ivanhoe Rail Facility to the Atlas-Campaspe Mine for subsequent unloading, stockpiling and placement behind the advancing ore extraction areas.
- Development of soil stockpiles and laydown areas.
- Monitoring and rehabilitation.
- Other associated minor infrastructure, plant, equipment and activities.

1.4.3 Ivanhoe Rail Facility

- Development of a rail siding for:
  - loading of train wagons with mineral concentrate for rail transport to the MSP via the Orange – Broken Hill railway; and
  - unloading of MSP process waste[3] in sealed storage containers (transported via the Orange – Broken Hill railway) from train wagons.

[2] Mining would use conventional open pit methods and would not involve dredge mining.

[3] Following cessation of operations at the Ginkgo and Snapper Mines (approximately Year 12 of the Project).

- Site access road and internal haul roads/pavements.
- Hardstand areas for mineral concentrate and MSP process waste[3] unloading, stockpiling/sealed container storage and loading.
- A retention basin, drains, pumps, pipelines and other water management equipment and structures.
- Site office and car parking facilities.
- Extension of existing 11 kilovolt powerline.
- Monitoring, landscaping and rehabilitation.
- Other associated minor infrastructure, plant, equipment and activities.

Further details regarding the Project are provided in Section 2 in the main report of the Environmental Impact Statement (EIS).

1.5 Definitions

Atlas-Campaspe Mine Study Area – the survey area for the Atlas-Campaspe Mine. The area covers the MLA 1 area and encompasses the approximate extent of proposed surface development at the Atlas-Campaspe Mine.

Atlas-Campaspe Mine Footprint – the approximate extent of proposed surface development at the Atlas-Campaspe Mine. This includes the roadworks along the MCTR.

Atlas Footprint – the approximate extent of proposed surface development associated with mining of the Atlas deposit.

Campaspe Footprint –the approximate extent of proposed surface development associated with mining of the Campaspe deposit.

Clearing - the destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation so as to result in the loss, or long term modification, of the structure, composition and ecological function of stand or stands.

Composition (in relation to ecological communities) - both the plant and animal species present, and the physical structure of an ecological community. While many ecological communities are identified primarily by their vascular plant composition, an ecological community consists of all plants and animals as defined under the TSC Act and NSW *Fisheries Management Act* (FM Act) that occur in that ecological community.

Direct impacts - those that directly affect the habitat and individuals. They include, but are not limited to, death through predation, trampling, poisoning of a plant(s) and the removal of suitable habitat.

Endangered Ecological Community (EEC) – an ecological community facing a high risk of extinction in the near future as defined under the TSC Act and EPBC Act.

Ecological function - the ecological processes/interactions that occur within an ecological community.

Extent - the physical area removed and/or the compositional components of the habitat and the degree to which each is affected.

Habitat - the area occupied, or periodically or occasionally occupied, by any threatened species, population or ecological community and includes all the different aspects (both biotic and abiotic) used by species during the different stages of their life cycles.

Important population – an 'important population' of a species' is defined under the EPBC Act as a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- key source populations either for breeding or dispersal
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species range

Indirect impacts – when Project-related activities affect species, populations or ecological communities in a manner other than direct loss. Indirect impacts can include loss of individuals through, exposure, predation by domestic and/or feral animals, loss of breeding opportunities, loss of shade/shelter, deleterious hydrological changes, increased soil salinity, erosion, inhibition of nitrogen fixation, weed invasion, fertiliser drift, or increased human activity within or directly adjacent to sensitive habitat areas.

Ivanhoe Rail Facility Footprint – the approximate extent of proposed surface disturbance at the Ivanhoe Rail Facility.

Ivanhoe Rail Facility Study Area – the study area for the Ivanhoe Rail Facility.

Life cycle – the series or stages of reproduction, growth, development, ageing and death of an organism.

Likely – a real or not remote chance or possibility.

Local occurrence – the extent of the ecological community that occurs within the study area. However, the local occurrence may include adjacent areas if the ecological community on the study area forms part of a larger contiguous area of that ecological community and the movement of individuals and exchange of genetic material across the boundary of the study area can be clearly demonstrated.

Local population – the population that occurs in the study area. The local population of a threatened plant species comprises those individuals occurring in the study area or the cluster of individuals that extend into habitat adjoining and contiguous with the study area that could reasonably be expected to be cross-pollinating with those in the study area.

Locality – the ecological community or species that occurs within the study area and same meaning ascribed to local population of a species or local occurrence of an ecological community if the ecological community or local population of a species on the study area forms part of a larger contiguous area of that ecological community and the movement of individuals and exchange of genetic material across the boundary of the study area can be clearly demonstrated.

Loss of native vegetation – the removal of native vegetation by direct or indirect actions.

MCTR – proposed Mineral Concentrate Transport Route.

MCTR Roadworks Footprint – roadworks along the MCTR.

MCTR Roadworks Study Area – the study area for the proposed roadworks along the MCTR. Encompasses a 40 km section of existing road that includes the Link Road, Boree Plains-Gol Gol Road, Magenta Road and Hatfield – The Vale Road and associated intersections.

MLA – Mining Lease Application Area.

Native vegetation – plant communities, comprising primarily indigenous species, the composition and structure of which reflects the interactions between plant species, between plants and fauna and with the environment.

Plant community – an assemblage of plant species occupying a particular area. The composition of a plant community is the assemblage of plant species that occur in the community. Plant communities are dynamic and subject to change, either endogenous as in some successions, or in response to external factors - such as seasonal variation, longer term changes in climate (drought-wet cycles) or disturbances such as fire or storm (NSW Scientific Committee 2001).

Population – a 'population of a species' is defined under the EPBC Act as an occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to:

- a geographically distinct regional population, or collection of local populations, or
- a population, or collection of local populations, that occurs within a particular bioregion

Project Area – the approximate extent of proposed surface development at the Atlas-Campaspe Mine and Ivanhoe Rail Facility.

Proposed offset area – the area proposed for the offset.

Risk of extinction – the likelihood that the local population (of a threatened species, or the local occurrence of an ecological community) would become extinct either in the short-term *or* in the long-term as a result of direct or indirect impacts on the viability of that population, and/or the function of the ecological community.

Significant – important, notable or of consequence having regard to its context or intensity.

Stratum (plural strata) – A more or less distinct layer within a stand of vegetation - for example ground layer, understorey, canopy, emergent.

Structure – the structure of a plant community is the three dimensional distribution of biomass within the community (the strata).

Viable – the capacity to successfully complete each stage of the life cycle under normal conditions.

1.6 Authorship and acknowledgements

Field surveys for this assessment were performed by four botanists Belinda Pellow, Dr John Hunter, Dr Dorothy Bell, and James Bevan. Plant identification was performed by Belinda Pellow, Dr John Hunter, Dr Dorothy Bell and James Bevan with samples confirmed as required by the NSW Herbarium. Data analyses and vegetation mapping were performed by Belinda Pellow and Dr John Hunter. This report was prepared by Belinda Pellow and James Bevan, with assistance from Melina Budden, and editing and advice provided by AMBS Senior Project Manager Glenn Muir.

2 Existing Environment

2.1 Regional setting

2.1.1 *Bioregion*

The Project is located within the Murray Darling Depression Biogeographic Region, which occurs in south-western NSW, north-western Victoria and south-eastern South Australia. The Project area is located within the north-eastern (NSW) portion of the bioregion, which contains few town centres. The Murray Darling Depression Bioregion includes the catchments of the Murray, Murrumbidgee, Lachlan, Darling, Barwon, and Yanda Rivers.

The Murray Darling Depression Bioregion is bordered to the north by the Broken Hill Complex Bioregion, with the Cobar Peneplain to the northeast and the Riverina Bioregion to the east. The Murray Darling Depression Bioregion also borders the Darling Riverine Plains Bioregion to the north-west.

Conservation-oriented mechanisms, such as Nature Reserves, National Parks, conservation reserves and historic sites, occupy 421,082 hectares (ha) or 5.25 percent (%) of the Bioregion (OEH, 2012b). National Parks and Nature Reserves (under the NSW *National Parks and Wildlife Act 1974* [NPW Act]) make the greatest contribution to the area conserved, occupying 279,343 ha, or about 3.48% of the Bioregion. The Willandra Lakes Region World Heritage Area, which occupies approximately 240,000 ha or almost 3% of the Bioregion, is included on the internationally recognised World Heritage List. About 10% of the Willandra Lakes Region World Heritage Area is in Mungo National Park.

2.1.2 *Botanical region*

The state of NSW is divided into 13 botanical regions. The NSW Herbarium provides information on the regions in which plant species have been collected. The study areas for the Project are located in the following botanical regions (Harden 1990 – 2002):

- South Western Plains (SWP) – Ivanhoe Rail Facility.
- South Far Western Plains (SFWP) – Atlas-Campaspe Mine.

2.1.3 *Catchment Management Authority region*

The Atlas-Campaspe Mine is located within the Lower Murray-Darling CMA, which has an area of some 6.3 million hectares and extends from Broken Hill in the north to the Murray River in the south, the South Australian border in the west and the Murray/Murrumbidgee junction in the east (Lower Murray-Darling CMA 2012). The Ivanhoe Rail Facility is located in the Lachlan CMA, which has an area of some 8.7 million ha and extends westwards from the Great Dividing Range and adjoins the Lower Murray Darling Catchment (Lachlan CMA 2012).

The Murrumbidgee, Lachlan and Darling Rivers are significant regional surface water features. The Murrumbidgee, at its closest point, is located approximately 64 km southeast of the Atlas-Campaspe Mine and the Darling River some 81 km to the west. The Murrumbidgee, Lachlan and Darling Rivers drain generally south to the Murray River.

The Willandra Lakes Region World Heritage Area extends from between Spring Hill and Mulurulu (approximately 50 km north of Boree Plains) south-west to Mungo Station (33km west of Boree Plains) and further south to Prungle (68 km south-west of Boree Plains) (SEWPaC 2008). It encompasses a series of interconnected dry lake beds.

2.2 Geology

The Murray Darling Basin is a large sedimentary basin covering approximately 300,000 square kilometres (km^2) extending across the borders of NSW, Victoria, Queensland and South Australia. A number of large scale ridges and basins form the pre-Tertiary basement profile, over which the relatively flat lying Tertiary and Quaternary sediments of the Murray Basin have formed within which the Atlas-Campaspe Mine is located (GEO-ENG 2013). The main structural feature of the area is the Ivanhoe Block, which is defined by the south-west to north-east trending Iona and Neckarboo basement ridges. The Willandra Trough exists as a basement low between these ridges and continues to the north-east as the Willandra Creek Depression. The Atlas-Campaspe Mine is located in the east of the Ivanhoe Block.

The Murray Basin contains mineral sands deposits within the Loxton-Parilla Sands host unit, a sequence of weakly consolidated, near horizontally bedded sands that were deposited during marine transgressions and regressions in the Late Miocene to Late Pliocene period (Ogyris 2012).

The Lower Loxton-Parilla Sands are typically overlain by barren sand of the Upper Loxton-Parilla Sand unit. The Shepparton Formation overlies the Upper Loxton-Parilla Sands and is a sandy clay unit with thick layers of clay. The Shepparton Formation can outcrop in places, but is generally overlain by a thin layer of the Woorinen Formation consisting of a wide range of soil textures from sandy loam to clay loam (Ogyris 2012).

2.3 Soils

2.3.1 *Atlas-Campaspe Mine*

The Atlas-Campaspe Mine study area contains the following Land Systems (Walker 1991):

- Mandelman;
- Arumpo;
- Wilkurra;
- Bulgamurra; and
- Marona.

The following soil types associated with these Land Systems occur within the study area:

- dunes of deep siliceous and brownish sands and earthy or calcareous sands;
- sandplains of solonised brown soils and calcareous red earths, or highly calcareous salinised brown soils;
- swales of highly calcareous solonised brown soils and texture-contrast soils;
- depressions of grey cracking clays;
- lakes of saline, gypseous or calcareous clays; and
- lunettes and dunes of deep earthy sands.

2.3.2 *Roadworks along the MCTR*

The section of road along the MCTR that would be subject to roadworks contain the following Land Systems (Walker 1991):

- Mulurulu;
- Youhl;
- Hatfield;
- Marma; and
- Wilkurra.

The following soil types associated with these Land Systems occur within the study area:

- dunes with deep brownish sands;
- plains and flats with highly calcareous salinised brown soils or red sandy earths, or solonised brown soils and red and brown texture-contrast soils;
- depressions or floodplains or grey cracking clays;
- lakebeds of grey clacking clays and red texture-contrast soils;
- lunettes of saline or compact clays, or calcareous red earthy sands and red earths; and
- levees of red and yellow texture-contrast soils and grey cracking clays.

2.3.3 *Ivanhoe Rail Facility*

The Ivanhoe Rail Facility study area contains the Hatfield and Manara Land Systems (Walker 1991).

The following soil types associated with this Land System occur within the study area:

- plains of solonised brown soils, red and brown texture-contrast soils and red earths;
- dunes of deep brownish sands; and
- depressions of grey clays.

2.4 Landform

Development of landforms within the Murray Basin is strongly related to climatic variation and interactions between fluctuating saline ground waters and surface geomorphic processes. Processes of Aeolian dune fields, groundwater discharge complexes, gypseous sediments clay lunettes and bed-load channel sands were activated by glacial aridity. Sand availability has been the dominant controlling factor in the distribution of dune fields, with climatic conditions initiating and reactivating the dune fields. Wetter inter-glacial periods provided vegetation-stabilised landforms, suspended load channel sediments and sand-dominated lunettes (Kingham 1998).

The Project area primarily comprises semi-arid vegetation occurring on tertiary and recent age (60 million years ago to present) sediments. The geomorphology of the area consists primarily of Aeolian dune fields and sandplains overlaying clay. Soils are of red and orange sands in the dune fields and sandplains to grey, brown or red calcareous clay sediments that underlie the sand deposits and are exposed in low-lying areas and depressions (Porteners et al. 1997). The dunes, which occupy a considerable proportion of the area, are relatively low in height, with gentle slopes; however, some higher, steep-sided dunes occasionally occur. The sandplains consist of a thin ‘veneer’ of sand overlaying the clays.

2.5 Climate

Long-term, monthly average daily maximum and minimum temperatures from the Pooncarie Mail Agency, Balranald (RSL) and Ivanhoe Post Office meteorological stations show that temperatures are warmest from November to March and coolest in the winter months of June, July and August (Table 1) (Bureau of Meteorology [BoM] 2012).

The long-term average annual rainfall at meteorological stations proximal to (i.e. less than approximately 50 km) from the Atlas-Campaspe Mine varies from approximately 268 millimetres (mm) at the Pooncarie (Top Hut) meteorological station to approximately 323 mm at the Oxley (Walmer Downs) meteorological station (Table 1).

Average monthly rainfall is relatively uniform throughout the year and no seasonal variation is obvious (Table 1).

Table 1. Average climate statistics.

Period of Record	Average Daily Temperature (°C)[1] [Minimum-Maximum]			Average Monthly Rainfall (mm)[1]									Average Monthly Evaporation (mm)[1,2]	
	Pooncarie Mail Agency [47029]	Balranald (RSL) [49002]	Ivanhoe Post Office [49019]	Hatfield (Clare) [49008]	Euston (Turlee) [49111]	Hatfield (The Vale) [49047]	Hatfield (Benikie) [49049]	Pooncarie (Mulurulu) [47024]	Pooncarie (Top Hut) [47018]	Oxley (Walmer Downs) [49055]	Ivanhoe (Kilfera) [49063]	Ivanhoe Post Office [49019]	Menindee Post Office [47019]	Mildura Airport [76031]
	1882-2012	1879-2012	1884-2012	1873-2012	1960-2012	1924-2012	1876-2012	1882-2012	1920-2012	1922-2012	1872-2012	1884-2012	1968-2012	1965-2012
January	33.4-38.5	29.5-38.1	29.5-39.5	25.6	33.1	28.0	23.6	24.0	22.9	28.2	20.7	30.0	332.6	328.6
February	31.8-37.0	28.6-37.1	30.1-38.4	25.9	22.7	24.7	25.0	22.7	27.0	29.4	29.0	28.4	268.3	274.0
March	27.6-33.4	25.3-33.8	26.3-37.6	27.4	21.2	24.1	22.1	23.2	20.1	24.9	24.5	29.8	225.1	229.4
April	22.9-30.0	16.3-28.6	22.1-31.2	21.5	20.1	20.4	18.9	19.1	16.7	23.0	19.4	19.1	143.1	141.0
May	18.8-23.4	16.4-23.3	17.1-23.6	29.0	24.9	25.5	27.9	29.0	22.7	29.1	27.7	27.1	85.3	83.7
June	14.8-18.5	13.2-20.0	14.8-19	26.1	20.2	24.0	25.6	25.7	19.7	26.6	27.6	26.6	57.7	57.0
July	16.0-19.6	12.4-21.0	13.7-19.5	22.9	25.1	21.6	21.6	21.8	23.5	26.1	20.1	22.9	64.7	62.0
August	16.8-21.4	14.7-25.4	15.8-23.4	24.0	25.8	23.7	24.0	23.8	22.5	26.1	22.7	23.5	99.5	93.0
September	20.5-24.7	16.9-24.9	18.5-25.8	22.9	24.8	21.2	22.7	23.4	19.7	22.8	22.4	22.2	147.0	138.0
October	23.3-28.9	19.8-30.0	21.9-30.2	26.6	28.1	28.2	27.2	26.7	29.1	31.9	25.6	28.6	212.2	201.5
November	27.2-33.9	23.4-32.8	25.2-35.1	23.7	25.9	25.0	23.2	23.2	19.3	26.1	25.3	24.0	260.4	255.0
December	30.9-35.4	24.5-34.9	29.5-37.1	22.0	22.9	22.5	21.8	23.7	20.8	26.4	20.6	26.1	319.9	310.0
***Average Annual**	**25.1-26.9**	**22.1-26.6**	**24.8-28.1**	**299 [297.6]**	**300 [294.8]**	**286 [288.9]**	**281 [283.6]**	**282 [286.3]**	**268 [264]**	**323 [320.6]**	**284.0 [285.6]**	**306 [308.3]**	**2,208.0 [2,215.8]**	**2,190.0 [2,173.2]**

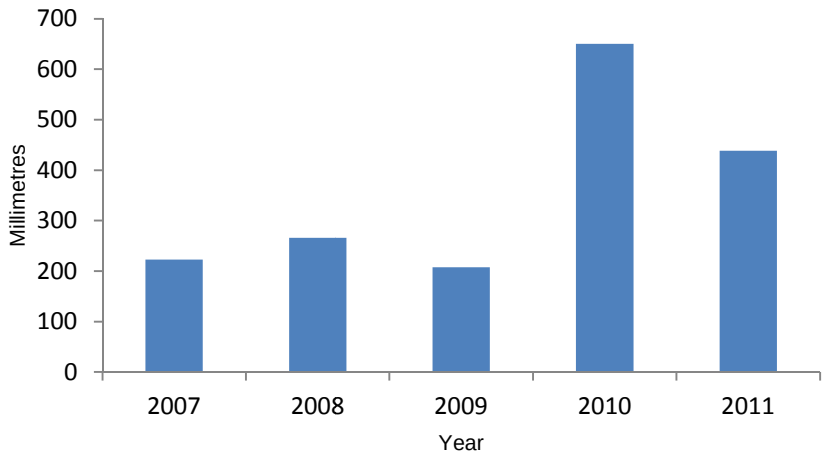
[1] Source: BoM (2012)
[2] As measured by Class A Evaporation Pan
°C degrees Celsius
AWS automatic weather station
* Monthly rainfall provided as total of rounded average figures and [total of average raw figures]

Based on an analysis by Evans & Peck (2012) of the Hatfield (Clare) meteorological station rainfall data (which has 140 years of complete records), the data shows that long-term droughts are a feature of the climate of the area. In particular (Evans & Peck 2012):

- an extended drought occurred between about 1880 and 1900;
- a further extended drought occurred between about 1930 to 1950;
- since 1950, rainfall has generally been above the long-term average with the exception of droughts in the late 1960's and from 2000 to the end of 2009; and
- rainfall has been significantly above average since 2010 with 650 mm of rainfall in that year and 440 mm in 2011, which is evident by water ponding in low-lying areas surrounding the Atlas-Campaspe Mine site.

The above is also supported by the fact that the nearest BoM meteorological station to the Atlas-Campaspe Mine site (Euston [Turlee]) recorded its highest daily total of 110 mm on 14 January 2011 in 53 years of record (BoM, 2012).

As shown in Graph 1, over the two years prior to this assessment (i.e. 2010 and 2011), the region received approximately double the annual average rainfall. In comparison, in the three preceding years (i.e. 2007, 2008 and 2009) only 222 mm, 266 mm and 207 mm of rainfall was recorded, respectively (Graph 1) (BoM, 2012). This resulted in ideal conditions during the survey period.



Source: BoM, 2012

Graph 1: Annual rainfall in the years preceding the field surveys – Hatfield (Clare) Meteorological Station.

Long-term evaporation records are available from the Menindee Post Office and Mildura Airport meteorological stations, which have recorded an average annual evaporation of approximately 2,208 and 2,190 mm, respectively (Table 1).

The highest monthly-average evaporation is in January (332.6 and 328.6 mm at Menindee Post Office and Mildura Airport, respectively) (Table 1). The lowest monthly evaporation is in June (57.7 and 57.0 mm for Menindee Post Office and Mildura Airport, respectively) (Table 1).

Based on the available datasets, measured monthly-average evaporation exceeds the measured monthly-average rainfall in all months (Table 1).

Based on an analysis by Evans & Peck (2012) of the Menindee DWR Depot meteorological station daily pan evaporation data recorded since 1968, and use of monthly potential evapotranspiration derived from the electronic spatial data on the BoM dataset *Climatic Atlas of Australia – Evapotranspiration*, the following conclusions were made (Evans & Peck 2012):

- Net open water evaporation in excess of 1.5 m per year can be expected. Accordingly, any runoff collected in the shallow depressions that characterise the landscape can be expected to evaporate rapidly.
- Potential evapotranspiration from vegetation exceeds the average rainfall in each month. Under these conditions, vegetation is under continual water stress and actual evapotranspiration is governed by the ability of vegetation to access moisture deep in the soil profile.

2.6 Hydrology

The Atlas-Campaspe Mine is located within the Benanee basin of the lower Murray River system in NSW. The Benanee basin borders the upstream effluent creeks of the Lachlan River basin, Darling and Murrumbidgee River basins, and the downstream Murray River basin. The Benanee basin is made up of a number of ill-defined creeks, streams and ephemeral lakes that contribute negligible inflows to the Murray River (GEO-ENG 2013).

The Atlas-Campaspe Mine site is located approximately mid-way between two ill-defined drainage systems (Evans & Peck 2012):

- The Willandra Creek and Willandra Lakes system (to the north and west of the Atlas-Campaspe Mine site) which contains numerous dry lakes (Mulurulu, Garnpung, Learhur, Mungo and Chibnalwood) draining from north-east to south-west.
- The Arumpo Creek and Prungle Lakes system (to the east and south of the Atlas-Campaspe Mine site) which also drains from north-east to south-west.

The regional surface drainage in the vicinity of the Atlas-Campaspe Mine occurs by overland flow from north-east towards the south-west. The Atlas-Campaspe Mine site contains no defined water courses other than a few minor drainage lines that drain from the south-eastern end of the Campaspe deposit towards a relic lake depression (Evans & Peck 2012).

The Atlas-Campaspe Mine area is located in a region with a semi-arid climate of low and sporadic rainfall and high evaporation. Long-term droughts are a feature of the climate of the area (Evans & Peck 2012). Rainfall has been significantly above average since 2010 with 650 mm of rainfall in that year and 440 mm in 2011, which is evident by water ponding in low-lying areas surrounding the Atlas-Campaspe Mine site (Evans & Peck 2012) and within the mine site.

Temporary ponding of rainfall occurs in localised topographic depressions where rainfall runoff is concentrated and the surficial soils have low permeability. These locations are isolated and do not contribute to any significant surface water system. Drainage from these locations is limited due to the low-permeability surface soils and the majority of the water eventually dissipates by evaporation (GEO-ENG 2013).

Where sandy layers occur the upper layer (sand) drains fast down to lower layer (clay). Water collects on the clay and persists after rain on numerous clay-based run-on depressions and gilgai. A series of such depressions occurs in an approximately north-south direction to the south-east of the Campaspe footprint (Evans & Peck 2012).

Two large clay-based depressions are located in the close surround; one on the very edge of and partially within (9 ha) the Campaspe footprint and one approximately 2.5km to the south-southeast of the Campaspe footprint (described further in Section 5 – see Black Box Woodland in Section 5.1.7). Both depressions are located on or beside the 'local topographic low point' or area in which surface flow would disperse into and collect during significant rain events (Evans & Peck 2012). Any runoff from the mine areas that filled the local depressions would flow predominantly in a south-south-easterly direction, following a series of large basin-like depressions that can be over 20 m in depth (Evans & Peck 2012).

There are no existing permanent surface water features at the proposed Atlas-Campaspe Mine (i.e. no groundwater window lakes fed by the deep underlying saline groundwater aquifer). Therefore, no impacts on any surface water baseflows are predicted (GEO-ENG 2013).

The groundwater table is associated with the underlying saline groundwater systems (ranging from approximately 10 m to 30 m below ground level) and generally sits within the shallow Shepparton Formation or underlying Loxton-Parilla Sands (GEO-ENG 2013). The region is characterised by low-gradient groundwater flow from east to west (GEO-ENG 2013).

Water sampling from the test bore at Atlas-Campaspe Mine site indicates a salinity of about 32,000 mg/L (equivalent to approximately 58 ds/m) (GEO-ENG 2013).

The Ivanhoe Rail Facility study area is located approximately 22 km north of Willandra Creek in the north-west corner of the area designated as the aquatic ecological community in the natural drainage system of the lowland catchment of the Lachlan River (DPI 2006). Temporary ponding of rainfall occurs in two localised topographic depressions located 0.5 km to the east between the study area and the Balranald Road. Groundwater is not a factor relevant to the Ivanhoe Rail Facility as no groundwater is proposed to be extracted at the facility.

2.7 Fire history

The only fires known to have occurred within the Atlas-Campaspe Mine and surrounding area are extensive fires during 1974-75 and a more recent, smaller fire to the north part of the Atlas-Campaspe Mine. In 1974-75 large fires burnt out much of the mallee vegetation in the Balranald, Wentworth, Central Darling and Cobar Shires (NPWS 2006; Noble 1989). A smaller fire occurred in the mallee to the north of the study area about 10-12 years ago (Caretaker Boree Plains station, pers., comm. 2012) and its approximate extent can still be seen on satellite imagery.

2.8 Land use

2.8.1 *Current land use*

The land where the Atlas-Campaspe Mine is proposed to be developed has been used for sheep and cattle grazing for the past 100 years. Some sections of land have also been cropped, and feral goats are periodically herded and sold for their meat. In the past properties have been fenced using local timbers, primarily Cypress Pine (*Callitris* spp.) for fence posts. Water is obtained through bores to groundwater aquifers to maintain stock numbers and rough tracks have been cut to facilitate vehicular access to tanks and fencing.

In 2011 a drilling program located within Exploration Licence 5359, was undertake focusing on the MLA. Drill lines were established across the survey area using a small front end loader 4WD tractor with a scrub blade to push aside vegetation (Bemax 2011). Drill lines were placed to avoid removal of large trees (Bemax 2011). A path of between 6-8m wide and up to 300m in length was cleared depending on the section.

The 203,000 ha Gol Gol Station (including Lake Mungo) was established in the 1860s. The property was purchased by the NSW National Parks and Wildlife Service (NPWS) in 1978, and now forms part of Mungo National Park and the Willandra Lakes Region World Heritage Area.

The Ivanhoe Rail Facility study area is currently being used for stock grazing. Large parts of this area have been cleared in the past.

2.8.2 *Current tenure*

Land on which the Atlas-Campaspe Mine and Ivanhoe Rail Facility are proposed to be developed consists of leasehold tenure as Western Lands Leases through the NSW *Western Lands Act 1901*. The MCTR roadworks footprint occurs on land consisting of leasehold and freehold land. A travelling stock route is located between 1 and 5 km to the south of the Atlas-Campaspe Mine Area.

3 Methods

3.1 Desktop review

3.1.1 *Atlas of NSW Wildlife and EPBC protected matters database assessments*

Background data searches for potentially occurring threatened flora and listed EECs were undertaken prior to the field assessment using the NSW Office of Environment and Heritage (OEH) Atlas of NSW Wildlife (OEH 2012a) and the Commonwealth Department of Sustainability, Environment, Water, Population and Communities' (SEWPaC) Protected Matters Search Tool (SEWPaC 2011). An area bounded by the following coordinates was defined for the searches, -34.178 142.934;-32.547 142.921;-32.307 145.032;-34.313 145.111;-34.178 142.934.

All previous threatened flora records from the locality were mapped. Habitat requirements and appropriate survey times for flora known to occur within the broad district of the study area were identified using the Threatened Species Profile Database (OEH 2011a). To refine appropriate survey times and potential habitat requirements for the threatened species further information was obtained from PlantNET (The Botanic Gardens and Domain Trust 2012), NSW Herbarium records and relevant listing advice provided by SEWPaC (2012a). A list of threatened plant species known or considered likely to occur within the study area was prepared using this information.

3.1.2 *Literature review*

The following key publications and reports were referred to in the preparation of this report and associated surveys. A full list of references is provided at the end of this report.

Previous Flora Surveys and Vegetation Mapping

- *Present Day Vegetation Communities* (Lower Murray Darling CMA 2009).
- *The Pre-clearing Natural Vegetation of the Southern Mallee Planning Region* (Val 2001).
- *Vegetation map of Western NSW* (Beadle 1945).
- *The Vegetation and Pastures of Western NSW with Special Reference to Soil Erosion* (Beadle 1948).
- *NSW Vegetation Classification and Assessment: Part 1 Plant Communities of the 383 NSW Western Plains* (Benson et al. 2006).
- *Murray Darling Basin M305 Structural Vegetation Layer VIS ID 917* (DECCW 2011)
- *Vegetation of the Ana Branch – Mildura 1:250,000 Map Sheet* (Fox 1991).
- *Ocean Shores to Desert Dunes: The Native Vegetation of NSW and the ACT* (Keith 2006).
- *Multivariate analysis of the semi-arid vegetation in south-eastern Australia: nodal ordination by component analysis* (Noy-Meir 1971).
- *The natural vegetation of north-western NSW: notes to accompany the 1:1000000 vegetation map sheet* (Pickard and Norris 1994).
- *The natural vegetation of the Hay Plain: Booligal-Hay and Deniliquin-Bendigo 1:250 000 maps.* (Porteners 1993).
- *Mungo National Park threatened Acacia Shrubland survey* (Porteners 2001).
- *The natural vegetation of the Pooncarie 1:250,000 map* (Porteners et al. 1997).
- *The natural vegetation of the Balranald-Swan Hill Area* (Scott 1992).
- *The vegetation of Mungo National Park Western New South Wales* (Westbrooke and Miller 1995).

Legal and Policy Documents

- *State Significant Development – Director-General's Requirements Atlas–Campaspe Mineral Sands Project* (DP&I 2012).
- *Balranald Shire Council Local Environment Plan* (Balranald Shire Council 2010).
- *Central Darling Council Local Environment Plan* (Central Darling Shire Council 2004).
- *Noxious weeds declaration* (NSW DPI 2012).
- NSW *Fisheries Management Act* (DPI 1994).
- *NSW State Groundwater Policy Framework Document* (DLWC 1997).
- *NSW State Groundwater Dependant Ecosystems Policy* (DLWC 2002).

Other Documents

- *Wampo Station Draft Voluntary Property Agreement under the Native Vegetation Conservation Act 1997* (Anon 1998).
- *Boree Plains Land Use Agreement. Environmental Assessment* (Anon 2002).
- *Atlas-Campaspe Mineral Sands Project EPBC Referral* (Bemax 2012b).
- *Flora and Fauna Baseline Studies Balranald Mineral Sands Project – Nepean Deposit Near Balranald NSW* (Ecotone Ecological Consultants 2012a).
- *Flora and Fauna Baseline Studies Balranald Mineral Sands Project – West Balranald Deposit, Balranald NSW* (Ecotone Ecological Consultants 2012b).
- *Mungo National Park Plan of Management* (DEC 2006).
- *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities* (Working Draft) (DEC 2004).
- *Threatened Species Assessment guidelines: the Assessment of Significance* (DECC 2007).
- *Biodiversity Survey of the Lower Murray Darling* (Val et al. 2001).
- *Native Vegetation Interim Type Standard* (Sivertsen 2009).
- *Western Lands Lease Management Plan – Wampo* (Soil Conservation Service 1974).
- *Western Lands Lease Management Plan – Boree Plains* (Soil Conservation Service 1977).
- *Western Lands Lease Management Plan – Carawatha & Topra Plains* (Soil Conservation Service 1981).

3.2 Field surveys

3.2.1 *Survey area units*

The study area is composed of the following survey units:

1. **The Atlas-Campaspe Mine study area.** This unit is represented by the mining lease area which encompasses the approximate extent of surface development for the Atlas-Campaspe Mine (Figure 2). This area is composed primarily of the semi-arid woodland vegetation formation (Keith 2006).

2. **The study area for Roadworks along the MCTR.** This unit is represented by a corridor which follows an already established roadway from the base of the Atlas footprint to the Balranald-Ivanhoe Road and includes the Link Road, Boree Plains-Gol Gol Road, Magenta Road and the Hatfield – The Vale Road. In three corner sections new roadway would be constructed to round off corners (Figure 3). The survey corridor was 40 m either side of the established roadway except at the location of the corners, where larger areas were surveyed (Figure 3). The area of direct impact is expected to be 12.5 m either side of a centre line along the established roadway or a 25 m corridor for the new roadway at each corner. This unit is composed primarily of the arid shrublands vegetation formation (Keith 2006).

3. **The study area for the Ivanhoe Rail Facility.** This unit is located adjacent to the railway line at Ivanhoe approximately 200 km north east of the Atlas-Campaspe Mine study area (Figure 4).

Vegetation surveys were also conducted in an area located directly to the west of the Atlas-Campaspe Mine study area. The results from the survey are provided in a separate report (Appendix A). A summary of these results are used to describe the proposed offset area later in this report (Section 8). This area is composed primarily of the semi-arid woodland vegetation formation (Keith 2006).

3.2.2 *Desktop stratification for vegetation surveys*

The Atlas-Campaspe Mine and MCTR study areas were assessed for field survey design utilising aerial imagery and information obtained during the preliminary field work in May 2011. Full floristic survey sites (Appendix B) were placed to sample the major environmental parameters across the study area according to current NSW survey guidelines (DEC 2004; Sivertsen 2009). Stratification was undertaken using soil type, topography, disturbance history based on preliminary field work, previous mapping (Porteners et al. 1997; Mitchell 2002; Eco Logical Australia 2008) and aerial imagery. Whenever possible survey sites were located along transects utilised for the threatened flora searches.

Aerial photograph interpretation, identification of known soil systems (Walker 1991) and previous regional vegetation mapping for the Ivanhoe Rail Facility study area were used during desktop assessment. Previous vegetation mapping of the Ivanhoe Rail Facility study area (DECCW 2011) was overlayed in ArcGIS to indicate likely vegetation types.

3.2.3 *Timing of surveys*

The study area for Atlas-Campaspe Mine, roadworks along the MCTR, and proposed offset area were surveyed over a period from May 2011 to April 2012 by two teams of two botanists. The timing of each survey is provided in Table 2. A survey of the Ivanhoe Rail Facility study area was undertaken in October 2012. A further threatened flora survey was undertaken in October 2012 (FloraSearch 2012).

Table 2. Timing of flora field surveys within the study area.

Date	Study Area	Activities
11 - 14 May 2011	Atlas-Campaspe Mine	Full floristics surveys; preliminary assessment of vegetation condition.
1 - 12 November 2011	Atlas-Campaspe Mine Proposed offset area	Threatened flora searches; full floristic surveys; vegetation condition assessment. Targeted searches for *Lepidium monoplocoides* (Winged Peppercress) in potential habitat in proposed offset area.
6 - 15 December 2011	Atlas-Campaspe Mine Proposed offset area	Verification of map units. Rapid data point assessment (RDP); full floristic surveys as required; opportunistic threatened flora searches.
1 - 6 February 2012	Roadwork's along the MCTR Proposed offset area	Threatened flora searches; full floristic surveys; vegetation condition assessment. Verification of map units.
24 - 29 April 2012	Roadwork's along the MCTR Proposed offset area	Threatened flora searches; full floristic surveys; vegetation condition assessment. RDP; full floristic surveys as required; opportunistic threatened flora searches.
3 – 4 October 2012	Ivanhoe Rail Facility	Threatened flora searches; full floristic surveys; vegetation condition assessment.
15 – 19 October 2012	Atlas-Campaspe Mine Proposed offset area	Threatened flora search.

3.2.4 *Indigenous and introduced flora*

Species records for the study area were predominately made via full floristic survey plots. During traverses to and from sites or when undertaking threatened flora transects opportunistic records were made of any species encountered that had not already been observed in full floristic survey plots.

3.2.5 *Searches for threatened species*

Threatened flora searches were undertaken in November 2011 and October 2012 (FloraSearch 2012) within the Atlas-Campaspe Mine study area. Where possible, it is preferable if searches for threatened flora occur when the target species is expected to be flowering to facilitate location and identification. Research on the OEH Threatened Species Profile Database indicated that November/December is suitable survey timing for most of the threatened flora species that may potentially occur in the study area (Section 4.1.1). Significant rainfall prior to November 2011 was also expected to result in flowering of ephemeral species usually only observed after such rainfall events.

Targeted searches were conducted in potential habitat identified via preliminary vegetation surveys undertaken in May 2011 and aerial photo interpretation using a sampling design based on the NSW *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities* (DEC 2004). Commonly such searches involve 30 minute searches within and in the immediate vicinity of the location of a survey plot (DEC 2004). Due to the size of the Atlas-Campaspe study area, its location in a semi-arid landscape and the patchy nature of vegetation/habitat which can change quickly over short distances it was considered that the use of transects would result in a better coverage of potential habitats. Recent research has found that using a series of transects to locate species in a vast landscape can be a more efficient way to detect targeted species (Rew et al. 2006).

The location of each transect was based on vegetation structure, topography, and available access. Transects covered all potential habitats in multiple locations and were between 0.6 and 2 km long. The location of each transect was plotted prior to field work and each was located and traversed in the field using a Global Positioning System (GPS) (Figure 5). Each transect was walked by two botanists at a distance of between 10 and 20 m from each other.

When a threatened flora population was located the following information was recorded:

- the location;
- the extent of each occurrence;
- population counts or estimates utilising 100 x 20 m transects;
- notes on condition, reproductive state and habitat; and
- a photographic record of the species and habitat made.

Targets searches for *Lepidium monoplocoides* were also undertaken after the recording of this species within the Atlas-Campaspe study area. Identified habitat was randomly searched at 43 locations within the Atlas-Campaspe study area and surrounds using 100 x 20 m transects.

Threatened flora searches in the study area for the roadwork's along the MCTR were also conducted using transects in February and April 2012. Transects were adapted to fit the narrow survey area. Transects were a total of 600 m long with 300 m being surveyed on one side of the road and the other 300 m surveyed on the opposite side of the road (Figure 6). Transects were placed approximately 1 to 1.5 km apart along the corridor.

Threatened flora searches of the Ivanhoe Rail Facility study area were undertaken in October 2012 using the method described above for the Atlas-Campaspe Mine study area (Figure 7).

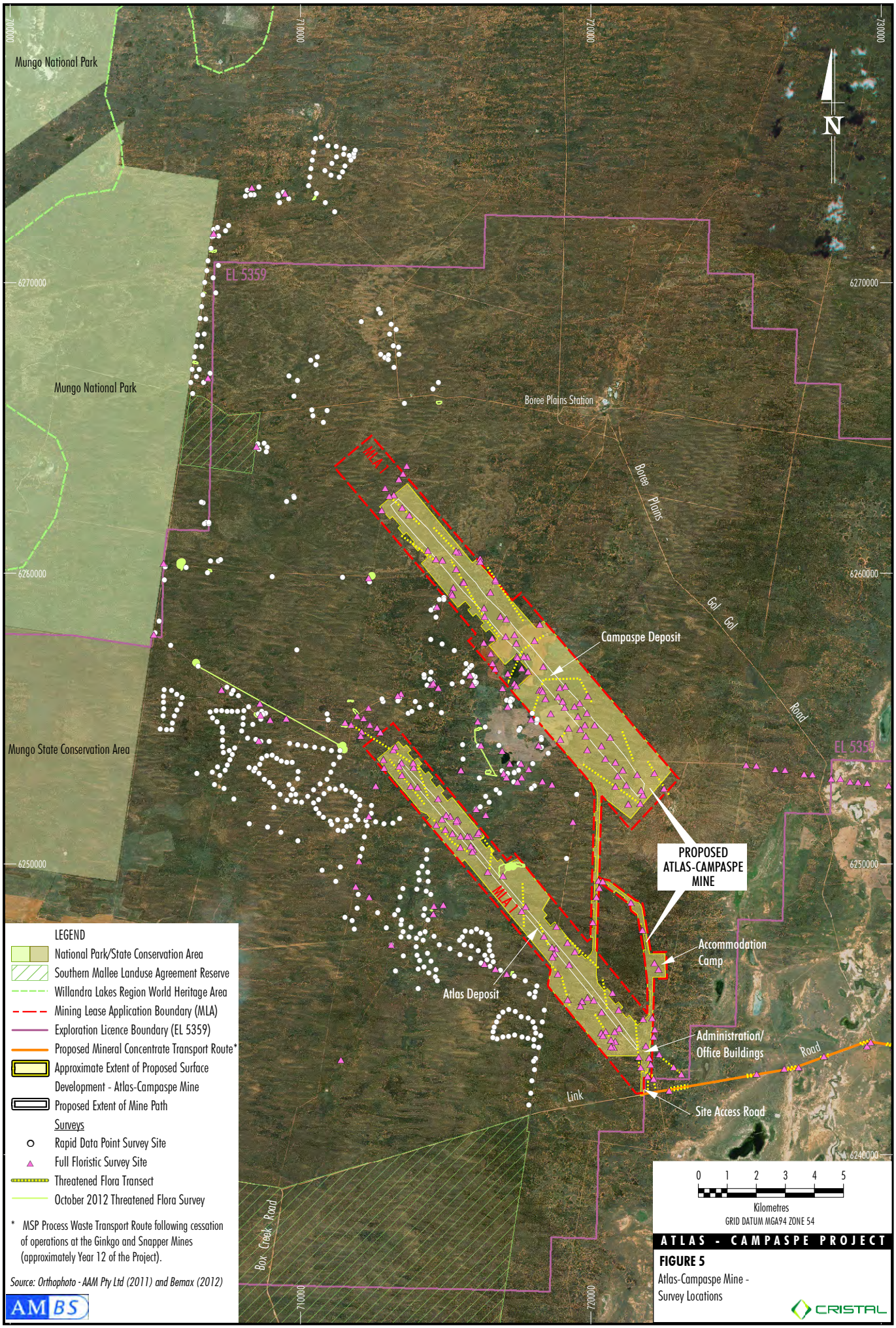
3.2.6 *Full floristic plots*

The field survey for vegetation community definition and mapping comprised full floristic survey plots (20 x 20 m) in accordance with current NSW survey guidelines (DEC 2004; Sivertsen 2009) and opportunistic observations. Field surveys for the Atlas-Campaspe Mine study area (Figure 5) and MCTR study area (Figure 6) were completed in two stages:

- a survey to provide a preliminary map of vegetation types and condition assessment (May 2011); and
- a comprehensive survey to map vegetation communities and conduct condition assessments (November 2011 for the Atlas-Campaspe Mine study area, February and April 2012 for the MCTR roadworks study area).

Full floristic plots were surveyed in the Ivanhoe Rail Facility study area in October 2012 (Figure 7).

Within the full floristic plots all vascular plant species rooted in, or overhanging a 20m x 20 m quadrat were identified and recorded. A cover/abundance estimate was assigned to each species based on a modified Braun-Blanquet scale (Table 3). Details of location, physiographic and soil features were recorded at each site. Vegetation structure was described by estimating the height and cover of each recognizable horizontal stratum of trees, shrubs and ground vegetation. Information for the determination of the type and severity of disturbance at each site was also recorded (see Section 3.2.8). Species were identified in the field or collected and identified in the laboratory. Specimens requiring further identification/confirmation were sent to the NSW Herbarium.



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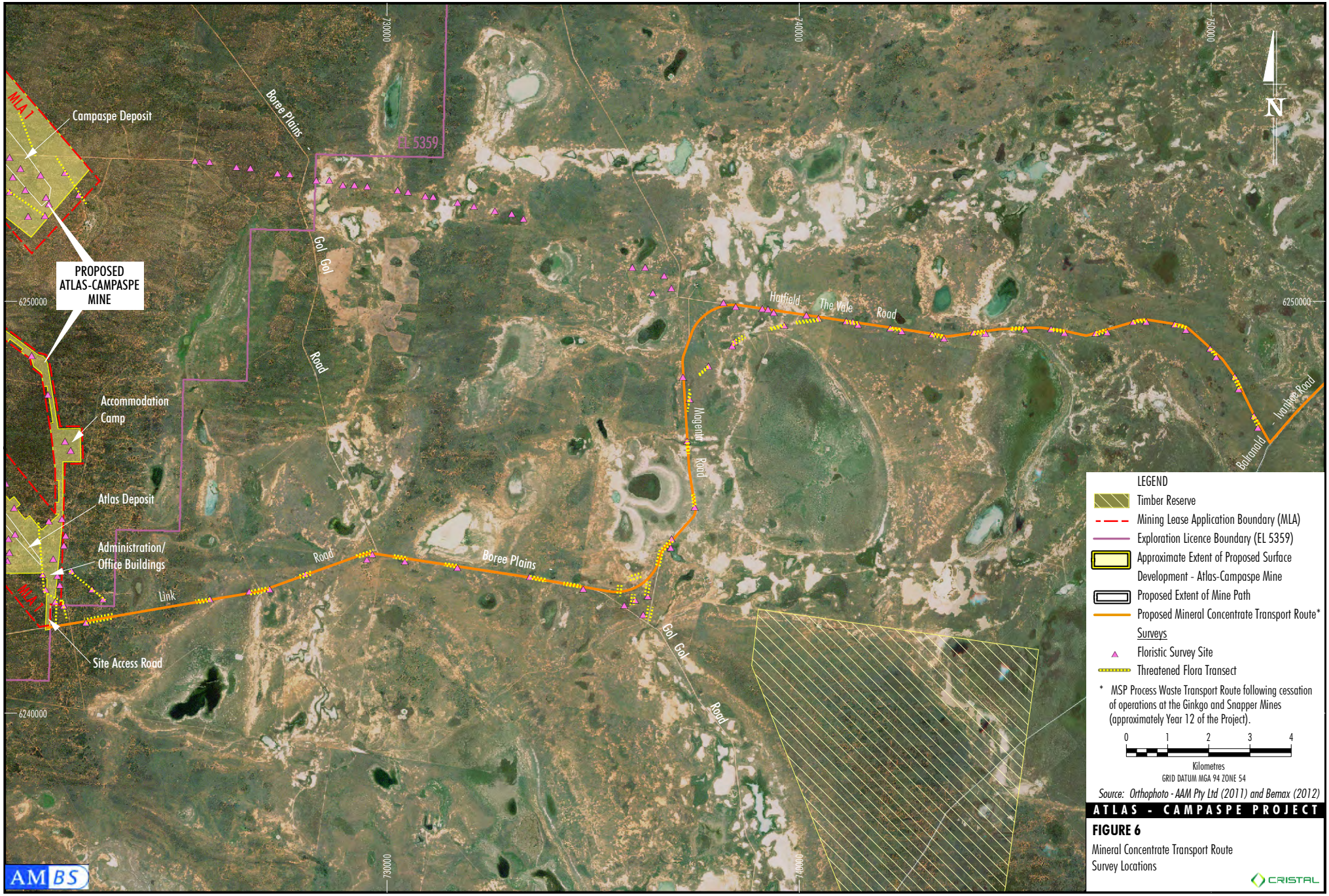

ATLAS - CAMPASPE PROJECT

FIGURE 6

Mineral Concentrate Transport Route
Survey Locations

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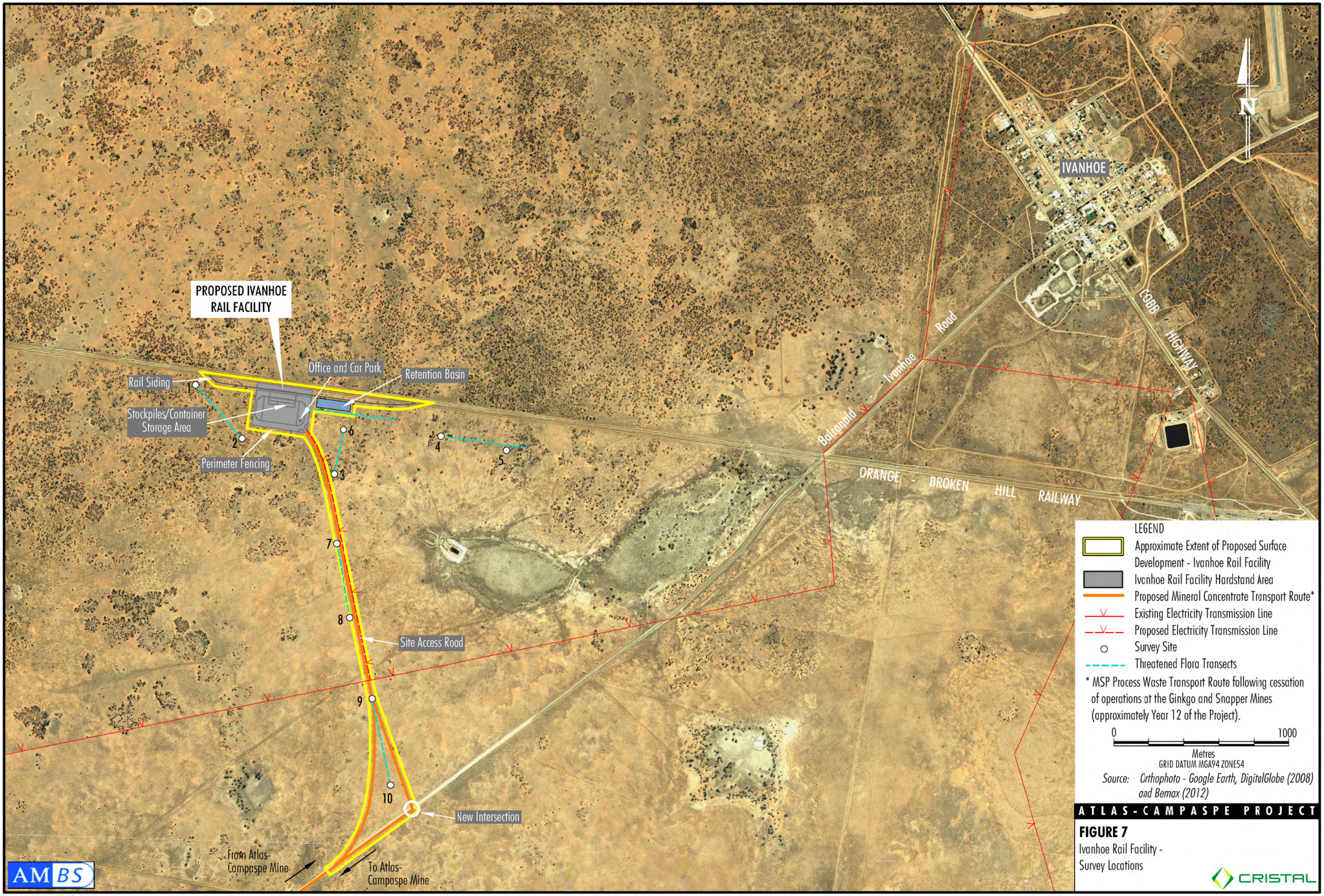

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Table 3. Modified Braun-Blanquet scale.

Cover Score	Projected Canopy Cover
1	<5% few individuals
2	<5% any number of individuals
3	6-25%
4	26-50%
5	51-75%
6	>75%

Field surveys in the proposed offset investigation area primarily involved collection of data from RDP and full floristic survey plots. RDP's were used to provide a rapid assessment of vegetation for the purpose of ground-truthing and refining the vegetation mapping. Full floristic plots as described above were undertaken if the field surveys encountered vegetation associations not previously sampled during surveys of the Atlas-Campaspe Mine study area or where additional data would improve the data analysis. At each RDP site the dominant species in decreasing order of dominance for the canopy layer, the shrub layer and ground layer were recorded. Notes were made on the percentage cover of each structural layer and the general condition/disturbance issues of the vegetation at each site. Photographs were taken at each site and the location of the site was recorded using a GPS.

Proforma for data collection were utilised to promote consistency in the data collection process. Discrepancies (e.g. variation in cover/abundance scores, variation in plant identification, selection of dominants in the rapid data point assessments) were identified during data analysis and considered in the interpretation of results.

3.2.7 *Vegetation Mapping*

Utilising the information collected and photographic images, each RDP was used during mapping to interpret imagery and assist in assigning boundaries for vegetation map units.

Opportunistic observations were also made throughout the field work and information was transferred onto hard copies of imagery. The information was used during desktop mapping to resolve issues relating to vegetation community boundaries.

Additional full floristic sites surveyed in the proposed offset investigation area and along a previously proposed road alignment were added to the data analysis to enhance community delineation. RDP sites were used extensively to apply the map units to the proposed offset area.

Verification of map units was undertaken during the December 2011 and February 2012 field trips using a Trimble hand held GPS unit.

3.2.8 *Recording vegetation condition*

Vegetation condition was assessed at full floristic survey sites and at Rapid Data Points (area surrounding the Project area) to gauge a comparative degree of disturbance. Standard factors were used to determine condition included: presence of a biological soil crust, litter cover, dominance of weeds, seedling regeneration, presence of fallen dead wood (greater than or equal to 10 cm diameter) and tree hollows (greater than or equal to 5 cm diameter), extent of clearing (presence of natural shrub and or tree strata) and extent of grazing. As grazing was evident at almost all sites to some degree, a general level of grazing was assumed. A broad three-tier condition score was used (good, moderate and poor).

For example, sites in good condition were relatively intact with negligible signs of disturbance (other than a low degree of grazing); these sites generally possessed an intact biological soil crust, some litter, no weeds, no evidence of clearing (with a natural shrub and or tree strata) and may contain regenerating seedlings. Sites in poor condition were heavily disturbed with significant evidence of grazing, clearing and erosion. Poor sites often had a relatively higher percentage cover of introduced species, did not possess an intact biological soil crust or litter. Sites in moderate condition displayed a broad mix of attributes of both good and poor condition sites. At each site an assessment was made of each of the attributes described above and the appropriate score applied.

The condition of vegetation can be impacted by fire frequency in that vegetation which burns too frequently can show a reduction in species diversity and alteration to vegetation structural layers. At each full floristic survey site the following signs of recent fire were noted if present: mallee trees or shrubs regenerating from lignotubers; any charring on branches.

3.2.9 *Survey limitations*

The study area is very large and although survey coverage of the Atlas-Campaspe Mine study area conformed to recommendations (DEC 2004; Sivertsen 2009) it is feasible that some species occurring within the area were not recorded.

Good coverage of the Atlas-Campaspe mine, MTCR and Ivanhoe Rail Facility study areas was achieved. However, full coverage was limited by the size of the area surveyed and the inaccessibility of some locations. The majority of the survey work undertaken in the area located directly to the west of the Atlas-Campaspe Mine study area was conducted in summer and the large distances between tracks and high daytime temperatures meant that much of this area could not be accessed on foot. Accordingly, vegetation mapping of the more inaccessible parts of this area was of necessity based on interpretation of aerial imagery.

3.3 Data analysis

3.3.1 *Plant communities*

Data from 320 full floristic surveys were quantitatively analysed to interpret and classify compositional patterns in the vegetation of the study areas (Appendix C). Data from sites in the Atlas-Campaspe Mine study area, MCTR roadworks study area, proposed offset area and surrounds were combined for these analyses as all areas occurred in the same general location and had comparable combinations of plant species, vegetation structure and edaphic factors.

Data from 10 full floristics surveys in the Ivanhoe Rail Facility study area were analysed as a discrete unit.

Flora species identifications were checked prior to analysis against descriptions and distribution information provided by PlantNET (The Royal Botanic Gardens and Domain Trust 2012) to confirm that species identified were known for the region and the habitat they were located in. Those species which were considered to be unusual for the location were confirmed at the NSW Herbarium.

Cover/abundance scores for native species from each site were analysed using PATN V3.1: Pattern Analysis Package (Belbin 2004) which undertakes hierarchical clustering of sites into groups using the symmetric version of the Kulzcynski coefficient applied to the unstandardised cover-abundance data. The resulting hierarchical clustering is dispayed diagramatically as a dendrogram.

Delineation of clusters of sites into groups was undertaken by interpreting lineages at successively lower levels in the hierarchy and assessing differences between sister groups (Keith & Sanders 1990) with respect to diagnostic species, vegetation structure and physical attributes (distribution, topography and soil type). Interpretation using such attributes is consistent with JANIS (1996) which defines groups in terms of floristic composition and in combination with substrate and position in the landscape. Floristic groups (species assemblages) are recognised when further splitting fails to discernibly resolve the variation in these factors. The number of groups in the classification is therefore limited by the identification of prominent differences in species composition, vegetation structure and physical habitat. The resulting groups are used to define the vegetation associations or 'communities' present within the study area.

Differences between sister groups can be established using a SIMPER analysis. Once established each group is defined by a factor (or number) which is applied to each individual site. The application of factors can be used in a SIMPER analysis to identify the species primarily providing the discrimination between and contributing to the clustering of each group. A SIMPER analysis undertaken using the multivariate ecological analysis package Primer 6 6.1.13 (Clarke and Gorley 2006), was used to finalise groupings which were then reflected in the vegetation map units.

3.3.2 *Vegetation condition*

Vegetation condition information from full floristics surveys and RDP site were collated and used to explore the relationship between vegetation community and vegetation condition.

3.4 Vegetation mapping

3.4.1 *Atlas-Campaspe Mine and MCTR study areas*

Production of the vegetation map was undertaken by interpreting assemblage groupings delineated in the analysis, interpretation of the RDP site data (surrounds study area only), opportunistic observations, field marking of hard copies of aerial imagery and field verification. A final map showing the location and extent of vegetation communities including any threatened ecological communities was produced using ArcMap 10. Resolution of the aerial imagery plays an important part in the interpretation of boundaries between communities. Imagery provided for the mapping of the MCTR study area and surrounds study area was of a resolution which allowed interpretation to a minimum of 1:10,000m while the imagery for mapping the Atlas-Campaspe study area was of a resolution which allowed interpretation to a minimum of 1:1,000m. Errors in topology were corrected using the ArcMap topology tool.

Determination of the final boundary between Yarran Shrubland vegetation and other structurally similar vegetation communities was undertaken using the following:

1. Site characteristics and species composition conformed to the description in the Final Determination for *Acacia melvillei* Shrubland EEC (NSW Scientific Committee 2008).
2. Soils present conformed to those described in other descriptions of this community (Scott 1992; Westbrooke & Miller 1995; Porteners et al. 1997; Benson et al. 2006).
3. Topography present conformed to those described in other descriptions of this community (Scott 1992; Westbrooke & Miller 1995; Porteners et al. 1997; Benson et al. 2006).
4. At least one individual of *Acacia melvillei* was present in the vicinity of the survey site or was located during field verification of this map unit.
5. Cover of other canopy species e.g. *Casuarina pauper* (Belah), *Alectryon oleifolius* subsp. *canescens* (Western Rosewood) or Eucalypt species was very sparse or did not occur either in the cover/abundance scores from relevant survey sites or during aerial imagery interpretation.

To provide an indication of the reliability of the vegetation community applied to each polygon, each mapping polygon was assigned a confidence score. The score represents the confidence of mapping for each polygon based on the presence or absence of assessment sites within a polygon, difficulty in delineating between map units, whether the polygon area was visited during field surveys and the quality of the imagery available for the mapping work. Three levels of confidence were assigned:

1. Polygon had at least one full floristic site or a number of rapid assessment sites or information points; vegetation boundaries on imagery were relatively clear.
2. Polygon was visited during field survey and notes made on the vegetation present and vegetation boundaries on imagery were relatively clear; or one full floristic site or a number of rapid assessment sites or information points were recorded but vegetation boundaries on imagery were unclear; or vegetation boundaries on imagery were relatively clear but the polygon area was not visited during field survey.
3. Polygon was not visited during field survey interpretation was made based on imagery available; some interpretation during field survey but vegetation boundaries of imagery were unclear.

Confidence scores can be found in the attribute tables for each of the vegetation mapping shape files.

3.4.2 *Ivanhoe Rail Facility study area*

A vegetation map of the Ivanhoe Rail Facility study area was produced using desktop API, soil mapping (Walker 1991) and previous regional vegetation mapping (DECCW 2011). Data collected during field surveys was analysed and used to assign boundaries to the map units. Field notes were used to refine community boundaries.

3.5 Assessment of impacts

The potential impacts of the Project on flora and vegetation of conservation significance were considered in two stages. The first phase used the results of the database searches, flora surveys and habitat assessments to determine whether a particular species or vegetation community was likely to occur within the Project area. The results of this assessment are presented in Sections 4 and 5, and Appendices D, E, F and G.

The second phase considered the likely potential impacts of the Project on flora and vegetation. This consideration included direct and indirect impacts. Where threatened flora or ecological communities were considered likely to occur within the Project area, the significance of the potential impacts of the Project on these were assessed. The significance of potential impacts on relevant threatened species and populations listed on the schedules of the TSC Act were assessed by application of the Seven Part Test in accordance with Section 5A of the EP&A Act and the *Threatened Species Assessment Guidelines – the Assessment of Significance* (DECC 2007). The significance of potential impacts on relevant matters of national environmental significance was assessed in accordance with the EPBC Act *Significant Impact Guidelines 1.1: Matters of National Environmental Significance* (DEWHA 2009) (Appendices L and M).

A discussion of potential impacts is presented in Section 6.

3.6 Mitigation measures and offset area

The Project would include a range of measures to reduce or mitigate potential impacts and also includes a proposed offset area. Mitigation measures were considered in Section 7 and the proposed offset area in Section 8.

4 Results

4.1 Desktop review

4.1.1 Database searches

Threatened plant species
A total of 23 threatened plant species are known or expected to occur within the region. A list of these species and information regarding their distribution and potential habitat is included in Appendix D. An additional species, *Acacia carneorum* (Needle Wattle), was not identified during the database searches; however, a record for this species was made on Boree Plains in 1989 (Anon 2002).

A revised list of threatened plant species likely to occur within the study area was produced based on the results of the database and literature searches and research of each species (Table 4). These species were targeted during survey work.

Table 4. Threatened plant species with potential to occur within the study area.

Scientific Name	Common Name	Flowering Time
Aeolian Chenopod Shrublands		
Solanum karsense	Menindee Nightshade	Spring
Dune Mallee Woodlands		
Acacia acanthoclada	Harrow Wattle	August to December
Lasiopetalum behrii	Pink Velvet Bush	Late winter to spring
Pimelea serpyllifolia subsp. serpyllifolia	Thyme Rice-Flower	Most of the year especially July to November
Santalum murrayanum	Bitter Quandong	August to January
Swainsona pyrophila	Yellow Swainson-pea	September to December
Sand Plain Mallee Woodlands		
Acacia acanthoclada	Harrow Wattle	August to December
Acacia carneorum	Needle Wattle	All Year
Atriplex infrequens	A saltbush	Spring
Lasiopetalum behrii	Pink Velvet Bush	Late winter to spring
Pimelea serpyllifolia subsp. serpyllifolia	Thyme Rice-Flower	Most of the year especially July to November
Santalum murrayanum	Bitter Quandong	August to January
Swainsona pyrophila	Yellow Swainson-pea	September to December
Riverine Chenopod Shrublands		
Atriplex infrequens	A saltbush	Spring
Brachyscome papillosa	Mossgiel Daisy	June to December
Solanum karsense	Menindee Nightshade	Spring
Riverine Sandhill Woodlands		
Austrostipa wakoolica	A spear-grass	October to December
Inland Floodplain Shrublands or Woodlands		
Atriplex infrequens	A saltbush	Spring
Austrostipa wakoolica	A spear-grass	October to December
Brachyscome papillosa	Mossgiel Daisy	June to December
Convolvulus tedmoorei		All Year
Dodonaea sinuolata subsp. *acrodentata*	Hopbush	January to May
Dysphania plantaginella		January to April; August to September

Scientific Name	Common Name	Flowering Time
Lepidium monoplocoides	Winged Peppercress	November to February
Solanum karsense	Menindee Nightshade	Spring
Swainsona plagiotropis	Red Darling Pea	August to September

Note: species are grouped according to broad vegetation classes (a number of species are known for multiple communities).

Endangered Ecological Communities

Searches of the Threatened Species Profiles Database (OEH 2011a) located three EEC's with the potential to occur within the study area (Table 5). No EEC's listed under the EPBC Act were located.

Table 5. Endangered Ecological Communities known or expected to occur within the Lower Murray Darling CMA region.

Sand Plain Mallee Woodlands
Acacia loderi Shrublands
Acacia melvillei Shrubland in the Riverina and Murray-Darling Depression bioregions
Semi-arid Sand Plain Woodlands & Riverine Sandhill Woodlands
Sandhill Pine Woodland in the Riverina; Murray-Darling Depression and NSW South Western Slopes bioregions

Consideration was given to the potential for habitat to occur relating to two EEC's listed under the *Fisheries Management Act 1994*; the *Aquatic ecological community in the natural drainage system of the lowland catchment of the Lachlan River* and the *Aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River.* Willandra Creek, which is part of the former EEC, is situated about 21 km south of the Ivanhoe Rail Facility study area. Potential habitat for either EEC was not identified in the Project area. Therefore the only potential impacts are those that would occur if there was an inadvertent spill on the MTCR.

Threatened Populations

No threatened populations have previously been reported from the study area.

Critical Habitat

No critical habitat has been declared within the study area.

4.1.2 *Literature and vegetation map review*

A number of publications for the purposes of mapping and/or describing vegetation have been prepared for the region and locality.

Work by Beadle (1948) provides valuable historical information on the status of the western division of NSW after decades of grazing. Primarily a work on the potential for the region to provide fodder for grazing, it provides valuable information on agricultural practices, vegetation types, species diversity and soil erosion.

Keith (2006) described the broad vegetation formations across NSW. This publication is a compilation of many vegetation mapping projects that have been undertaken within the state. It provided a framework for the interpretation of the vegetation formations found within the study area.

Benson et al. (2006) is a compilation of descriptions of vegetation communities from the western NSW region. Each vegetation community has been described based on field surveys which compile species lists and describe the structural characteristics of the community. Information on expected distribution, equivalent map units and edaphic characteristics are also provided. The delineation of these communities is interpretive and no data analyses have been used in the circumscription. The vegetation communities from this work have not been mapped.

The Lower Murray Darling CMA (2009) has produced a map which is a diagrammatic representation of present day vegetation communities in the catchment area. Mapping has also been undertaken for the Murray Darling Basin by DECCW (2011). The latter is based on interpretation of the Benson et al. (2006) vegetation community descriptions, and has a spatial scale of 1:100,000 and a low level of field verification of map unit polygons. DECCW (2011) provides a more detailed breakdown of the broader communities used by the Lower Murray Darling CMA vegetation map and is presented in Figure 8 to provide some regional context to the Project vegetation mapping.

Val et al. (2001) undertook a biodiversity survey of the Lower Murray Darling bioregion which involved analysis of 114 flora survey sites. Analysis results identified three broad vegetation associations, belah woodlands, a mallee complex and a group of sites of mixed vegetation communities located on heavier soils (Val et al. 2001).

The pre-clearing vegetation of the southern mallee planning region which includes the study area has been mapped by Val (2001). The mapping has a spatial scale of 1:100,000 and no formal accuracy assessments were undertaken (Val 2001). Sixteen vegetation communities were described and mapped and estimates of the percentage of the different vegetation types cleared in the southern mallee region as at 1998 were calculated.

Three published mapping projects have been undertaken in the vicinity of the study area, Porteners et al. (1997), Scott (1992) and Westbrooke and Miller (1995). All of these projects use a similar method of data analyses and mapping based on flora surveys in a set plot size (20 x 20 m). They provide valuable information on the vegetation communities likely to occur within the study area, which is supported by peer reviewed data analysis. The spatial scale for these projects was larger than for the study area; Porteners et al. (1997) and Scott (1992) spatial scale was 1:250,000 while Westbrooke and Miller (1995) spatial scale was 1:100,000.

A series of documents were also reviewed that provided some historic information on the status of the vegetation of properties which make up the study area (Anon 1998, Anon 2002, Soil Conservation Service 1974, 1977, 1981).

Other documents listed within Section 3.1.2 are discussed at other points within this report.

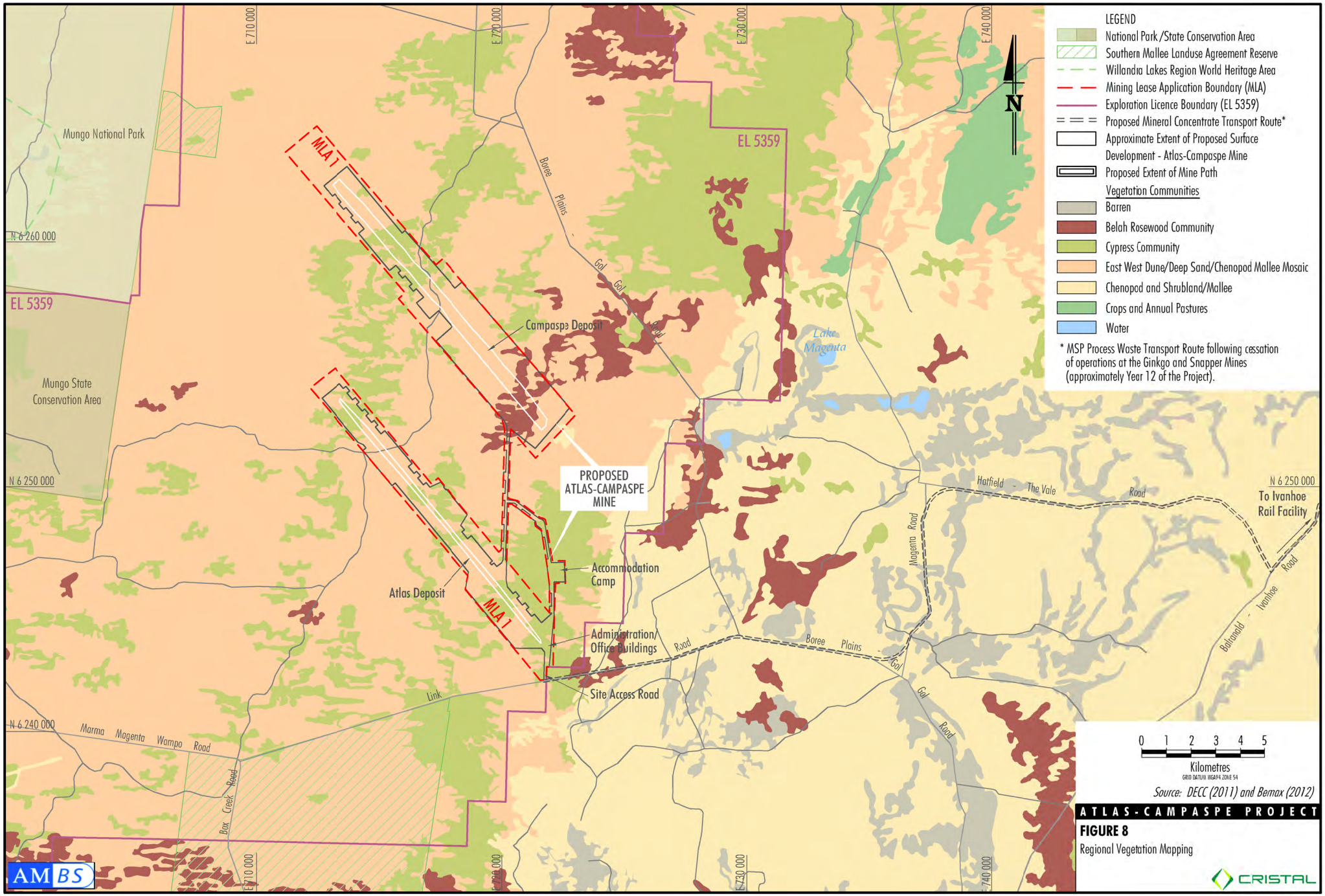
Many other publications were utilised in the preparation of this report and are referred to throughout. A complete list is included in the reference list for this report.

4.2 Plant species

4.2.1 *Native species*

A total of 368 native plant species were recorded in the Atlas-Campaspe Mine study areas and MCTR roadworks study area (Appendix E).

A total of 75 native species were recorded in the Ivanhoe Rail Facility study area (Appendix G).



ATLAS-CAMPASPE PROJECT

FIGURE 8

Regional Vegetation Mapping

BMX-11-25_EIS App Flora_115E

4.2.2 Threatened flora species

Three threatened plant species were located within the study areas for the Atlas-Campaspe Mine and MCTR roadworks (Table 6; Figures 9 and 10).

- *Lepidium monoplocoides* F.Muell. (Winged Peppercress), listed as endangered under the TSC Act and the EPBC Act, was recorded at two locations in the Atlas-Campaspe Mine study area.
- *Brachyscome papillosa* G.L.Davis (Mossgiel Daisy), listed as vulnerable under the TSC Act and the EPBC Act, was recorded in large numbers at one location along the existing Magenta Road.
- *Pterostylis cobarensis* M.A.Clem. (Cobar Greenhood Orchid), listed as vulnerable under the TSC Act and the EPBC Act, was recorded at four locations within the Atlas-Campaspe Mine study area. This species had not previously been identified as potentially occurring by literature and database searches.

A specimen of each has been confirmed and lodged with the NSW Herbarium.

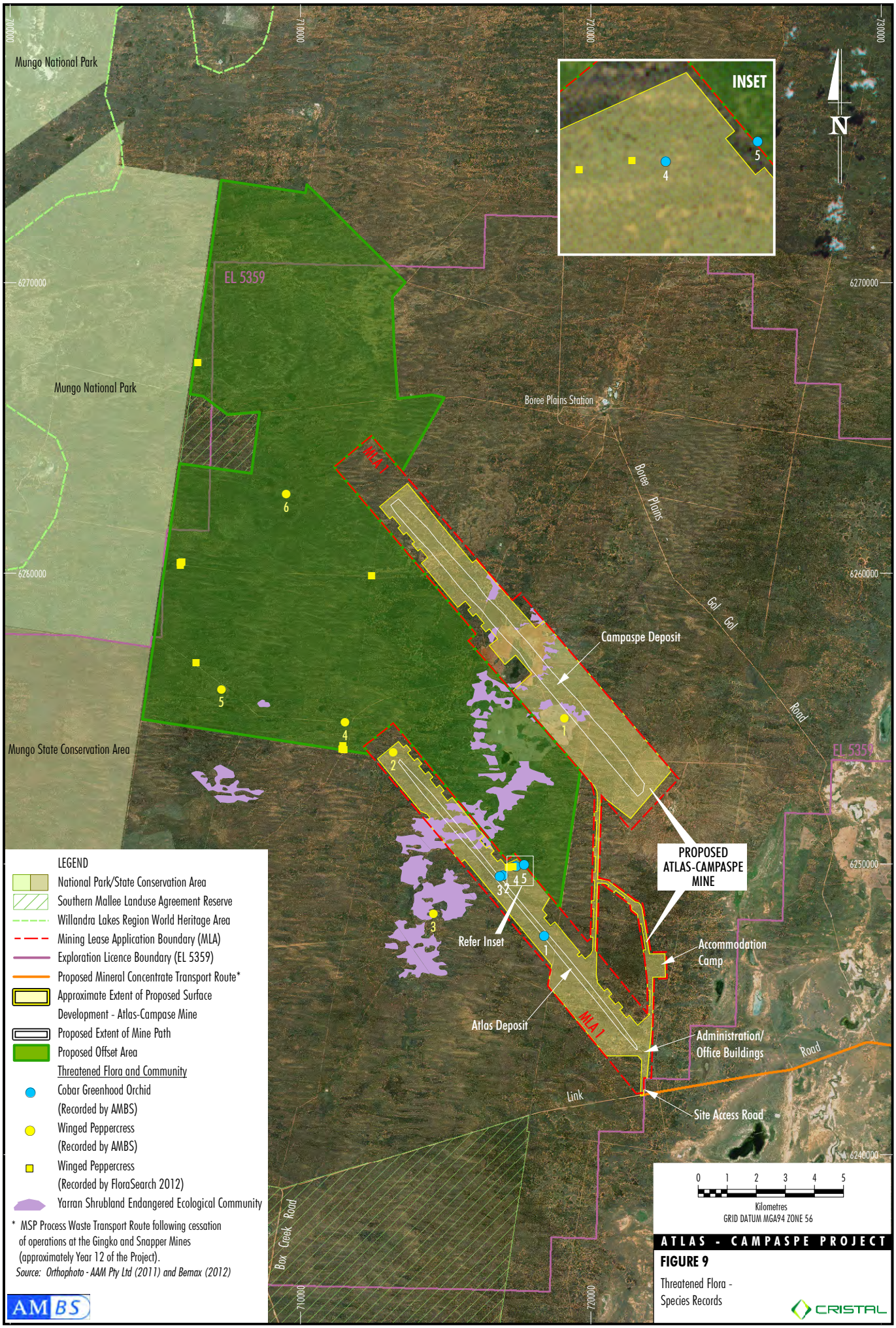
Surveys in October 2012 (FloraSearch 2012) identified a third location for *Lepidium monoplocoides* within the Atlas-Campaspe study area. This record has not been confirmed by the NSW Herbarium (Figure 9). No threatened flora species were located during surveys of the Ivanhoe Rail Facility study area.

Lepidium monoplocoides (confirmed by the NSW Herbarium) was also found at four locations during the field surveys to the west of the Atlas-Campaspe Mine (Appendix A; Figure 9). Three of these locations representing a minimum total of 195 individuals are included within the proposed offset area (Appendix A). Five further records we made in October 2012 within the proposed offset area (FloraSearch 2012). The identification of these records has not been confirmed by the NSW Herbarium. Estimates of population size were not made in these locations.

Table 6. Location of threatened plant species, type of vegetation and number of individuals recorded within the Atlas-Campaspe Mine footprint.

Species	Site Number	Vegetation Community	Number of Individuals	Zone	Easting	Northing
Pterostylis cobarensis	Site 1 (CSB08)	Linear Dune Mallee	1	54	718393	6247517
	Site 2 (CSB43)	Sandplain Mallee	1	54	716977	6249606
	Site 3	Sandplain Mallee	1	54	716867	6249560
	Site 4	Sandplain Mallee	4	54	717428	6249913
	Site 5*	Sandplain Mallee	11	54	717707	6249974
Lepidium monoplocoides	Site 1	Belah-Rosewood Woodland	1	54	713195	6253843
	Site 2	Belah-Rosewood Woodland	1	54	719090	6255018
	Site 3[1]	Belah-Rosewood Woodland	Unknown	54	717165 717325	6249889 6249916
Brachyscome papillosa	CSH90	Bluebush Shrubland	>1000	54	737471	6245008

* located within the proposed offset area 25 m east of the Atlas footprint
[1] identification has not been confirmed by NSW Herbarium



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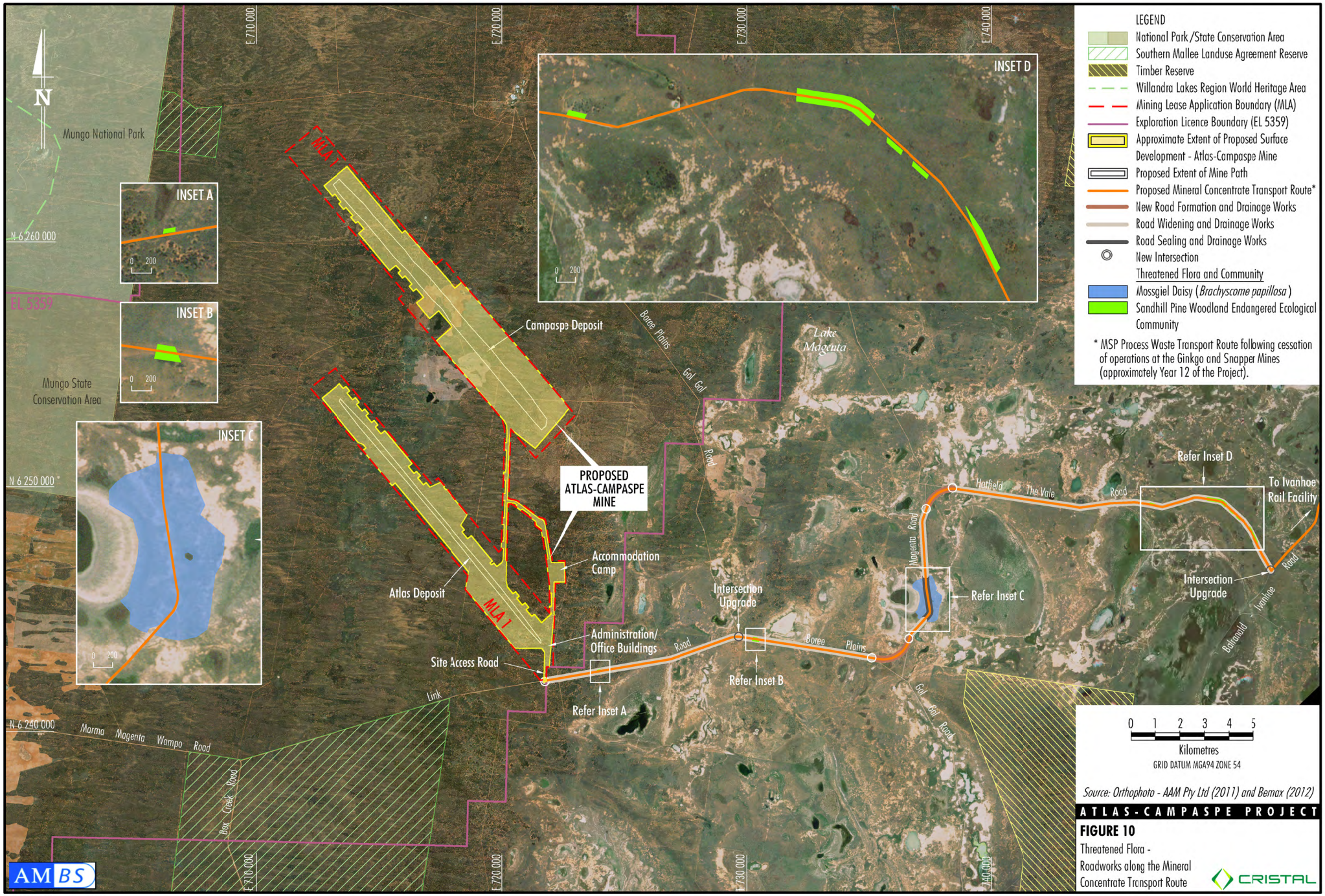

ATLAS-CAMPASPE PROJECT

FIGURE 10

Threatened Flora - Roadworks along the Mineral Concentrate Transport Route

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Winged Peppercress (Lepidium monoplocoides G.L.Davis)

Two individual *Lepidium monoplocoides* (Plate 1) were observed within the Atlas-Campaspe Mine study area in two separate locations. The identification of these has been confirmed by the NSW Herbarium (Figure 9). Two individuals were observed at a third location (FloraSearch 2012) but these have not been confirmed by the NSW Herbarium. The confirmed records consist of one individual each; one record was found in 1 ha of habitat and the second record was found in 37 ha of habitat. Both records were located in gilgai associated with Belah-Rosewood Woodland or in Grass/Herblands of Drainage Depressions.

Plate 1. *Lepidium monoplocoides* and example of its habitat

Brachyscome papillosa F.Muell.

Brachyscome papillosa (Plate 2) was located along the existing Magenta Road section of the MCTR study area (Figure 9). Habitat for this local population is restricted to soft grey to red cracking clays of the Marma Land System (Walker 1991) in a shrubland dominated by *Atriplex vesicaria* (Bladder Saltbush) and *Maireana pyramidata* (Black Bluebush). The vegetation has an open structure and the soils are prone to erosion and scalding. The population within this habitat is large (estimated at >1,000 individuals) and extensive. The population covers an area of approximately 142 ha and occurs from immediately adjacent to the compact road surface to greater than 250 m away from the existing road.

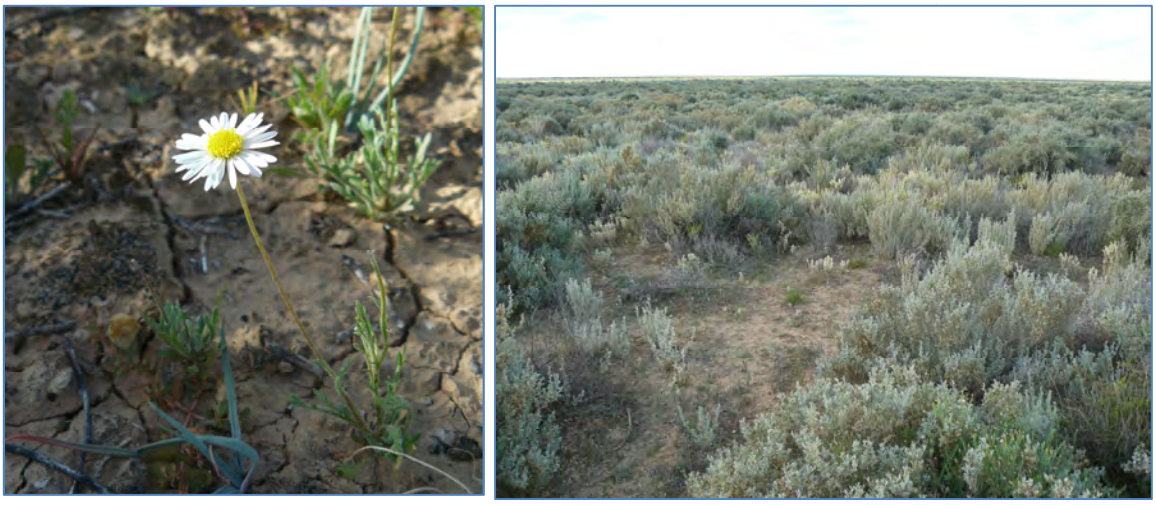


Plate 2. *Brachyscome papillosa* and example of its habitat

Pterostylis cobarensis M.A.Clem.

Pterostylis cobarensis (Plate 3) was recorded at five locations in mallee woodland complex vegetation on sand dunes or plains (Figure 9). Two locations were found during surveys in November 2011 (Sites 1 and 2) and three locations during follow-up surveys in October 2012 (Sites 3, 4 and 5) (FloraSearch 2012). The mine plan has been modified so that mining activities would avoid direct impacts to the location where individuals were recorded at Site 4. Site 5 is located within 25 m of the boundary of the Atlas footprint in the proposed offset area (FloraSearch 2012). Site 1 was located to the south of the other four occurrences, which occur within 0.2 to 0.7 km of each other. *Pterostylis cobarensis* only appears above ground to flower. It remains below ground as a tuber when flowering is not occurring.

Image of Orchid: FloraSearch (2012)

Plate 3. *Pterostylis cobarensis* and potential habitat in the Project area

4.2.3 Other native flora of interest

A number of species were of interest as extensions of known range within the botanical subregion SFWP, new records for the SFWP or because they are uncommon across their known range (Table 7). The location of a number of new records in the SFWP botanical region is likely to be the result of the high rainfall the region has received over the past 2 years (Section 2.5).

Table 7. Native species of interest recorded during surveys of the study area.

Scientific Name	Common Name	Floristic Status
Abutilon fraseri	Dwarf Lantern-flower	Uncommon
Abutilon otocarpum	Desert Lantern	Extension of range within region
Brachyscome papillosa	Mossgiel Daisy	Vulnerable under the TSC Act and EPBC Act
Dodonaea lobulata		Second record for the region
Eragrostis elongata	Clustered Lovegrass	New record for SFWP
Eragrostis falcata	Sickle Lovegrass	Extension of range within region
Goodenia havilandii		New record for SFWP
Gypsophila tubulosa	Annual Chalkwort	New record for SFWP
Isoetes muelleri	Quillwort	New record for SFWP
Leiocarpa leptolepis		Extension of range within region
Lepidium monoplocoides	Winged Peppercress	Endangered under the TSC Act and EPBC Act
Podolepis canescens	Large Copper-wire Daisy	New record for SFWP
Pterostylis cobarensis	Cobar Greenhood Orchid	Vulnerable under the TSC Act and EPBC Act
Senecio quadridentatus	Cotton Fireweed	Extension of range within region
Triptilodiscus pygmaeus	Common Sunray	New record for SFWP
Velleia arguta		New record for SFWP
Vittadinia blackii	Western New Holland Daisy	Uncommon
Vittadinia pterochaeta	Winged New Holland Daisy	New record for SFWP

4.2.4 Introduced flora

A total of 77 introduced species were recorded within the Atlas-Campaspe Mine study area and the MCTR roadworks study area (Appendix F). Higher numbers of introduced species were recorded in highly disturbed communities and on soils with higher clay content (Table 8). A list of introduced species for each vegetation community described for the Atlas-Campaspe Mine study area and the MCTR roadworks study area is provided in Appendix H.

A total of 11 introduced species were recorded within the Ivanhoe Rail Facility study area (Appendix G).

Table 8. Number of introduced species recorded in full floristic survey plots in each vegetation community in the Atlas-Campaspe Mine study area and the MCTR roadworks study area.

Vegetation Community	Total number of weed species	Median Cover/Abundance Score
Semi-arid Woodlands		
Belah-Rosewood Woodland	20	1
Black Box Woodland	32	1
Linear Dune Mallee	1	1
Sandplain Mallee	9	1
Sandhill Pine Woodland	16	1
Yarran Shrubland	22	1
Arid Shrublands		
Disturbed Area Shrubland Complex (including Mulga Woodland)[1]	38	1
Bluebush Shrubland	38	1
Chenopod Shrubland Depressions	15	1
Saltbush Shrubland	3	1

[1] Table contents based on analysis results that included Mulga Woodland and of Disturbed Areas Shrubland Complex sites in the same grouping.

Full floristic survey sites were not undertaken in the vegetation community Grass/Herblands of Drainage Depressions, however, opportunistic species lists were made in locations where this vegetation community was identified. A suite of introduced species similar to those recorded in Black Box Woodland were found in these locations. The MCTR roadworks study area had a high number of weed species, which is expected due to the disturbance from road maintenance activities, higher levels of soil moisture due to surface runoff and the transportation of weed propagules along the corridor by cars and trucks.

Introduced or weed species generally possess reproductive or life history traits which facilitate opportunistic establishment in areas where disturbance of native vegetation and supporting topsoil creates gaps in the ground layer of litter, biological soil crust, native shrubs, grasses and herbs. As expected, weeds in the study area were associated with disturbance and the prevalence of water, with greatest diversity of weed species being recorded in Bluebush Shrubland, Disturbed Areas Shrubland Complex and Black Box Woodland, followed by Yarran Shrubland, Belah-Rosewood Woodland, Sandhill Pine Woodland, Chenopod Shrubland Depressions, Sandplain Mallee, Saltbush Shrubland and Linear Dune Mallee (Table 8). The median modified Braun-Blanquet cover-abundance of each weed species observed in every vegetation community across the study area was 1 (<5% few individuals), indicating that weed species recorded generally provided a low percentage cover.

Six weed species declared as noxious in the Balranald LGA were recorded in the study area (DPI 2012), *Asphodelus fistulosus* (Onion Weed), *Cuscuta campestris* (Golden Dodder), *Lycium ferocissimum* (African Boxthorn), *Xanthium orientale* (Californian Burr), *Xanthium occidentale* (Noogoora Burr) and *Xanthium spinosum* (Bathurst Burr) (Table 9). These noxious weed species were recorded in Belah-Rosewood Woodland, Disturbed Areas Shrubland Complex, Yarran Shrubland, Sandhill Pine Woodland and Bluebush Shrubland. Records for noxious weeds are only from full floristic survey sites and these weeds are likely to be spread throughout the study area.

One species, *Asphodelus fistulosus,* was recorded in the Ivanhoe study area but is not listed as noxious in the relevant LGA (Central Darling). No noxious weeds were recorded at the Ivanhoe study area.

A number of weed species are considered to be priority weeds impacting on biodiversity in the Lower Murray Darling CMA region (OEH 2012d) (Table 9).

Table 9. Noxious and priority weeds recorded in the study area.

Scientific Name	Common Name	Study Area	Priority Weed in the Lower Murray Darling	Noxious Weed in the Balranald LGA	Noxious Class	Requirement under the NSW *Noxious Weeds Act, 1993*
Asphodelus fistulosus	Onion Weed	Atlas-Campaspe Mine	X	X	4	The growth of the plant must be managed in a manner that reduces its numbers spread and incidence and continuously inhibits its reproduction.
Brassica tournefortii	Mediterranean Turnip	Atlas-Campaspe Mine and Roadworks along the MCTR	X	-	-	-
Bromus rubens	Red Brome	Atlas-Campaspe Mine	X	-	-	-
Carrichtera annua	Wards Weed	Atlas-Campaspe Mine and Roadworks along the MCTR	X	-	-	-
Cuscuta campestris	Golden Dodder	Atlas-Campaspe Mine	-	X	4	The growth of the plant must be managed in a manner that reduces its numbers spread and incidence and continuously inhibits its reproduction.
Heliotropium supinum	Prostrate Heliotrope	Atlas-Campaspe Mine and Roadworks along the MCTR	X	-	-	-

Scientific Name	Common Name	Study Area	Priority Weed in the Lower Murray Darling	Noxious Weed in the Balranald LGA	Noxious Class	Requirement under the NSW *Noxious Weeds Act, 1993*
Lycium ferocissimum	African Boxthorn	Atlas-Campaspe Mine and Roadworks along the MCTR	X	X	4	The growth of the plant must be managed in a manner that reduces its numbers spread and incidence and continuously inhibits its reproduction.
Marrubium vulgare	Horehound	Atlas-Campaspe Mine and Roadworks along the MCTR	X	-	-	-
Psilocaulon tenue	Wiry Noon Flower	Atlas-Campaspe Mine and Roadworks along the MCTR	X	-	-	-
Schismus barbatus	Arabian Grass	Atlas-Campaspe Mine and Roadworks along the MCTR	X	-	-	-
Sisymbrium erysimoides	Smooth Mustard	Atlas-Campaspe Mine	X	-	-	-
Xanthium occidentale	Noogoora Burr	Atlas-Campaspe Mine and Roadworks along the MCTR	X	X	4	The growth of the plant must be managed in a manner that reduces its numbers spread and incidence and continuously inhibits its reproduction.
Xanthium orientale	Californian Burr	Atlas-Campaspe Mine and Roadworks along the MCTR	-	X	4	The growth of the plant must be managed in a manner that reduces its numbers spread and incidence and continuously inhibits its reproduction.
Xanthium spinosum	Bathurst Burr	Atlas-Campaspe Mine and Roadworks along the MCTR	X	X	4	The growth of the plant must be managed in a manner that reduces its numbers spread and incidence and continuously inhibits its reproduction.

4.3 Vegetation communities

4.3.1 *Atlas-Campaspe mine study area and MCTR roadworks study area*

Higher rainfall over the past two years has resulted in the appearance of many species that are difficult to detect during extensive drought periods and this contributed to the effectiveness of the vegetation association analysis. Sampling across a 12 month period resulted in some variation in the analysis results due to seasonal impacts on species composition.

Analysis of data collected from 320 full floristic survey sites defined a series of lineages in relation to the assemblage of species recorded. At the highest level of division two major lineages (groups) were defined, which can be broadly attributed to the substrate on which the sites were located, soils influenced in varying degrees by sand and clay soils.

Sand-influenced Communities

The sand influenced soil lineage split further into five groups (Groups 1-5 in the dendrogram) representing the following species assemblages (Appendix I).

Group 1 represents assemblages dominated by mallee Eucalypt species. Group 1 is further divided into subgroups 1a and 1b which represent two forms of mallee woodland, Sandplain Mallee and Linear Dune Mallee respectively. These subgroups reflect structural and species composition differences between the mallee vegetation.

Subgroup 1a is typically found in shallower sand on plains or in the swales between the deeper dunes. Species associated with subgroup 1a include *Austrostipa nitida, Enchylaena tomentosa* (Ruby Saltbush)*, Vittadinia curvispicatum, Olearia pimeleoides* and *Maireana georgei* (Slit-wing Bluebush) and although *Triodia scariosa* (Porcupine Grass) is occasionally present in this subgroup it occurs very sparsely.

Subgroup 1b is typically found on deeper sands than subgroup 1a and includes species such as *Eucalyptus costata* (Ridge-fruited Mallee)*, Halgania cyanea* (Rough Halgania) and *Lomandra leucocephala* (Woolly Mat-rush), a ground layer dominated by *Triodia scariosa* and a lower cover of chenopod shrub species than subgroup 1a.

Group 2 represents an assemblage of species found on brown sands or sandy loams with alkaline subsoil containing limestone nodules (Keith 2006). Group 2 is located on sandplains and as isolated occurrences in larger dune swales (Belah-Rosewood Woodland).

The dendrogram displays a number of subgroups within Group 2. Examination of the differences between the subgroups using a Simper analysis reveal that they are the result of changes in the cover/abundance scores of some key species including *Chenopodium curvispicatum, Callitris glaucophylla* (White Cypress Pine)*, Sclerolaena obliquicuspis* (Limestone Bindii)*, Casuarina pauper* (Belah)*, Geijera parviflora* (Wilga)*, Alectryon oleifolius, Maireana sclerolaenoides* and *Enchylaena tomentosa.* These differences in cover/abundance are considered to represent typical variation within this vegetation group and the low truncation level in the dendrogram for this group did not support further division (Appendix I). Boundaries between these subgroups were not detectible in aerial imagery interpretation. Several sites with a higher cover/abundance of *Callitris glaucophylla* that forms a small subgroup within Group 2 were further assessed using a Simper analysis and the final determination criteria for a potential EEC (Sandhill Pine Woodland) (NSW Scientific Committee 2008). None of the sites in this group had a species composition consistent with that described for the EEC. Only one of these sites, CAL1_OFF had characteristic considered to be similar in relation to topography. It was located on a sand dune in semi-arid woodlands.

Group 3 represents an assemblages of species found on flat areas of crusted sandy loam soils or on an exposed soil B horizon in locations with signs of significant disturbance such as heavy grazing, erosion and clearing (Disturbed Area Shrubland Complex). These locations probably represent disturbed areas of other assemblages such as Belah-Rosewood Woodland, Black Box Woodland Sandplain Mallee or Yarran Shrubland.

The dendrogram revealed a number of subgroups within Group 3. Examination of these using a Simper analysis revealed that the subgroups were the result of changes in the density of some key species including *Austrostipa nitida, Dodonaea viscosa* subsp. *angustissima* (Narrow-leaved Hopbush), *Sclerolaena patenticuspis* (Spear-fruit Copperburr) and *Dissocarpus paradoxus* (Cannonball Burr). Further division of the assemblages for mapping purposes was not supported by the analysis due to the low truncation level in the dendrogram for this group (Appendix I). Boundaries between these subgroups were not detectible in aerial imagery interpretation. A number of sites were, however, used to map a separate unit of vegetation. These sites (CSO4-24, CSB60, CSB64, CSB72) formed part of one subgroup within the dendrogram, all were highly disturbed and had a remnant canopy of *Acacia aneura* (Mulga) present. The distinctive canopy of this woodland makes it possible to distinguish it from other vegetation and given that *Acacia* shrubland of this type is restricted within the southern mallee region (D. Keith pers. comm. OEH 2011); Benson et al. 2006) a vegetation community was allocated to these sites (Mulga Woodland).

Two sites CSB28 and CSB30 were placed in Group 3 in the dendrogram. Both sites were in a location that has been cleared and cultivated. The significant disturbance to the soil from repeated cultivation has resulted in a low cover of native species, a higher cover of weed species and significant erosion. This area was in very poor condition and was not considered to represent a vegetation community even though some native species were present. Both sites are included in a map unit labelled Cleared Land.

Group 4 represents assemblages of species found on plains of grey to brown clay loam often with gilgai (Yarran Shrubland). All but one site used in the analysis have been severely disturbed by clearing, grazing and soil erosion. The Group 4 species assemblage is found in similar locations and under similar conditions to those of Group 3 and it is not easy to distinguish between these groups in aerial imagery interpretation. Group 4 represents the vegetation community Yarran Shrubland.

One site CSB40 was placed in Group 4 in the dendrogram. The site was located in an area that has been cleared and cultivated. The significant disturbance to the soil from repeated cultivation has resulted in a low cover of native species, a higher cover of weed species and significant erosion. This area was in very poor condition and was not considered to represent a vegetation community even though some native species were present. The site is included in a map unit labelled Cleared Land.

Group 5 represents assemblages of species that are generally found on red sand rises and dunes of flat alluvial plains (Sandhill Pine Woodland). These plains generally support chenopod shrublands. All sites had been significant disturbed by heavy grazing, erosion and logging. Group 5 represents the vegetation community Sandhill Pine Woodland. One site assigned to this group CSO8-12 was located on sandplains to the north of the development area. Although the species composition was similar to other sites in this group it was located in an area of disturbed vegetation where other sites have been attributed to Group 2 Belah-Rosewood Woodland. For this reason the site has been attributed to Group 2.

Clay-influenced Communities

The clay soil lineage split further into 5 groups (groups 6 - 10 in the dendrogram) representing the following species assemblages (Appendix I).

Group 6 represents an assemblage of species that are found on heavy alluvial clays in low lying areas which retain moisture for long periods after rainfall events (Black Box Woodland).

Group 7 represents an assemblage of species found on flat alluvial plains of brown to red clays in water retaining depressions of chenopod shrublands (Chenopod Shrubland Depressions).

Group 8 represents an assemblage of species found on flat alluvial plains of deep grey to brown clays in damper area of chenopod shrubland with relatively higher salinity levels (Saltbush Shrubland).

Group 9 and **Group 10** represent assemblages of species found on flat alluvial plains of brown to red clays and sandy loam soils (Bluebush Shrublands).

Although sites in this assemblage formed separate groups in the dendrogram, examination of the results using a Simper analysis reveal that the division of these sites can be attributed in the most part to the recording of data in different seasons. Sites allocated to these groups were surveyed in February and April 2012 (post a heavy rainfall event in March 2012) and the groupings were found to represent this seasonal sampling with those surveyed in April (Group 10) having a set of species that contributed significantly to this group which were not recorded in sites surveyed in February 2012 (Group 9) or were recorded at much lower abundances e.g. *Erodium crinitum* (Blue Storksbill), *Tetragonia tetragonoides, Enneapogon avenaceus* (Bottle Washers) and *Bulbine alata* (Bulbine Lily).

4.3.2 Ivanhoe Rail Facility study area

An analysis of survey data collected from 10 sites in the Ivanhoe Rail Facility study area was undertaken. Two broad lineages were identified in the dendrogram. Two sites IV3 and IV4 with a canopy cover of >25 % and dominated by *Casuarina pauper, Geijera parviflora* and *Alectryon oleifolius* split from the remaining 8 sites. Within this second group of 8 sites two subgroups were identified representing sites with a canopy cover of < 20%, dominated by *Acacia homalophylla* and *Casuarina pauper* (IV1 and IV2) and native grassland sites without a canopy (IV 5, IV6, IV7, IV8, IV9 and IV10). Areas of vegetation with a canopy of either *Casuarina pauper* or *Acacia homalophylla* occurred as a mosaic of small patches across the study area. Both were incorporated into a single map unit for mapping purposes - Belah-Rosewood/*Acacia* Woodland. Native grassland areas lacked a continuous canopy but isolated individual *Acacia* species were present as well as a sparse chenopod shrub layer. This assemblage was mapped as Native Grassland/Sparse *Acacia*/Chenopod Shrubs.

5 Vegetation Community Descriptions

5.1 Introduction

Vegetation community delineation is based on an analysis of data recorded for 320 sites across the study area and reflects the vegetation associations as they currently occur. A number of sites originally sampled now fall outside the study area. Areas cleared for cultivation have been mapped as well as sites on the chenopod shrublands plain where scalding has removed the vegetation making determination of a specific unit difficult. One map unit, Grass/Herblands of Drainage Depressions has been described based on species composition, position in landscape and structure.

Mapped vegetation associations are shown on Figures 11 to 13. Table 10 lists the vegetation communities used and provides other information on conservation status, sites allocated to each community and a broad description of vegetation condition.

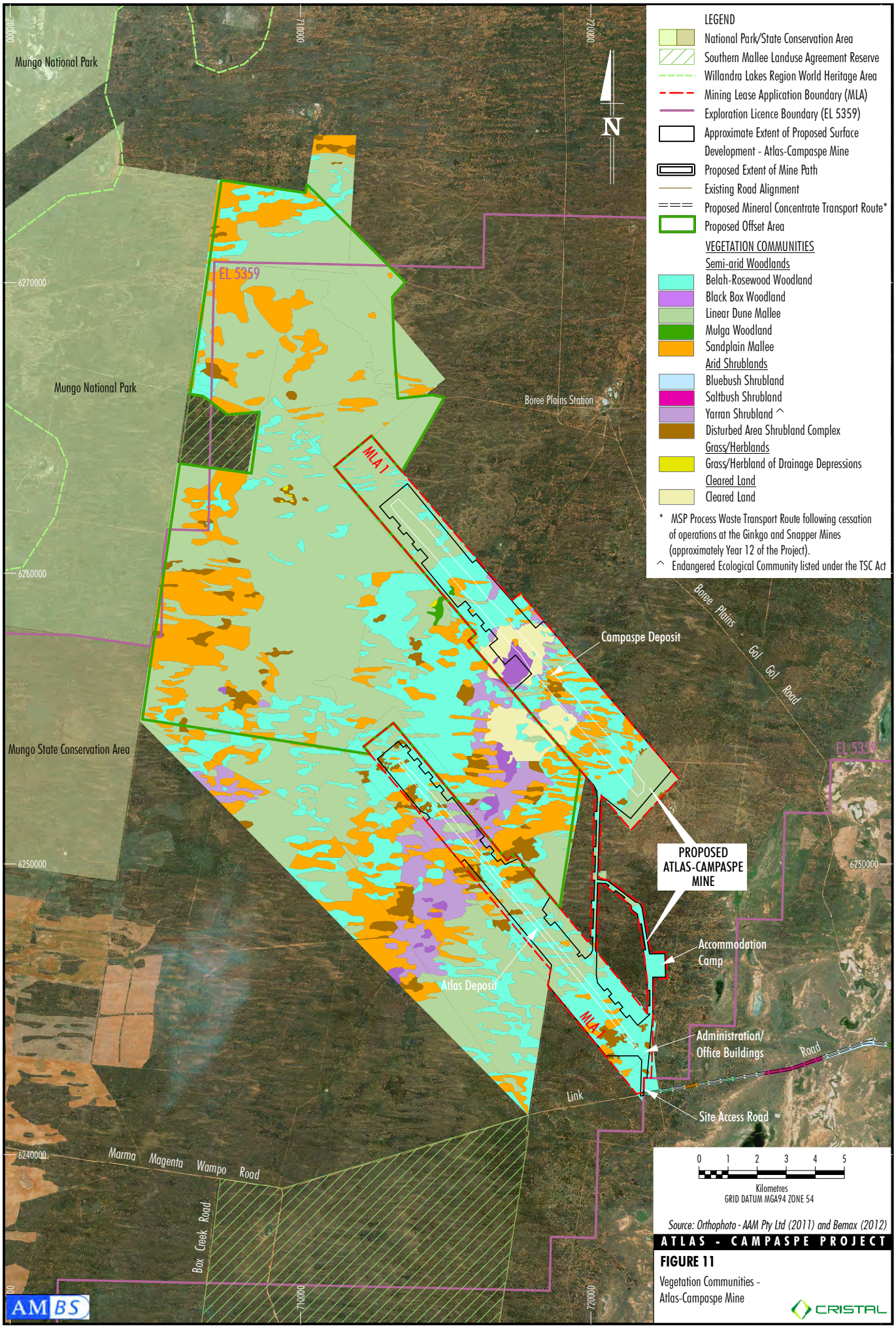
5.1 Vegetation of the Atlas-Campaspe Mine and MCTR study areas

5.1.1 *Mallee Woodland Complex*

Extensive areas of mallee woodland occur within the study area, occupying dune crests, swales and adjacent sand plains. Dunes in the study area may be irregularly placed and surrounded by other vegetation communities, typically Belah-Rosewood Woodland, or form east-west running ridges. Soils are either deep red sandy or loamy deposits or weathered calcareous sands.

A number of mallee eucalypt species occur in various abundances and assemblages. The more prevalent are *Eucalyptus socialis* (Red Mallee), *Eucalyptus dumosa* (White Mallee), *Eucalyptus gracilis* (Yorrell), *Eucalyptus costata* subsp. *murrayana* and less commonly *Eucalyptus leptophylla* (Narrow-leaved Red Mallee) and *Eucalyptus oleosa* (Red Mallee).

Two forms of this community occur and have been mapped as separate units, Linear Dune Mallee on deeper dune sands with a ground layer dominated by *Triodia scariosa* subsp. *scariosa*, and Sandplain Mallee on sand plains with a ground layer dominated by *Austrostipa nitida* and chenopod shrubs. Each unit can occur as small patches within the other. Sandplain Mallee was often observed as small areas between the dunes in large expanses of Linear Dune Mallee and in area predominantly covered by Sandplain Mallee. Patches of Linear Dune Mallee were often observed on small sandy rises. Wherever possible full floristic sites, RDP sites and opportunistic records were used to map these two units, but small areas of one or the other unit will be included in each.

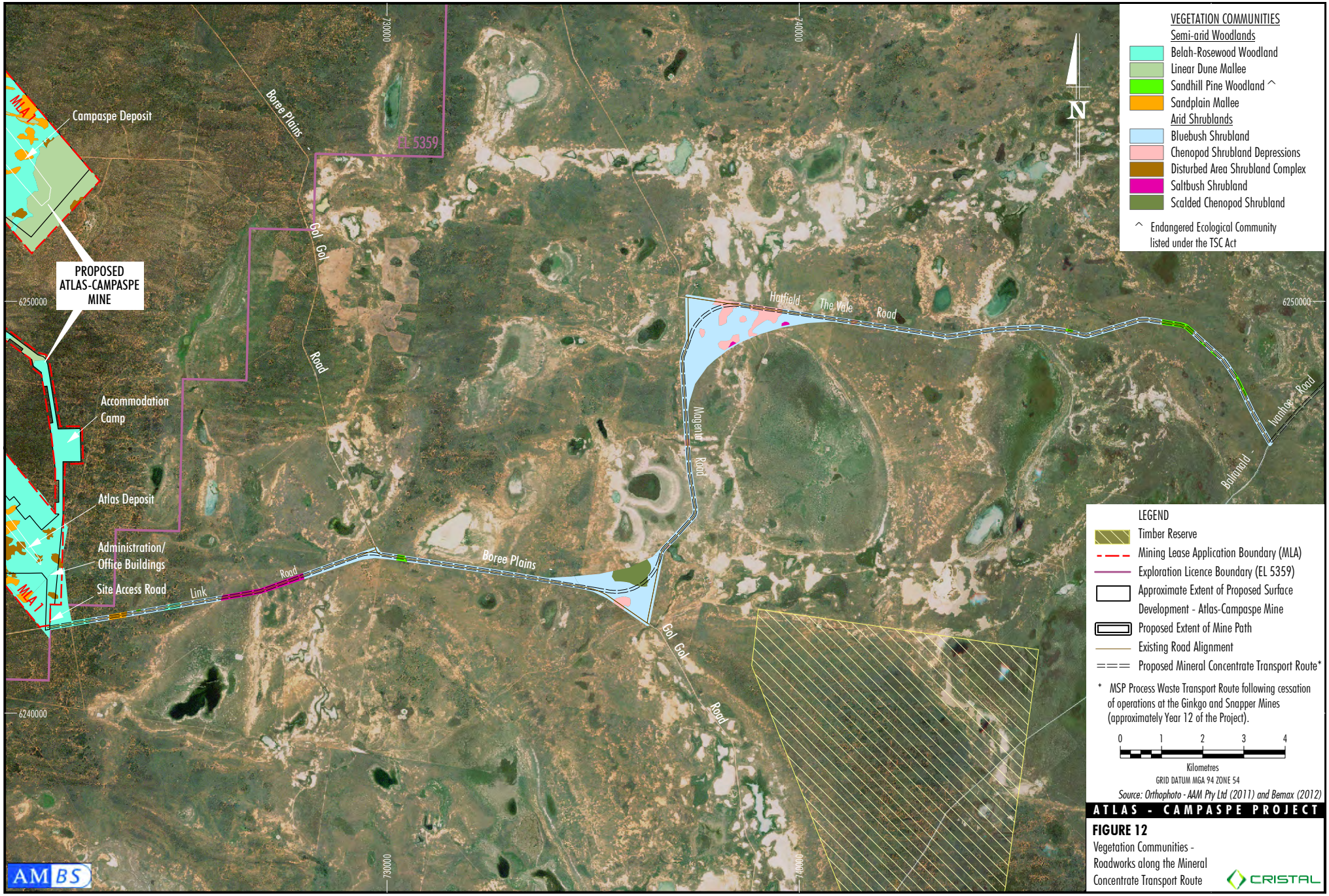


ATLAS - CAMPASPE PROJECT

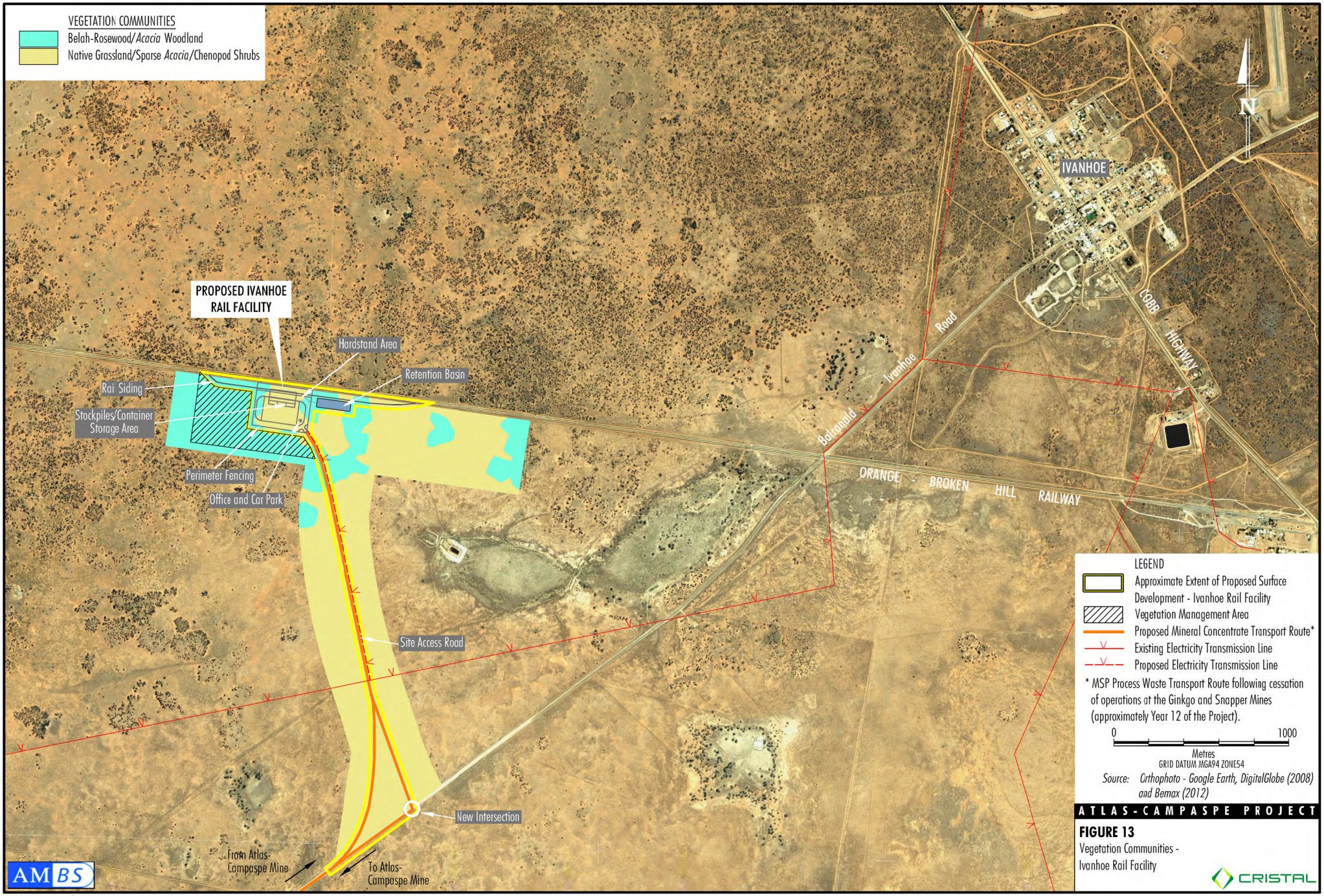
FIGURE 11

Vegetation Communities - Atlas-Campaspe Mine

BMX-11-25_EIS App Flora_2031



BMX-11-25_EIS App Flora_204G



BMX-11-25_EIS App Flora_106J

Table 10. Map units, sites allocated, conservation status and condition for each vegetation community mapped in the Project study areas.

Vegetation community	Floristic Survey Sites Assigned To Each Vegetation Community	Conservation Status	Overall Condition
Linear Dune Mallee	CS21, CS22, CS23, CS30, CS31, CS41, CS45, CS52, CS55, CS58, CS61, CS63, CS64, CS65, CS67, CS69, CSB10, CSB11, CSB12, CSB14, CSB16, CSB17, CSB3, CSB4, CSB8, CSB9, CSE5, CSE9	Not listed	good
Sandplain Mallee	CS1, CS11, CS12, CS26, CS3, CS32, CS35, CS40, CS43, CS49, CS53, CS57, CS6, CS66, CS71, CS76, CSB0, CSB1, CSB13, CSB15, CSB2, CSB41, CSB42, CSB43, CSB5, CSB6, CSB7, CSB73, CSB74, CSB75, CSB76, CSB77, CSB78, CSE4, CSE6, CSE7, CSE8, CSH38[3], CSH39[3], CSH40[3], CSH41[3], CSH42[3], CSO6-50, CSO8-18	Not listed	good to moderate
Belah-Rosewood Woodland	CS10, CS16, CS18, CS19, CS2, CS20, CS24, CS25, CS27, CS28, CS29, CS4, CS42, CS44, CS46, CS5, CS50, CS54, CS62, CS68, CS7, CS70, CS73, CS74, CS75, CS8, CS9, CSB18, CSB19, CSB20, CSB21, CSB22, CSB23, CSB25, CSB26, CSB27, CSB32, CSB33, CSB35, CSB36, CSB50, CSB62, CSC1, CSE1, CSE10, CSE11, CSE12, CSE2, CSE3, CSO3-12, CSO3-3, CSO4-16, CSO8-6, CSO9-T, CSP10, CSP12, CSP13, CSP14, CSP15, CSP16, CSP17, CSP18, CSP19, CSP20, CSP21, CSP22, CSP23, CSP24, CSP25, CSP26, CSP27, CSP30, CSP31, CSP35, CSP36, CSP8, CSP9, CAL1_OFF, CSH102, CSH57, CSO8-12	Not listed	good to moderate
Shrubland Complex of Disturbed Areas (A)	CS13, CS14, CS15, CS17, CS33, CS34, CS36, CS37, CS38, CS39, CS48, CS51, CS59, CS60, CS72, CS78, CSB24, CSB29, CSB31, CSB34, CSB37, CSB38, CSB39, CSB51, CSB52, CSB53, CSB54, CSB55, CSB56, CSB57, CSB58, CSB61, CSB63, CSB65, CSB66, CSB67, CSB68, CSB72, CSP1, CSP11, CSP2, CSP28, CSP32, CSP33, CSP37, CSP38	Not listed	poor
Mulga Woodland[1]	CSO4-24, CSB60, CSB64, CSB72	Restricted in Region	poor
Yarran Shrubland	CS77, CSA1, CSA2, CSA3, CSA5, CSA6, CSA7, CSA8, CSB40, CSB49, CSB70, CSB71, CSO1-2, CSO1-21, CSO1-27, CSO1-35, CSO2-1, CSO2-13, CSO4-1, CSO9-5, CSO1-6, CSP29, CSW1[2], CSO35	EEC under TSC Act	moderate to poor
Sandhill Pine Woodland	CSA9, CSB59, CSH43[3], CSH44[3], CSH46[3], CSH47[3], CSH7,	EEC under TSC Act	poor
Black Box Woodland	CS47, CS56, CS79, CS80, CSB44, CSB45, CSB46, CSB47, CSB48, CSP3, CSP34, CSP4, CSP5, CSP6, CSP7	Not listed	good to poor
Grass/Herblands of Drainage Depressions	Areas were inspected but no sites were surveyed	Not listed	moderate to poor
Chenopod Shrubland Depressions	CSH25, CSH28, CSH29, CSH30, CSH31, CSH32, CSH51[3], CSH55[3], CSH80, CSH87, CSH91, CSHRE-EE	Not listed	good
Saltbush Shrubland	CSH65, CSH66, CSHRE-D, CSHRE-E, CSHRE-G	Not listed	moderate to poor

Vegetation community	Floristic Survey Sites Assigned To Each Vegetation Community	Conservation Status	Overall Condition
Bluebush Shrubland	CSH1, CSH10, CSH12, CSH13, CSH14, CSH15, CSH16, CSH2, CSH3, CSH4, CSH49[3], CSH5, CSH6, CSH8, CSH9, CHS69, CSH64, CSH70, CSH71, CSH73, CSH75, CSH76, CSH79, CSH81, CSH82, CSH85, CSH88, CSH90, CSH93, CSHRE-I.	Not listed	moderate to poor
	CSH11, CSH17, CSH18, CSH19, CSH20, CSH21, CSH22, CSH23, CSH24, CSH26, CSH27, CSH33, CSH34, CSH35, CSH36, CSH37, CSH45[3], CSH48[3], CSH50[3], CSH52[3], CSH53[3], CSH54[3], CSH56[3]		
Cleared land[1]	CSB28, CSB30, CSB40	Not listed	Poor
Scalded Chenopod Shrublands	Areas were inspected but no sites were surveyed	Not listed	Poor
Belah-Rosewood/Acacia Woodland	V1, IV2, IV3, IV4	Not listed	good to moderate
Native Grassland/Sparse Acacia/Chenopod Shrubs	IV5, IV6, IV7, IV8, IV9, IV10	Not listed	moderate to poor

1 Sites assigned to this vegetation community from another dendrogram group, see analysis results section.
2 This site was located in a relatively intact stand of Yarran Shrubland to the south of the study area.
3 These sites are located outside the study area.

Linear Dune Mallee

Linear Dune Mallee has a canopy dominated by *Eucalyptus socialis* and *Eucalyptus gracilis,* with *Eucalyptus leptophylla* and *Eucalyptus costata* subsp. *murrayana* occurring less commonly (Plate 4).

The shrub and ground layer has a mix of species including *Triodia scariosa* subsp. *scariosa, Schoenus subaphyllus* (Desert Bog-rush), *Sclerolaena diacantha* (Grey Copperburr), *Sclerolaena parviflora, Chenopodium desertorum, Halgania cyanea* and *Maireana decalvans* (Black Cotton Bush). Linear Dune Mallee has a number of species particularly associated with it including *Lomandra effusa* (Scented Mat-rush), *Lomandra leucocephala, Lomandra collina* (Pale Mat-rush), *Eremophila glabra ssp. murrayana, Callitris verrucosa* (Mallee Pine), *Scaevola depauperata* (Skeleton Fan-flower), *Leptospermum coriaceum* (Green Tea-tree), *Bossiaea walker* (Cactus Bossiaea), *Acacia wilhelmiana* (Wilhelm's Wattle), *Acacia rigens, Acacia brachybotrya* (Grey Mulga), *Schoenus aphyllus, Dodonaea lobulata* and *Amphipogon caricinus*

Overall the Linear Dune Mallee in the study area is in good condition compared to other communities. This is possible because the type of vegetation, deep sand and distances from watering tanks reduce the visits to such areas by stock and goats. Weed species were seldom recorded in this community.

Plate 4. Typical Linear Dune Mallee

Occurrences of Linear Dune Mallee association have been described in other vegetation surveys:

In the Lower/Murray Darling region:

- Benson *et al*. (2006): ID 171 Spinifex linear dune mallee mainly of the Murray-Darling Depression Bioregion; and Deep Sand Mallee of irregular dunefields of the semi-arid (warm) zone.
- Val (2001): Deep Sand Mallee and East West Dune Mallee.

In the vicinity of the study area:

- Scott (1992): ID 3a Mallee of Irregular Dune fields, 3b Dune Crest Mallee and 3c Swale Mallee.
- Westbrooke and Miller (1995): ID 2b *Eucalyptus* open-shrublands with *Triodia* understorey.
- Porteners *et al*. (1997): ID 3a Irregular Dune Mallee and 3b Linear Dune Mallee.

Sandplain Mallee

Sandplain Mallee has a canopy dominated by *Eucalyptus socialis, Eucalyptus dumosa* and *Eucalyptus gracilis* (Plate 5).

The shrub and ground layer has a mix of species including *Austrostipa nitida, Sclerolaena diacantha, Chenopodium desertorum, Olearia pimeleoides, Maireana georgei, Maireana triptera* (Three-wing Bluebush), *Maireana radiata* (Grey Bluebush), *Enchylaena tomentosa* and *Marsdenia australis* (Doubah). Sandplain Mallee shares many species with other vegetation communities in the study area.

Overall the Sandplain Mallee in the study area ranges from good to moderate condition depending on the degree of disturbance from grazing and clearing. Few weed species were recorded in Sandplain Mallee, but where weeds did occur the following species were most common: *Medicago laciniata* (Cut-leaved Medic), *Salvia verbenaca* (Vervain), *Sisymbrium erysimoides* (Smooth Mustard) and *Sonchus oleraceus* (Common Sowthistle).

Plate 5. Typical Sandplain Mallee

Occurrences of the Sandplain Mallee association have been described in other vegetation surveys.

In the Lower/Murray Darling region:

- Benson *et al*. (2006): ID 170 Chenopod sandplain mallee woodland/shrubland of the arid and semi-arid (warm) zones.
- Val (2001): Chenopod Mallee Community

In the vicinity of the study area:

- Scott (1992): ID 3d Sandplain Mallee.
- Westbrooke and Miller (1995): ID 2a *Eucalyptus gracilis*/*E. dumosa*/E. *socialis* open-shrubland.
- Porteners *et al*. (1997): ID 3d Sandplain Mallee.

Mallee Woodland Complex is not listed as a Threatened Ecological Community under either State or Commonwealth legislation.

5.1.2 Belah-Rosewood Woodland

Belah-Rosewood Woodland occurs on level to undulating sand plains on calcareous soils mainly of red-brown loam to loamy sands; solonised brown soils to sandy red earths; reddish brown sands and duplex soils (Porteners et al. 1997). Small depression (gilgai) can be found within this community.

Belah-Rosewood Woodland in the study area is generally dominated by *Casuarina pauper* and the small tree *Alectryon oleifolius* subsp. *canescens* (Plate 6). Within this broad definition, stands of this woodland may contain in varying densities *Geijera parviflora Callitris glaucophylla* and a number of mallee eucalypt species. All of these species, except for mallee eucalypts, may be the dominant canopy species depending on the land use history of the specific location. In the southern portion of the Atlas footprint, *Callitris glaucophylla* is more commonly dispersed among the Belah and Rosewood and occasionally occurs as small canopy monocultures.

The shrub and ground layer has a mix of species including *Enchylaena tomentosa, Dissocarpus paradoxus* (Cannonball Burr)*, Sclerolaena diacantha, Austrostipa nitida, Atriplex stipitata* (Mallee Saltbush)*, Chenopodium curvispicatum, Chenopodium desertorum, Maireana decalvans* and *Brachyscome ciliaris* (Variable Daisy).

Overall the Belah-Rosewood Woodland in the study area ranges from good to moderate condition depending on the degree of disturbance from grazing or clearing. A number of weed species were recorded in Belah-Rosewood Woodland including *Medicago laciniata, Salvia verbenaca, Sisymbrium erysimoides, Reichardia tingitana* (False Sowthistle)*, Malva parviflora* (Small-flowered Mallow)*, Conyza bonariensis* (Flaxleaf Fleabane) and *Sonchus oleraceus.*

Plate 6. Typical Belah-Rosewood Woodland

Occurrences of the Belah-Rosewood Woodland assemblage have been described in other vegetation surveys:

In the Lower Murray Darling region;

- Benson et al. (2006): ID 58 Black Oak – Western Rosewood open woodland on deep sandy loams of the Murray-Darling Depression and Riverina Bioregions and; ID 221 Black Oak-Pearl Bluebush open woodland of the sandplains of the semi-arid warm and arid climate zones.
- Val et al. (2001): 1.Low belah woodlands
- Val (2001): Belah Rosewood Community and components of Cypress Community.

In the vicinity of the study area;

- Scott (1992): ID 4 Belah-Rosewood.
- Westbrooke and Miller (1995): Vegetation community ID 1b *Casuarina pauper*, Belah woodland/open woodland.
- Porteners et al. (1997): ID 4 Belah-Rosewood.

Belah-Rosewood Woodland is not listed as a Threatened Ecological Community under either State or Commonwealth legislation.

5.1.3 Disturbed Area Shrubland Complex

Disturbed Area Shrubland Complex is found in drainage lines, swales between dunes and on sandplains within the Atlas-Campaspe Mine study area (Plate 7). Typically these shrublands occur on soils which have a hard crust or exposed subsoil surface as a result of erosion.

Once disturbed, many shrub and tree species are prevented from re-establishing by grazing of stock and rabbits and shrub species which are unpalatable become dominant over time (Beadle 1948; Benson et al. 2006). Within the study area this complex is typically dominated by the shrub species *Eremophila sturtii* (Narrow-leaf Emu-bush) and *Dodonaea viscosa* subsp. a*ngustissima*, with *Nitraria billardierei* (Dillon Bush) and *Senna* species occurring less commonly. Other species associated with this vegetation community include *Dissocarpus paradoxus, Maireana coronata* (Crown Fissure-weed)*, Vittadinia cuneata* (Fuzzweed)*, Nicotiana goodspeedii, Teucrium racemosum, Eremophila glabra* (Tarbush)*, Enneapogon avenaceus, Sclerolaena obliquicuspis, Chamaesyce drummondii* (Caustic Weed) and *Enchylaena tomentosa*.

Disturbed Area Shrubland Complex is often found in association with disturbed remnants of the vegetation communities Yarran Shrubland, Belah-Rosewood Woodland, Black Box Woodland and Sandplain Mallee and may represent vegetation of this type which is severely disturbed. These areas no longer have characteristics which allow for the determination of past vegetation types. However, survey sites in such areas form a distinct group in the analysis and are closely associated with the Yarran Shrubland group as Yarran Shrubland sites are also highly disturbed. Disturbed shrubland vegetation has been recorded by others as being areas which have been disturbed by grazing, rabbits, clearing and erosion (Beadle 1948; Porteners et al. 1997; Scott 1992; Westbrooke & Miller 1995; Benson et al. 2006).

Disturbed Area Shrubland Complex represents vegetation considered to be remnant of other map units in poor condition within the study area. However, a number of sites have been scored as being in good condition due to the low number of weeds present and a high shrub cover. Weed species recorded in this vegetation community include *Medicago minima* (Woolly Burr Medic)*, Salvia verbenaca, Sisymbrium erysimoides, Conyza bonariensis, Cirsium vulgare* (Spear Thistle)*, Chondrilla juncea* (Skeleton Weed) and *Sonchus oleraceus.*

Plate 7. Typical Shrubland Complex of Disturbed Areas

Occurrences of communities similar to the Disturbed Area Shrubland Complex assemblage have been described in other vegetation surveys:

In the Lower Murray Darling region;

- Benson et al. (2006): ID 143 Narrow-leaved Hopbush-Scrub Turpentine-Senna shrubland of semi-arid and arid sandplains and dunes.
- Val (2001): Mixed Shrubland.

In the vicinity of the study area;

- Porteners et al. (1997): ID 22 Disturbed Shrubland Complex.
- Westbrooke and Miller (1995): ID 4a *Dodonaea viscosa* subsp. *angustissima* shrubland.

Disturbed Area Shrubland Complex is not listed as a Threatened Ecological Community under either State or Commonwealth legislation.

5.1.4 *Mulga Woodland*

Small stands of Mulga Woodland were located on red crusted loamy clay soils in the Campaspe footprint.

The Mulga Woodland in the proposed offset area is dominated by a canopy of *Acacia aneura* (Mulga) with an understorey of chenopod shrubs, herbs and grasses with occasional occurrences of *Hakea tephrosperma* (Hooked Needlewood) and *Eremophila longifolia* (Berrigan) as trees or shrubs (Plate 8). The shrub and ground layers are dominated by *Eremophila sturtii, Dodonaea viscosa* subsp. *angustissima*, *Austrostipa nitida, Austrostipa eremophila, Einadia nutans* (Climbing Saltbush)*, Abutilon otocarpum* (Desert Lantern)*, Maireana triptera, Eremophila glabra, Sclerolaena diacantha* and *Cheilanthes sieberi*.

Mulga Woodland occurs less commonly and in smaller stands in the SFWP. It has not been mapped by other vegetation surveys in the vicinity of the offset study area (Scott 1992; Porteners et al. 1997) and is not included in the mapping of vegetation provided by the Lower Murray Darling CMA. Mulga Woodland is recorded as occurring in Mungo National Park (Westbrooke & Miller 1995).

Mulga Woodland is in poor condition within the study area, with most sites being scored as moderate to poor. Much of the canopy layer has disappeared and heavy grazing has depleted the shrub and ground layers. Weed species recorded in this vegetation community include *Medicago minima, Salvia verbenaca, Sisymbrium erysimoides, Conyza bonariensis, Cirsium vulgare, Chondrilla juncea* and *Sonchus oleraceus.*

Plate 8. Mulga Woodland with remnant canopy of *Acacia aneura*

Occurrences of communities similar to the Mulga Woodland assemblage have been described in other vegetation surveys:

In the Lower Murray Darling region;

- Benson et al. (2006): ID 199 Hooked Needlewood-Needlewood-Mulga-Turpentine Bush open shrubland of the semi-arid and arid plains.

In the vicinity of the study area by;

- Westbrooke and Miller (1995): ID 3a *Acacia aneura* open-woodland.

Mulga Woodland is not listed as a Threatened Ecological Community under either State or Commonwealth legislation.

5.1.5 *Yarran Shrubland*

Yarran Shrubland occurs on level to undulating plains of brown-red calcareous loams. Small depressions (gilgai) are typically found within this community. Yarran Shrubland has been extensively cleared in the past for cropping and grazing and now occurs as patches of heavily grazed vegetation dominated by shrub species such as *Eremophila sturtii, Sclerolaena obliquicuspis* and *Dissocarpus paradoxa* which are not palatable to stock (Plates 9 to 11).

Typically Yarran Shrubland is distinguished by a canopy dominated by *Acacia melvillei* (Yarran) with other species such as *Casuarina pauper* and the small tree *Alectryon oleifolius* subsp. *canescens* occasionally present. The understory is composed of chenopod shrubs, herbs and grasses (Scott 1992; Porteners et al. 1997; Benson et al. 2006).

Plate 9. Yarran Shrubland showing senescing *Acacia melvillei* tree

Plate 10. Yarran Shrubland showing small regenerating shrubs of *Acacia melvillei*

Plate 11. Yarran Shrubland with regenerating *Acacia melvillei* in foreground

Within the study area the vegetation community Yarran Shrubland has very little canopy with *Acacia melvillei* represented by small shrubs or regenerating rootstock. The shrub and ground layers are dominated by *Eremophila sturtii, Austrostipa nitida, Vittadinia cervicularis, Sclerolaena diacantha, Sclerolaena obliquicuspis, Dissocarpus paradoxus, Austrodanthonia setacea* (Smallflower Wallaby Grass)*, Maireana triptera, Einadia nutans, Oxalis perennans, Sida intricate* (Twiggy Sida)*, Convolvulus remotus* and *Enchylaena tomentosa*.

The species *Acacia melvillei* was also recorded as isolated individuals in other assemblages, including Belah-Rosewood Woodland and Black Box Woodland. Another *Acacia* species, *Acacia homalophylla*, is often confused with *Acacia melvillei* and was also recorded during the field survey. Identification of both species was made using the characteristics of seed pods, which were present during the survey period. *Acacia melvillei* was the most common species found, with only a few occurrences of *A. homalophylla* being recorded. Although *Acacia melvillei* is able to re-sprout from root stock this species is highly palatable and grazing prevents the re-establishment of mature plants.

Determination of Yarran Shrubland was undertaken using the results of the data analysis. Within this analysis, sites with *Acacia melvillei* formed a distinct assemblage, separate from other vegetation assemblages. One site of relatively intact Yarran Shrubland (CSW1) was surveyed and this site grouped with the highly disturbed Yarran Shrubland sites within the analysis. Closely associated with this assemblage was another assemblage, Disturbed Area Shrubland Complex that generally did not have regenerating *Acacia melvillei* present, but was highly disturbed and dominated by unpalatable shrub species found in the Yarran Shrubland assemblage. Sites in the Disturbed Area Shrubland Complex may have supported Yarran Shrubland community in the past. Distinguishing the boundary between Yarran Shrubland and Disturbed Area Shrubland Complex was difficult. Given that Yarran Shrubland is an EEC (*Acacia melvillei* Shrubland) a precautionary approach was taken to delineating these two closely related species assemblages.

Remnants of Yarran Shrubland in the study area are generally in moderate to poor condition, lacking structural integrity and having higher numbers of weed species than most other map units in the study area. However, a number of sites have been scored as being in good condition due to the low number of weeds present and a high shrub cover. Given the significant disturbance of Yarran Shrubland due to its location in areas often considered to be arable, the fact that the plant is considered to be folder for sheep and cattle, the significant impact of high rabbit numbers on seedlings/regrowth and the high numbers of goats it is rare to find a patch of this shrubland which could be considered to be intact. Most sites had dead large individuals of *Acacia melvillei* often with heavily grazed regeneration occurring nearby.

A number of weed species were recorded in Yarran Shrubland including *Picris hieracioides* (*Picris angustifolia* subsp. *angustifolia*), *Carthamus lanatus* (Saffron Thistle), *Centaurea calcitrapa* (Star Thistle), *Medicago laciniata, Medicago minima, Asphodelus fistulosus, Salvia verbenaca, Cucumis myriocarpus, Marrubium vulgare* (White Horehound), *Sisymbrium erysimoides, Reichardia tingitana, Malva parviflora, Conyza bonariensis* and *Sonchus oleraceus, Malva parviflora, Conyza bonariensis* and *Sonchus oleraceus.*

Occurrences of the Yarran Shrubland assemblage have been described in other vegetation surveys:

In the Lower Murray Darling region;

- Benson et al. (2006): ID 23 Yarran shrubland of the sandplains and plains of the semi-arid (warm) and arid climate zones.

In the vicinity of the study area by;

- Scott (1992): ID 17 *Acacia melvillei* woodland.
- Westbrooke and Miller (1995): ID 3b *Acacia melvillei* tall open shrubland.
- Porteners et al. (1997): ID 17 *Acacia melvillei* woodland.

'Acacia' shrubland was mapped as occurring on Boree Plains station during a biodiversity assessment linked to a landuse agreement (Anon 2002). An environmental assessment report of Boree Plains includes the statement that "in some instances patches of *Acacia homalophylla* was present" (Anon 2002). It is likely that these stands of vegetation represented *Acacia melvillei* Shrubland EEC given the confusion between the two species (Scott 1992; Porteners et al. 1997). *Acacia melvillei* is more likely to form stands in this location than *Acacia homalophylla* which is more common on the plains and slopes further east (Porteners et al. 1997).Benson et al. (2006) lumps *Acacia melvillei* and *Acacia homalophylla* into the one community 'Yarran shrubland of the sandplains and plains of the semi-arid (warm) and arid climate zones' (Veg. Comm. ID 23) for semi-arid NSW.

Yarran Shrubland mapped in the study area conforms to the description of '*Acacia melvillei* Shrubland in the Riverina and Murray Darling Depression Bioregions' an EEC under the TSC Act (Appendix J). It is not listed under Commonwealth legislation.

5.1.6 Sandhill Pine Woodland

Sandhill Pine Woodland is associated with raised sandy areas such as low linear dunes, sandhills and ridges (Porteners et al. 1997). Within the study area this assemblage of species is found on low red sand rises and dunes across the chenopod shrubland plains.

Typically Sandhill Pine Woodland is distinguished by a canopy of *Callitris glaucophylla* with *Alectryon oleifolius* subsp. *canescens* and *Geijera parviflora* occurring less often, and an understorey of species such as *Enchylaena tomentosa*, *Salsola kali, Chenopodium cristatum* (Crested Goosefoot)*, Maireana pyramidata, Calandrinia eremaea* and *Calotis hispidula* (Bogan Flea) (Scott 1992; Porteners et al. 1997; Westbrooke & Miller 1995).

Within the study area Sandhill Pine Woodland is very disturbed with only a few remnant *Callitris glaucophylla* trees present in the canopy layer (Plate 12). The shrub and ground layer includes species such as *Dissocarpus paradoxus, Enchylaena tomentosa, Sclerolaena diacantha, Salsola kali, Maireana pyramidata, Austrostipa nitida* and *Heliotropium europaeum* (Potato Weed)*.*

The species *Callitris glaucophylla* can also occur as a co-dominant canopy species in other woodland communities on sandplains. However sites surveyed in examples of these locations e.g. in the south of the Atlas footprint, have a species composition more closely aligned with that of Belah-Rosewood Woodland and group with other sites of this woodland in the analysis (e.g. Sites CSC1, CAL1_OFF1, CS9, CS10).

All remnants of Sandhill Pine Woodland in the study area are in very poor condition, being heavily grazed and possibly logged in the past. Weed species recorded in this vegetation community include *Salvia verbenaca, Sisymbrium erysimoides, Medicago polymorpha* (Burr Medic)*, Conyza bonariensis, Cirsium vulgare, Cucumis myriocarpus, Psilocaulon tenue* (Wiry Noon-flower)*, Chondrilla juncea* and *Sonchus oleraceus.*

Plate 12. Highly disturbed Sandhill Pine Woodland showing mature and dead *Callitris glaucophylla* trees

Occurrences of the Sandhill Pine Woodland assemblage have been described in other vegetation surveys:

In the Lower Murray/Darling region;

- Benson et al. (2006): ID 28 White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone'.
- Val (2001): Components of Cypress Community.

In the vicinity of the study area by;

- Scott (1992): ID 16 *Callitris* Mixed Woodland.
- Westbrooke and Miller (1995): ID 1b *Callitris glaucophylla* Cypress-Pine Woodland.
- Porteners et al. (1997): ID 16 *Callitris* Mixed Woodland.

Sandhill Pine Woodland mapped in the study area conforms to the description of 'Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions' a listed EEC under the TSC Act (Appendix K). It is not listed under Commonwealth legislation.

5.1.7 Black Box Woodland

Small stands of Black Box Woodland occur within the study area in low lying areas where surface and sub-surface runoff accumulates after rain. Soils where Black Box Woodland occurs are characterized by medium clay loam Hypercalcic and Supracalcic Calcarosols or duplex (texture contrast) Red Chromosols (Ogyris 2012). Black Box Woodland has been extensively cleared within the study area, remaining only in areas where cultivation or clearing for grazing is not practical due to the potential for such areas to flood during rain periods.

Eucalyptus largiflorens (Black Box) (Plate 13) is the dominant tree species within this vegetation assemblage with an understory of grasses, herbs and chenopod shrubs. The shrub and ground layers has a mix of species including *Eremophila maculata* (Spotted Fushsia-bush), *Pseudognaphalium luteoalbum* (Jersey Cudweed), *Marsilea drummondii* (Common Nardoo), *Lachnagrostis filiformis, Teucrium albicaule, Wahlenbergia tumidifructa, Polygonum plebeium* (Small Knotweed), *Teucrium racemosum* (Forest Germander), *Verbena gaudichaudii, Stemodia florulenta* (Blue-rod), *Persicaria lapathifolia* (Pale Knotweed), *Myriophyllum verrucosum* (Red Water-milfoil), *Austrostipa nitida, Nicotiana goodspeedii, Rumex tenax* (Shiny Dock), *R. crystallinus* (Shiny Dock) and *Bulbine semibarbata* (Native Leek). The shrub *Acacia melvillei* may also occur, particularly where Black Box Woodland and Yarran Shrubland intergrade.

Overall the Black Box Woodland in the study area is in good to poor condition depending on the degree of disturbance from grazing or clearing. A number of weed species were recorded in Black Box Woodland *including Picris angustifolia* subsp. *angustifolia, Spergularia rubra, Verbena supina* (Trailing Verbena), *Lactuca serriola* (Prickly Lettuce), *Medicago laciniata, Medicago minima, Salvia verbenaca, Sisymbrium erysimoides, Onopordum acaulon* (Stemless Thistle), *Reichardia tingitana, Malva parviflora, Conyza bonariensis* and *Sonchus oleraceus.*

Plate 13. Typical Black Box Woodland

Occurrences of the Black Box Woodland assemblage have been described in other vegetation surveys:

In the Lower Murray/Darling region;

- Benson et al. (2006): ID 15 Black Box open woodland with chenopod understorey mainly on the outer floodplains in south-western NSW.
- Val et al. (2001): 3. Low black box woodland.
- Val (2001): Black Box Community

In the vicinity of the study area;

- Scott (1992): ID 2 Black Box.
- Westbrooke and Miller (1995): ID 1a *Eucalyptus largiflorens*, Black Box open-woodland.
- Porteners et al. (1997): ID 2: Black Box Woodland.

One threatened flora species, the *Lepidium monoplocoides*, has been located within this vegetation community in the study area.

Black Box Woodland is not listed as a Threatened Ecological Community under either State or Commonwealth legislation.

5.1.8 Grass/Herblands of Drainage Depressions

Areas of Grass/Herblands of Drainage Depressions are found in drainage depressions or gilgai and are often associated with Black Box Woodland, Yarran Shrubland and Belah-Rosewood Woodland communities. In some locations of the study area, the assemblage occurs in relatively large drainage depressions which often support Black Box Woodland. In other locations it occurs in depressions known as gilgai, which form in clay-rich soils exposed to periodic wetting and drying.

These depressions have a unique association of herb and grass species including *Marsilea drummondii, Centipeda cunninghamii* (Common Sneezeweed), *Centipeda thespidioides* (Desert Sneezeweed), *Goodenia fascicularis, Stemodia florulenta, Teucrium racemosum, Teucrium albicaule, Eragrostis falcata* (Sickle Lovegrass), *Wahlenbergia gracilenta* (Annual Bluebell), *Isolepis australiensis* and *Schenkia spicata* (Spike Centaury) (Plates 14 and 15).

Grass/Herblands of Drainage Depressions in the study area are in moderate to poor condition, being severely disturbed. Damage to this assemblage is high as they retain water for longer periods that surrounding areas and consequently are heavily visited by stock and goats. Weed species associated with this vegetation community include *Spergularia marina* (Lesser Sea-Spurrey), *Medicago minima, Salvia verbenaca, Sisymbrium erysimoides, Conyza bonariensis, Cirsium vulgare, Chondrilla juncea* and *Sonchus oleraceus.* These depressions are likely to have very little vegetation present during drought periods.

Grass/Herblands of Drainage Depressions occur throughout the study area generally in very small patches and consequently many have not been mapped. No large areas were located within the Atlas-Campaspe Mine study area; however a number have been located and mapped in the surrounding area (AMBS 2012).

Plate 14. Grass/Herblands of Drainage Depressions showing drying depression and disturbance from stock visits.

Plate 15. Grass/Herblands of Drainage Depressions showing larger area and disturbance by goats

Occurrences of communities similar to Grass/Herblands of Drainage Depressions assemblage have not previously been described in the vegetation surveys of Benson et al. (2006), Scott (1992), Westbrooke and Miller (1995) or Porteners et al. (1997).

One threatened flora species, *Lepidium monoplocoides*, has been located within this vegetation community in the study area.

Grass/Herblands of Drainage Depressions is not listed as a Threatened Ecological Community under either State or Commonwealth legislation.

5.1.9 Chenopod Shrubland Depressions

Depressions within the clay soils of the alluvial plains support an assemblage of species associated with locations where water accumulates and is retained after rain for longer periods than the surrounding environment. These depressions vary in size from 500 or more metres across to only a few metres across.

Chenopod Shrubland Depressions do not have a tree canopy layer, the shrub and ground layers are characterised by the following species *Marsilea drummondii, Eleocharis pallens* (Pale Spike-sedge), *Senecio runcinifolius* (Tall Groundsel), *Juncus aridicola, Chenopodium nitrariaceum* (Nitre Goosefoot), *Eragrostis australasica* (Cane Grass), *Walwhalleya proluta, Sclerolaena muricata* (Black Rolypoly), *Nitraria billardierei, Haloragis glauca, Centipeda thespidioides, Stemodia florulenta* and *Lachnagrostis filiformis* (Plate 16).

Overall the Chenopod Shrubland Depressions vegetation is in good condition as a result of the recent rainfall. It is likely that these depressions would have a much lower cover of vegetation during drought periods. The impact of sheep grazing appeared to be low in these locations even though they had a good cover of vegetation. Possibly the species present in these depressions are less palatable to stock than the surrounding chenopod shrubland species. A number of weed species were present in Chenopod Shrubland Depressions *Medicago polymorpha* and *Malva parviflora* were common with a high percentage cover, while others such as *Verbena officinalis* (Common Verbena), *Aster subulatus* (Wild Aster), *Galium aparine* (Goosegrass) and *Sisymbrium irio* (London Rocket) were present in low numbers.

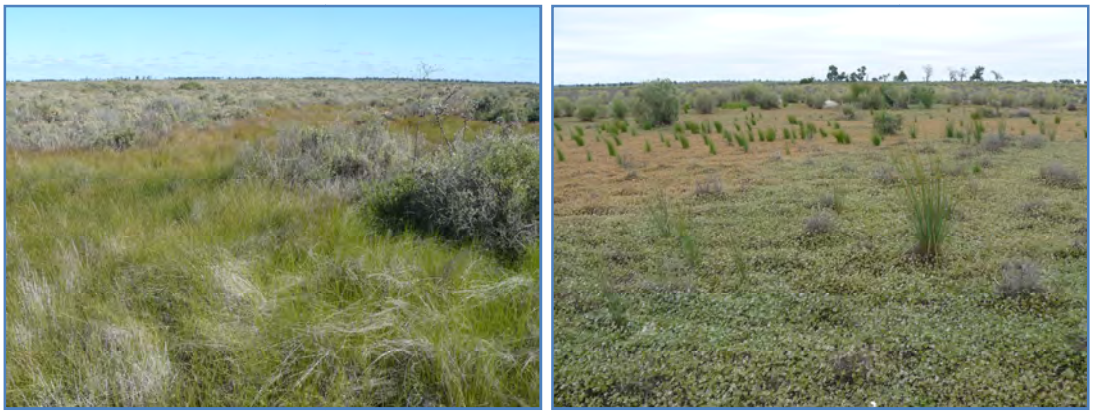


Plate 16. Two structural states of Chenopod Shrubland Depressions

Chenopod Shrubland Depressions vary in size, only the larger depressions have been mapped however unmapped smaller depressions occur within the study area.

The Chenopod Shrubland Depressions assemblage is similar to the following assemblages that have been described in other vegetation surveys, however although present *Eragrostis australasica* (Canegrass) was not at the time of survey a dominant species in the depressions found in the study area.

In the Lower Murray Darling region;

- Benson et al. (2006): ID 24 Canegrass swamp of drainage depressions, lakes and pans of the inland plains.
- Val (2001): Components of the Canegrass and Sedge Swamp Communities.

In the vicinity of the study area by;

- Scott (1992): ID 13 Canegrass.
- Westbrooke and Miller (1995): ID 5a *Eragrostis australasica*, Canegrass tussock grassland.
- Porteners et al. (1997): ID 13 Canegrass.

Chenopod Shrubland Depression vegetation is not listed as a Threatened Ecological Community under either State or Commonwealth legislation.

5.1.10 Saltbush Shrubland

Saltbush Shrubland occurs in saline situations on grey to brown clay soils of the ancient alluvial plains in the MCTR roadworks study area. This assemblage is located on chenopod shrubland plains in association with the vegetation community Bluebush Shrubland.

A canopy layer is not present in Saltbush Shrubland, the shrub and ground layer has a mix of species generally dominated by *Atriplex vesicaria*, and including *Disphyma crassifolium, Tecticornia tenuis, Minuria cunninghamii, Marsilea drummondii, Malacocera tricornis* (Soft Horns), *Sclerolaena divaricata* (Tangled Copperburr) and *Sporobolus caroli* (Fairy Grass) (Plate 17).

Overall the Saltbush Shrubland in the study area is in moderate to poor condition depending on the intensity of grazing, damage from rabbits and soil erosion events. Few weeds were recorded in survey sites, those present were *Sisymbrium irio, Sonchus oleraceus* and *Medicago polymorpha.*

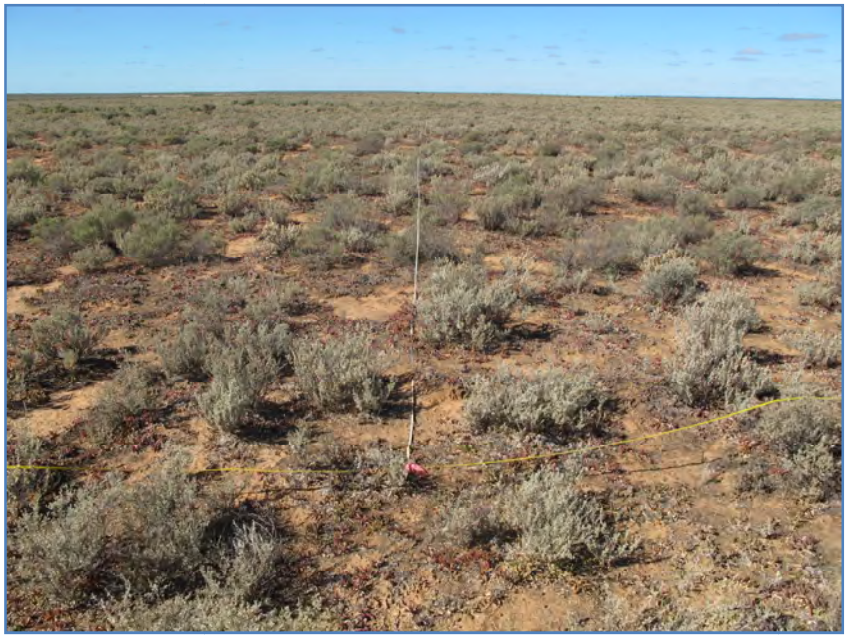


Plate 17. Saltbush Shrubland showing sparse ground layer and grazing disturbance

Occurrences of the Saltbush Shrubland assemblage have been described in other vegetation surveys:

In the Lower Murray/Darling region;

- Benson et al. (2006): ID 18 Slender Glasswort low shrubland in saline depressions in the semi-arid and arid climate zones.
- Val (2001): Components of the Herbland and Chenopod Shrubland Communities.

In the vicinity of the study area by;

- Scott (1992): ID 11 Bladder Saltbush with *Sclerostegia tenuis*.
- Westbrooke and Miller (1995): ID 4c *Atriplex vesicaria* low open-shrubland.
- Porteners et al. (1997): ID 12 *Sclerostegia tenuis* and ID11 Bladder Saltbush.

Saltbush Shrubland vegetation is not listed as a Threatened Ecological Community under either State or Commonwealth legislation.

5.1.11 Bluebush Shrubland

Bluebush Shrubland occurs on deep grey to brown clay soils of the alluvial plains in the MCTR roadworks study area. This assemblage occurs on chenopod shrubland plains in association with the vegetation community Saltbush Shrubland.

A canopy layer is not present in Bluebush Shrubland, the shrub and ground layer has a mix of species generally dominated by *Maireana pyramidata* and including *Maireana appressa, Austrostipa nitida, Dissocarpus paradoxus, Sclerolaena patenticuspis, Enneapogon avenaceus, Atriplex lindleyi, Sida intricata, Poa fax* (Scaly Poa)*, Chenopodium cristatum, Minuria cunninghamii, Chloris truncata* (Windmill Grass)*, Portulaca oleracea* (Pigweed)*, Malacocera tricornis, Austrodanthonia setacea, Enchylaena tomentosa, Atriplex eardleyae* and *Chamaesyce drummondii* (Plate 18).

Overall the Bluebush Shrubland in the study area is in moderate to poor condition depending on the intensity of grazing, damage from rabbits and soil erosion events. A number of weeds were recorded in survey sites including *Alyssum linifolium, Brassica tournefortii, Carrichtera annua, Citrullus lanatus var. lanatus, Dittrichia graveolens, Erodium cicutarium, Heliotropium europaeum, Malva spp., Medicago minima, Salvia verbenaca, Schismus barbatus, Sisymbrium irio* and *Sonchus oleraceus.*

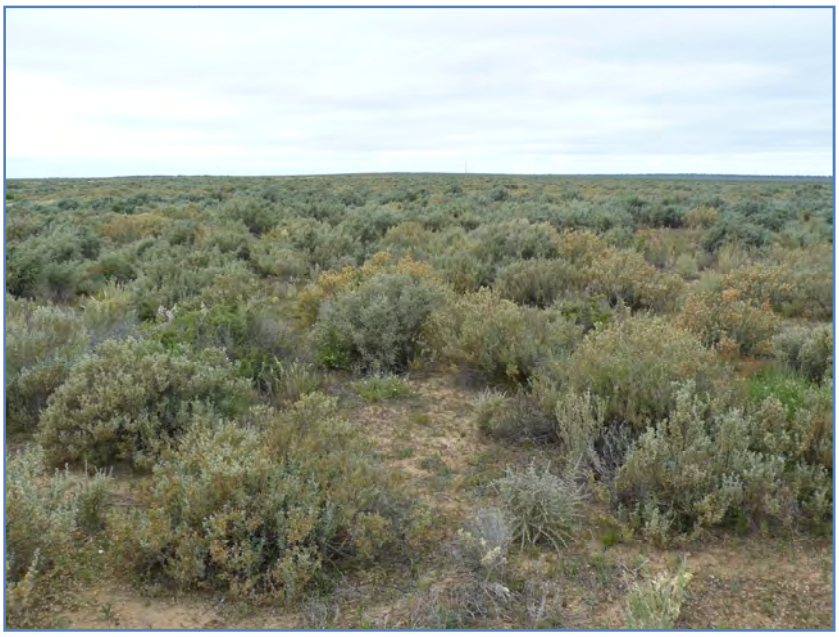


Plate 18. Typical Bluebush Shrubland

Occurrences of the Bluebush Shrubland assemblage have been described in other vegetation surveys:

In the Lower Murray Darling region;

- Benson et al. (2006): ID 153 Black Bluebush low open shrubland of the alluvial plains and sandplains of the arid and semi-arid zones.
- Val et al. (2001): 2. Low bluebush shrublands.
- Val (2001): Chenopod Shrubland Community.

In the vicinity of the study area by;

- Scott (1992): ID 8 Black Bluebush.
- Westbrooke and Miller (1995): ID 4b *Maireana pyramidata/M. sedifolia* Bluebush low open-shrubland.

- Porteners et al. (1997): ID 8 Black Bluebush.

One threatened flora species, *Brachyscome papillosa*, has been located in the study area within forms of this vegetation community found on red and grey cracking clays with a high cover of *Atriplex lindleyi*.

Bluebush Shrubland vegetation is not listed as a Threatened Ecological Community under either State or Commonwealth legislation.

5.1.12 Scalded Chenopod Shrubland

Scalded Chenopod Shrubland occurs in locations where grazing and soil erosion have resulted in the exposure of the subsoil (Plate 19). These locations are devoid of almost all vegetation making determination of a specific unit difficult. Scalding can occur in small or large patches and are often dotted with hummocks which may support vegetation in good seasons (Beadle 1948). Scalded Chenopod Shrubland was in poor condition.

Plate 19. Scalded Chenopod Shrubland

5.1.13 Cleared Land

A portion of the riverine plain located in the study area has been cleared of native vegetation and periodically cultivated (Plate 20). There are occasional occurrences of remnant native species within this area, sometimes occurring as small isolated clumps of trees. This vegetation community represents land that is considered too disturbed to be able to make reliable conclusions about the vegetation that occurred here in the past. It is most likely that this area was covered by stands of Yarran Shrubland, Black Box and Belah-Rosewood Woodland. Regenerating *Acacia melvillei* suggests that a significant portion may have once included Yarran Shrubland. The Cleared Land vegetation map unit is in poor condition.

Plate 20. Cleared land showing regenerating *Acacia melvillei* (Yarran)

5.2 Vegetation of the Ivanhoe Rail Facility Study Area

5.2.1 *Belah-Rosewood/Acacia Woodland*

The Belah-Rosewood/*Acacia* Woodland map unit occurs on level to undulating sand plains on calcareous soils mainly of red-brown loam to loamy sands; solonised brown soils to sandy red earths; reddish brown sands and duplex soils (Porteners et al. 1997).

Belah-Rosewood/*Acacia* Woodland contains a mosaic of vegetation in which patches have a varying dominance of either *Casuarina pauper* or *Acacia homalophylla* (Yarran).

In locations where *Casuarina pauper* is the dominant canopy species *Alectryon oleifolius* subsp. *canescens* and *Geijera parviflora* occur and the understory consists of chenopod shrubs such as *Dissocarpus paradoxus*, *Atriplex eardleyae* and *Maireana brevifolia* (Plate 21). Grasses are generally less dense and herbs such as *Tetragonia tetragonioides* and *Zygophyllum simile* more common.

In locations where *Acacia homalophylla* is the dominant the canopy tends to be is more open and a denser layer of the grass species *Austrostipa nitida* occurs with a shrub layer dominated by *Maireana pyramidata* and *Maireana georgei* (Plate 22). Herb species including *Brachyscome ciliaris* var. *lanuginosa*, *Maireana sclerolaenoides*, *Zygophyllum iodocarpum* and *Vittadinia gracilis* occur.

Overall the Belah-Rosewood/*Acacia* Woodland in the study area ranges from good to moderate condition depending on the degree of disturbance from grazing or clearing. A number of weed species were recorded including *Medicago truncatula* (Barrel Medic), *Salvia verbenaca, Carrichtera annua* (Wards Weed), *Alyssum linifolium* (Flax-leaf Alyssum) and *Sonchus oleraceus.*

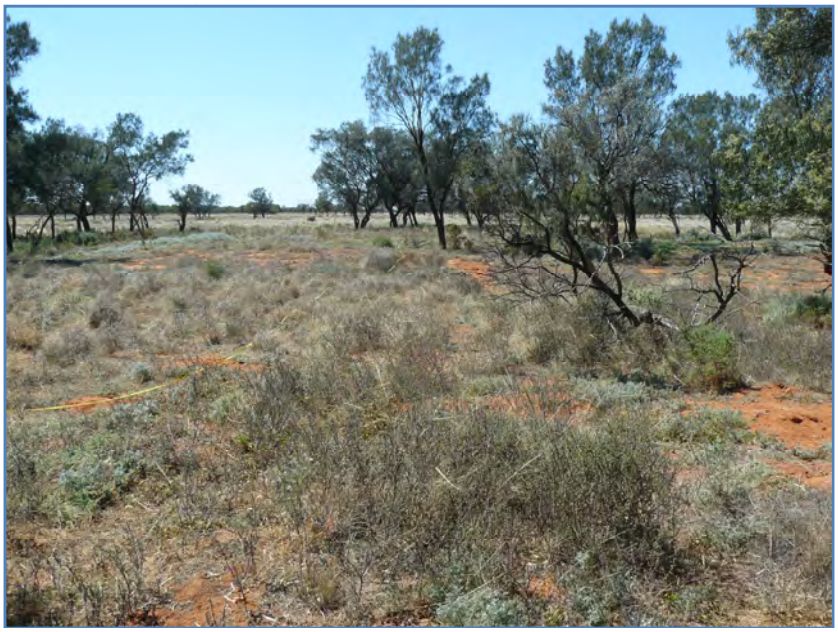


Plate 21. Belah-Rosewood/Acacia Woodland with a canopy dominated by *Casuarina pauper*

Plate 22. Belah-Rosewood/*Acacia* Woodland with a canopy dominated by *Acacia homalophylla*

Acacia loderi was recorded at four locations in the study area three of which occur within the development footprint. Occurrences were of 1 to 4 individuals. When this species forms a dominant canopy in the landscape it represents the EEC *Acacia loderi* Shrubland. All occurrences were isolated and not considered to represent this EEC (Plate 23).

Plate 23. *Acacia loderi* individual

Occurrences of the Belah-Rosewood/*Acacia* Woodland assemblage have been described in other vegetation surveys:

In the Lachlan region;

- Benson et al. (2006): ID 58 Black Oak – Western Rosewood open woodland on deep sandy loams of the Murray-Darling Depression and Riverina Bioregions and; ID 221 Black Oak-Pearl Bluebush open woodland of the sandplains of the semi-arid warm and arid climate zones.
- Benson et al. (2006): Yarran shrubland on peneplains and alluvial plains of central-northern NSW
- Val et al. (2001): 1.Low belah woodlands
- Val (2001): Belah Rosewood Community.

In the vicinity of the study area;

- Porteners et al. (1997): ID 4 Belah-Rosewood.

Species assemblages of the Belah-Rosewood/*Acacia* Woodland map unit are not listed as Threatened Ecological Communities under either State or Commonwealth legislation.

5.2.2 Native Grassland/Sparse Acacia/Chenopod Shrubs

Native Grassland/Sparse *Acacia*/Chenopod Shrubs is found in the Ivanhoe Rail Facility study area in cleared and grazed locations on solonised brown and duplex soils. A continuous canopy layer does not occur in this assemblage however *Acacia* species occur as groups of one to a few individuals and shrubs are sparsely distributed. The community represents areas of woodland which have been cleared.

The individual occurrences of *Acacia* species are mainly *Acacia homalophylla* with *Acacia oswaldii* and *Acacia loderi* occurring much less frequently (Plate 24). The sparse shrub layer is dominated by *Maireana pyramidata* and *Rhagodia spinescens.* The ground layer includes species such as *Austrostipa nitida*, *Sporobolus caroli, Austrodanthonia setacea, Sclerolaena diacantha, Podolepis canescens, Teucrium racemosum, Lepidium phlebopetalum, Rhodanthe floribunda* and *Vittadinia gracilis.*

Overall, Native Grassland/Sparse *Acacia*/Chenopod Shrubs is in moderate to poor condition with the community retaining a cover of native species although the canopy and shrub layers have mostly been removed. A number of weed species occur including *Asphodelus fistulosus* (Onion Weed), *Carrichtera annua*, *Salvia verbenaca, Echium plantagineum* (Patterson's Curse) and *Medicago truncatula.* In some locations *Asphodelus fistulosus* and *Carrichtera annua* contributed significantly to the cover of vegetation in the ground layer.

Plate 24. Typical view of native grassland areas in the Ivanhoe Rail Facility study area

Occurrences of Native Grassland/Sparse *Acacia*/Chenopod Shrubs assemblage have been described in the other vegetation surveys:

In the Lachlan region:

- Benson et al. (2006): ID 165 Derived corkscrew grass grassland/forbland on sandplains and plains in the semi-arid (warm) climate zone.
- Val (2001): Grassland.

Native Grassland/Sparse *Acacia*/Chenopod Shrubs vegetation is not listed as a Threatened Ecological Community (EEC) under either State or Commonwealth legislation.

5.3 Vegetation condition

Typically vegetation condition is assessed using criteria such as percentage weed cover, state of the structural layers, cover of litter, percentage of bare ground and number and cover of native species. The ability of these criteria to reflect condition depends on the vegetation community to which they are applied. In coastal sandstone vegetation for example, deep litter cover and an absence of bare ground would be considered to be positive attributes in relation to condition, whereas in semi-arid woodland low levels of litter and bare ground are a natural phase of the cycles of drought which are characteristic of this environment and do not necessarily represent vegetation in poor condition.

Grazing, clearing and timber harvesting have altered the structural and species composition of the vegetation in the Project area and surrounds. Beadle (1948) recorded that species composition in semi-arid areas was being altered by grazing of stock with palatable perennial species being replaced by non-palatable species. Pickard (1994) estimated that timber harvesting for the fencing of properties of the Western Division was responsible for the removal of 10^7 trees – mainly *Acacia* and *Callitris* species. Nevertheless, all vegetation communities in the Project area are still dominated by native species and most still have structural layers considered to be typical of their respective Keith vegetation formation (Keith 2006).

Preliminary survey investigations indicated that condition assessment of sites across all vegetation types utilising standard methods would result in a good/moderate condition score for all but those located in land cleared for cropping. It was noted however that levels of disturbance/condition could be expressed as a function of community type. For this reason, data collected during the full floristic site surveys and RDP sites (area surrounding the Project area) were used to describe the condition of vegetation as a function of vegetation type.

Using the criteria in Section 3.2.8, RDP sites were allocated one of three condition scores. Table 11 lists the percentage of sites which were classified as poor or poor/moderate in different vegetation communities. Overall sites located on soils with higher clay content (Black Box Woodland, Grass/Herbland of Drainage Depressions, Yarran Shrubland, Disturbed Area Shrubland Complex and Mulga Woodland) were more inclined to be in moderate/poor or poor condition than the Belah-Rosewood Woodland, Linear Dune Mallee and Sandplain Mallee vegetation.

Table 11. Percentage of RDP sites in each community with a poor and combined moderate to poor condition score.

Vegetation Community	Total Number of RPD Sites/Community	% Moderate/Poor	% Poor
Belah-Rosewood Woodland	125	24.8	0.0
Black Box Woodland	9	55.6	22.2
Linear Dune Mallee	164	1.2	0.0
Mulga Woodland	4	50.0	0.0
Sandplain Mallee	76	14.5	1.3
Disturbed Area Shrubland Complex	34	41.2	2.9
Yarran Shrubland	38	44.7	21.1
Grass/Herbland of Drainage Depressions	6	16.7	0.0

Comparisons of data collected on numbers of native species and percentage cover of exotic species (full floristic sites) shows the relationship between vegetation type, number of native species and percentage cover of exotic species recorded (Table 12). As would be expected, cleared land used for cropping had the lowest number of native species and the highest percentage cover of exotics, while Black Box Woodland, Yarran Shrubland, Disturbed Area Shrubland Complex and Bluebush Shrubland had high percentage cover of exotic species but a similar number of native species to other communities excluding Cleared Land. All communities except for Cleared Land and the highly disturbed Sandhill Pine Woodland had an average of 12 or more native species present within survey sites.

Table 12. Relationship between vegetation type, number of native species, percentage cover of exotic species, number of trees with hollows and total length of fallen logs recorded at full floristic survey sites.

Vegetation Community	Average Number of Native Plant Species	Average % Exotic Species Cover	Average number trees with hollows (5 cm)	Average Total length of fallen 10 cm diam. logs (m)
Belah-Rosewood Woodland	21.0	3.7	0.5	19.3
Black Box Woodland	20.1	9.6	1.2	20.9
Linear Dune Mallee	21.9	1.0	0.0	4.9
Mulga Woodland	26.3	0.0	0.0	36.0
Sandplain Mallee	18.7	2.6	0.1	10.9
Sandhill Pine Woodland	10.0	1.2	0.0	3.7
Disturbed Area Shrubland Complex	16.0	9.5	0.0	0.9
Bluebush Shrubland	14.5	5.0	0.1*	2.3*
Chenopod Shrubland Depressions	18.0	0.1	0.0	0.0
Saltbush Shrubland	12.7	2.7	0.0	0.0
Yarran Shrubland	17.0	5.0	0.0	4.6
Cleared Land	6.7	10.7	0.0	0.0
Belah-Rosewood/Acacia Woodland	26.5	10.0	0.0	4.0
Native Grassland/Sparse Acacia/Chenopod Shrubs	24.3	4.8	0.0	0.0

* Fallen logs and hollow associated with individual dead tree at one site
cm = centimetre

A greater diversity of weed species were found in the Black Box Woodland, Disturbed Area Shrubland Complex, Yarran Shrubland and Bluebush Shrubland with between 22 and 38 weed species recorded across all survey sites in these communities. In mallee woodland complex survey sites no more than 9 weed species were recorded across all survey sites (Table 8, Appendix H).

Mallee woodland complex has been less affected by timber harvesting or clearing, however the impact of grazing can be seen in both Linear Dune Mallee and Sandplain Mallee as erosion resulting from tracking in the deeper dunes and removal of surface soil on the sandplains. A high level of goat activity was observed in mallee which had been recently burnt (approximately 10 years ago) an observation also made by Val et al. (2001).

Yarran Shrubland in the Project area has lost the canopy layer in most locations as the Acacias were used to provide fodder in drought years and later cleared for cultivation. Subsequent regeneration of the canopy species in this community is prevented by grazing and ringbarking by rabbits.

Areas of Disturbed Shrubland Complex are thought to represent locations where severe long-term disturbance has resulted in the restriction of the regeneration of palatable species including canopy species. Only isolated mallee eucalypt, *Casuarina pauper*, *Callitris* sp. or stunted regenerating *Acacia* shrubs are present to indicate the vegetation that may have once occurred here.

Bluebush Shrubland had a higher number of weed species than other communities (Table 8). These areas have been grazed for decades and the soils have higher clay content and retain moisture for longer than in most other communities. These characteristics provide favourable conditions for weed establishment. As well survey sites were located in close proximity to an existing roadway where weed species are general found in higher densities. A high incidence of rabbit activity and weed species has been reported by Val et al. (2001) in Bluebush communities.

Hollows were recorded more often in Belah-Rosewood Woodland and Black Box Woodland, as these communities have trees which grow large enough to develop hollows of 5 cm or more in diameter (Table 12). In Sandplain Mallee (one site with a tree hollow) an occasional mallee eucalypt species will develop a more typical tree shape rather than the multi stemmed mallee form. Hollows were not recorded at sites in other vegetation communities.

The MCTR roadworks study area was highly disturbed in locations associated with the construction of drainage ponds and within the road verge (Plates 25 and 26). Cultivated lands are the only areas where introduced species have provided a higher percentage of the vegetation cover than natives, and at times when cropping is not occurring the percentage cover of introduced species is likely to be reduced.

Plate 25. Highly disturbed road verge, drainage pond in background on left

Plate 26. Disturbed road verge scalding from road runoff and grazing (Saltbush Shrubland)

Anecdotal observations and results from the condition assessment found that the closer survey sites were to water tanks the higher the level of disturbance observed e.g. more intense grazing pressure, tracking, erosion, loss of biological soil crust and weed species (Plate 27). In the biodiversity survey of the Lower Murray Darling Bioregion Val et al. (2001) recorded cattle most frequently in Belah-Rosewood Woodland and sheep more frequently in Bluebush shrublands. Similar to the findings of this survey, a high level of rabbit activity and exotic weeds was observed by Val et al. (2001) in Black Box Woodlands.

Plate 27. Tracking by stock and erosion within 500 m of a ground tank (Sandplain Mallee)

Grazing has a serious impact on the biological soil crust of semi-arid and arid environments (Read et al. 2011; Eldridge et al. 2011, Daryanto & Eldridge 2010). Biological soil crust provides habitat for microfauna and may facilitate recruitment of vascular plants (Read et al. 2011). The destruction of the biological soil crust by grazing leads to an increase in susceptibility to erosion, interferes with water infiltration and runoff, and reduces the capacity of cryptograms to fix atmospheric nitrogen and carbon dioxide (Read et al. 2011). When seen biological soil crust was observed most commonly in Belah-Rosewood Woodland, Disturbed Area Shrubland Complex, Sandplain Mallee, Bluebush Shrubland and Saltbush Shrubland. In Yarran Shrubland, Black Box Woodland and other communities associated with high levels of disturbance, a biological soil crust was seldom observes. Linear Dune Mallee located on deep sands was also seldom found to have a biological soil crust.

Fires in semi-arid landscapes vary in size up to several thousand hectares and may return at intervals that vary from 10 to 100 year scales (Keith & Tozer 2011). Fires may consume most or all of the standing biomass, although patterns of spread may be complex, partly because flammable Mallee Woodland occurs in association with non-flammable Belah Woodland (*Casuarina pauper*) and partly because mallee vegetation is less flammable in swales than on dunes (Bradstock and Cohn 2002). Although it is likely that sections of the Atlas-Campaspe Mine footprint have burnt in the recent past (15 – 20 years) it is believed that a significant fire has not occurred since the 1974-75 fires of the southern mallee area. Typical signs of recent fire were only observed in the northern portion of the proposed offset area during the survey of the Atlas-Campaspe Mine footprint and its surrounds (Plate 28). In this location mallee trees and shrubs were in the initial stages of regeneration from lignotubers, and charring could still be seen on branches.

A strong relationship has been demonstrated between mean stem diameter of mallee eucalypts and time since fire, showing that a mallee stem of 5 cm or more in diameter is likely to be at least 30 years old (Clarke et al. 2010). Anecdotal observations suggest that much of the mallee woodland in the Atlas-Campaspe Mine footprint and surrounds is over 30 years old.

Plate 28. Regrowth in a patch of mallee burnt in a fire approximately 10 years ago (Linear Dune Mallee)

Weed species provided a greater percentage cover in the Ivanhoe Rail Facility study area with an average cover of 10% in the Belah-Rosewood/Acacia Woodland than in most of the vegetation communities in the Atlas-Campaspe Mine study area (Table 12). The average number of native species was generally higher in the Belah-Rosewood/Acacia Woodland and the Native Grassland/Sparse Acacia/Chenopod Shrubs than for vegetation communities in the Atlas-Campaspe Mine study area and this may be a reflection of the recent heavy rainfall and flooding.

The condition of the vegetation at the Ivanhoe Rail Facility study area was considered to be moderate to poor given the high number of weeds, significant areas that had been cleared and the signs of past grazing resulting in little or no shrub or tree regeneration.

Finally, surveys of the Project area were undertaken following a period of high rainfall, it is probable that during drought periods the overall cover of vegetation will be greatly reduced.

5.4 Conservation status of the vegetation

Two EEC have been recorded within the Project area, *Acacia melvillei* Shrubland in the Riverina and Murray Darling Depression Bioregions (Yarran Shrubland - see Section 5.1.5) and Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes Bioregion (Sandhill Pine Woodland - see Section 5.1.6). These two EECs are listed under the TSC Act but not under the EPBC Act. A description of each EEC is included in Appendix L of this report.

Although not listed as EEC's a number of other vegetation communities in the study area have been described by Benson et al. (2006) as 'Near Threatened'. 'Near Threatened' is a term used by the International Union for the Conservation of Nature (IUCN) to classify species and it is defined as follows - a taxon is 'Near Threatened' when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future (IUCN 2012).

Many of these communities may become threatened over the coming decades if particular threatening processes are not mitigated (Benson et al. 2006). The four main threats are high, continuous grazing pressure, vegetation clearing, rises in saline water tables and reductions in natural flooding regimes on floodplains Benson et al. (2006). Those communities occurring within the study area considered by Benson et al. (2006) to be 'Near Threatened' include Black Box Woodland; Belah-Rosewood Woodland; Mulga Woodland; Sandplain Mallee; Bluebush Shrubland; and Saltbush Shrubland.

The Biodiversity Survey of the Lower Murray Darling (Val et al. 2001) lists Chenopod Shrubland as being of conservation concern in the Lower Murray Darling Catchment. The vegetation communities Bluebush Shrubland, Saltbush Shrubland and Chenopod Shrubland Depressions as described in this report are considered to be components of Chenopod Shrublands described in Val et al. (2001).

6 Potential Impacts

6.1 Description of direct impacts

6.1.1 *Clearing of native vegetation*

'Clearing of native vegetation' (NSW Scientific Committee 2001) and *'land clearance'* (SEWPaC 2009) are similar key threatening processes listed under the TSC Act and EPBC Act, respectively. The impacts of clearing native vegetation include destruction of habitat causing a loss of biodiversity, isolation of populations, disturbed habitat which facilitates the establishment and spread of exotic or pioneering species and removing habitat for a wide variety of vertebrates and invertebrates (NSW Scientific Committee 2001). The majority of the native vegetation within the Project area and the locality is currently uncleared, except for a portion which has been previously cleared for cultivation (Figures 11 to 13).

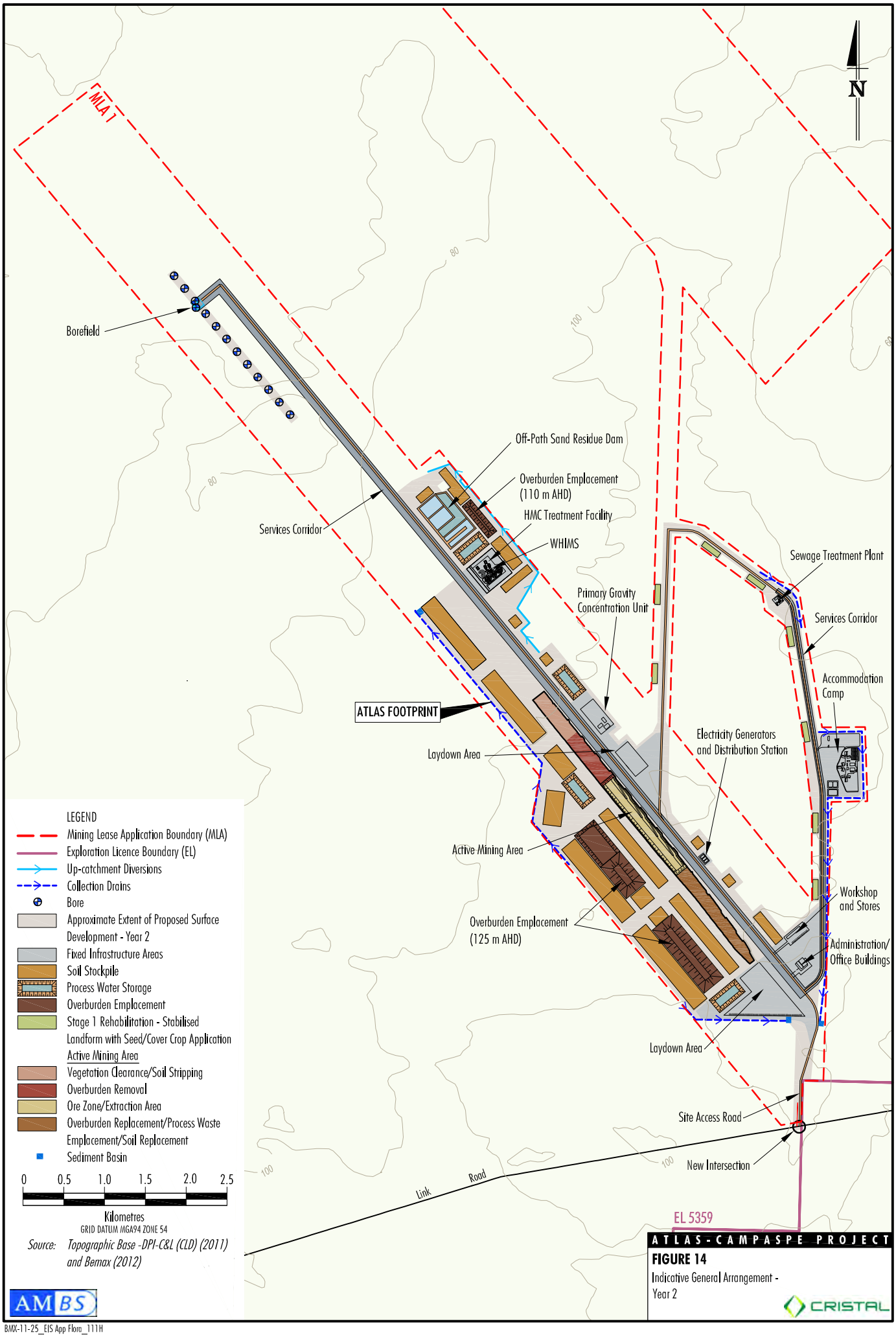
The Project would require the progressive clearance of approximately 4,158 ha of native vegetation over approximately 20 years. The total clearance area includes native vegetation required to be removed for all of the various components of the Project (including within the Atlas-Campaspe Mine footprint, MCTR roadwork's footprint and at the Ivanhoe Rail Facility footprint). A majority of the native vegetation to be cleared over the life of the Project is associated with the proposed infrastructure (Atlas-Campaspe Mine and Ivanhoe Rail Facility) and stockpiles surrounding the proposed pits. A smaller area of native vegetation would be cleared for the proposed pits.

Some components of the Project would be fixed during the life of the mine (e.g. the MCTR, Ivanhoe Rail Facility and administration buildings and workshops). Others components of the Project would be temporary and/or change locations within the overall Project area (e.g. the active mine area, location of the extraction area, internal roads and overburden emplacements). The progressive clearance of native vegetation ahead of the advancing extraction area and active mine area would be followed by progressive rehabilitation of the backfilled pit and overburden emplacements. The staged progression of mining is shown on Figures 14 to 16. Most of the Project infrastructure would be decommissioned and revegetated at the end of the mine life, although the MCTR would be retained for public use.

Vegetation clearing would be undertaken progressively over the life of the Project retaining vegetation until mining operations require its removal.

Approximately 98 ha of native vegetation would be cleared either side of existing roads or in uncleared areas in the MCTR roadworks footprint (Figure 12). This vegetation along the existing road comprises mostly disturbed vegetation on the existing road verge with less disturbed vegetation further from the existing road. A portion of undisturbed vegetation would be removed in those locations where corners of the existing road are to be rounded.

To the north of the Atlas-Campaspe Mine, approximately 40 ha of native vegetation would be cleared for the construction of the Ivanhoe Rail Facility.



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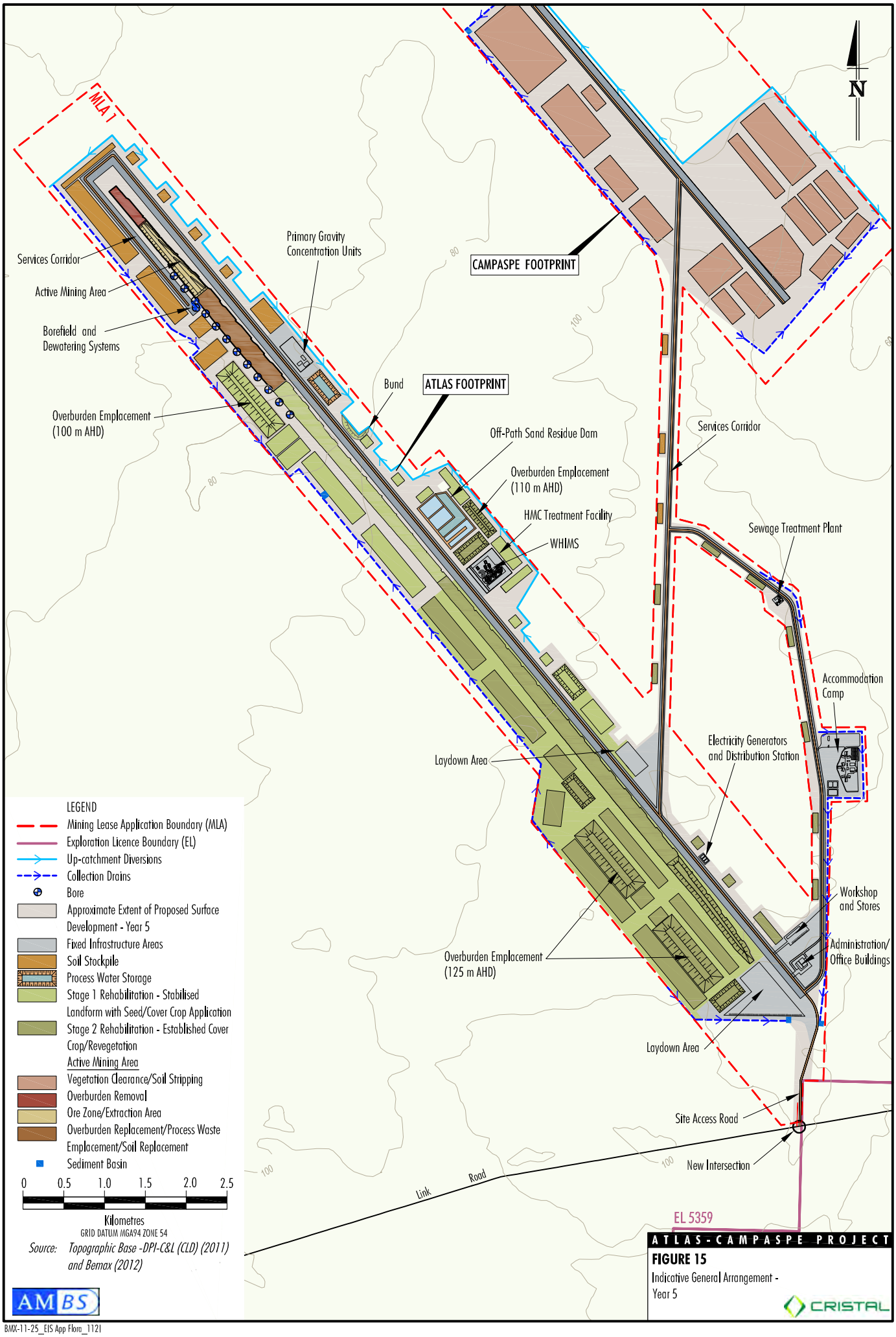

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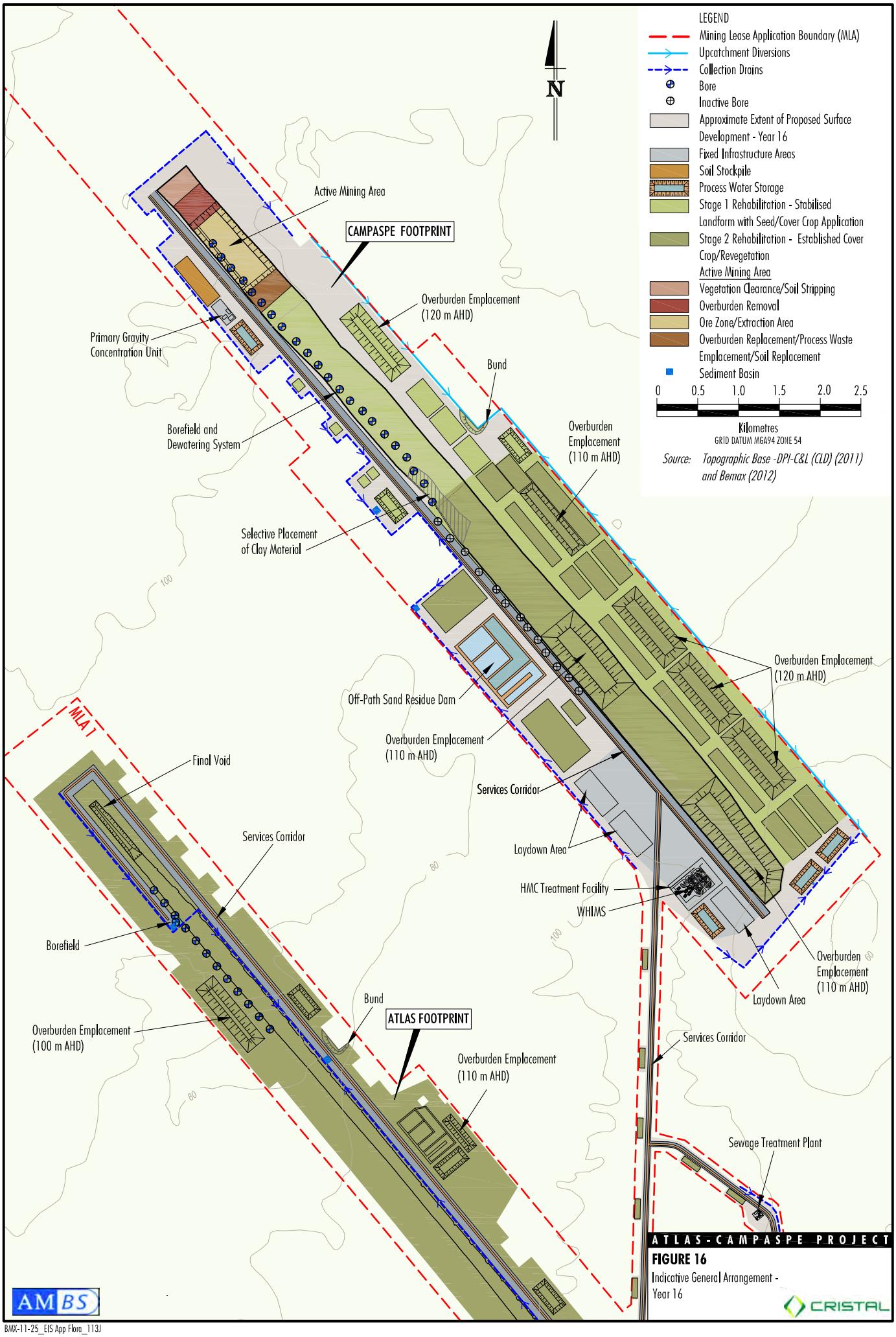

ATLAS-CAMPASPE PROJECT

FIGURE 16

Indicative General Arrangement - Year 16

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The vegetation communities that would be cleared, the quantity and their location are described in Table 13 and shown in Figures 11 to 13. Of the vegetation communities in the Project area, the Belah-Rosewood Woodland would be subject to the most clearance (approximately 2,035 ha). The second highest level of clearance would occur in the Mallee communities (Linear Dune Mallee and Sandplain Mallee), with a combined total clearance area of approximately 1,575 ha.

Table 13. Vegetation type to be cleared by the Project, location, total area and estimates of clearing 1998 and 2012

Vegetation Community	Approximate Area to be Cleared by the Atlas-Campaspe Mine (ha)	Location	Vegetation Type Cleared Estimate Lower Murray Darling (%) (OEH 2012e)	Total Area Modified as at November 1998 Southern Mallee Region (%) (Val 2001)
Semi-arid Woodlands				
Belah-Rosewood Woodland	2,035	In the Atlas-Campaspe Mine footprint, MCTR road works footprint.	20	7.06
Black Box Woodland	50	Predominantly in the middle of the Campaspe footprint.	15	8.21
Linear Dune Mallee	1,040	Predominantly in the middle of the Atlas footprint and in the northern end of the Campaspe footprint.	5	6.06
Mulga Woodland	5	In a small portion of the Campaspe footprint.	15	Not estimated
Sandplain Mallee	535	In scattered occurrences through the Atlas-Campaspe Mine footprint and a small area in the MCTR road works footprint.	30	22.62
*Sandhill Pine Woodland	3	In the MCTR roadworks footprint.	50	Not estimated
Belah-Rosewood/Acacia Woodland	10	In the Ivanhoe Rail Facility footprint.	20	7.06
Arid Shrublands				
*Yarran Shrubland	195	Through the low-lying areas of the Atlas-Campaspe Mine footprint.	60	Not estimated
Disturbed Area Shrubland Complex	170	In scattered occurrences through the Atlas-Campaspe Mine footprint.	30	1.24
Bluebush Shrubland	70	In the MCTR roadworks footprint.	10	1.59
Chenopod Shrubland Depressions	5	In the MCTR roadworks footprint.	10	Not estimated
Saltbush Shrubland	5	In the MCTR roadworks footprint.	5	Not estimated
Scalded Chenopod Shrubland	5	In the MCTR roadworks footprint.	Not estimated	Not estimated
Native Grassland/Sparse Acacia/Chenopod Shrubs	30	In the Ivanhoe Rail Facility footprint	Not estimated	Not estimated
Total	4,158			

* An endangered ecological community listed under the TSC Act.

Table 13 reports on the estimated percentage of clearance to each vegetation type in the Lower Murray Darling CMA as at 2012 compared to their pre-European extent (OEH 2012e). All but two of these vegetation types are estimated to be at least 70% remaining in the CMA. There is estimated to be approximately 60% of the Yarran Shrubland and 50% of the Sandhill Pine Woodland remaining in the CMA and these two vegetation communities are listed EEC's under the TSC Act. A further assessment of the impact on these two communities is provided in Section 6.6.

Val (2001) has estimated the quantities of vegetation modified since pre clearing (1750) in the southern mallee region as at 1998 (Table 13). Of those communities where estimates are available percentages are below 10% modified except for the Sandplain Mallee which is 22.62% modified.

Most of the vegetation communities recorded in the Project area are locally abundant, with a number protected within Mungo National Park or Mungo State Conservation Area (e.g. Bluebush Shrublands, Belah-Rosewood Woodland and mallee communities). Yarran Shrubland, Sandhill Pine Woodland, Black Box Woodland and Mulga Woodland are less well represented in the landscape (Figure 11). Excluding the Sandhill Pine Woodland each of these vegetation communities are represented by a greater quantity within the proposed offset area (Section 8). Bluebush Shrubland, Chenopod Shrubland Depressions and Saltbush Shrubland are not represented in the proposed offset area.

The majority of native species recorded in the Project area are not threatened (except those listed in Section 4.2.2) and are known to be widely present within the locality (after OEH 2012a). Potential impacts on threatened species are considered in Section 6.6.

Management approach

A number of impact mitigation and offset measures would be adopted to reduce the impacts of vegetation loss. The primary measures include:

- refining the mine design to avoid unnecessary land clearance (Section 7.1);
- implementing vegetation clearance procedures for controlled and progressive clearance (Section 7.3);
- undertaking progressive rehabilitation and re-vegetation of post-mine landforms (Section 7.12);
- retention and management of vegetation in the mining lease and Ivanhoe Rail Facility (Section 7.12); and
- the offset strategy which includes conservation of existing vegetation and revegetation of cleared land (Section 8).

6.2 Description of indirect impacts

6.2.1 *Habitat fragmentation/loss of connectivity*

Land clearance for the Atlas-Campaspe Mine footprint would contribute to the fragmentation of vegetation communities and flora habitat in the locality. The amount of contiguous bushland remaining, however, means that most of the surrounding native vegetation cover would remain physically connected. Some vegetation communities may become more disconnected than they currently are, in particular the communities associated with drainage depressions running north-south (e.g. Black Box Woodland and Yarran Shrubland). The gaps in the existing continuous canopy of vegetation created by the Project could restrict the interaction of species populations on either side at least until the mine is decommissioned and progressive rehabilitation takes place.

Flora that occupy the communities along the MCTR corridor are already separated by the existing road. While the widening of the MCTR would increase the width of the existing road surface widening of the road is unlikely to impact on the connectivity between flora species or vegetation communities along the MCTR.

6.2.2 Edge effects

Edge effects occur along ecological boundaries and can extend for some distance to either side of the boundary. The establishment of the mine pits, infrastructure and construction and widening of roads would create a number of new edges throughout the study area. Alterations to local habitat conditions and flora species composition are likely to occur in habitats adjacent to the new edges.

The new edges could facilitate the establishment and spread of exotic plant species without appropriate monitoring and control measures. An assessment of this potential impact is discussed in Section 6.2.3. Measures to control weeds and pests are discussed in Section 7.6.

6.2.3 Introduction of exotic flora (weed species)

There is potential for weeds already existing in the Project area to increase in number as a result of disturbance relating to mining activities, in particular vegetation clearance. Those vegetation communities which provide favourable conditions for the establishment of weed species adjacent to disturbance areas can be expected to show an increase in cover and abundance of species with increased disturbance e.g. Bluebush Shrubland, Disturbed Areas Shrubland Complex, Black Box Woodland and Yarran Shrubland. Also, new weed species can potentially be introduced as a result of the movement of construction vehicles and materials into the Project areas and from truck movements along the proposed MCTR which passes through large expanses of Bluebush Shrubland vegetation.

Six weed species declared as noxious in the Balranald LGA were recorded in the study area: *Asphodelus fistulosus*, *Cuscuta campestris*, *Lycium ferocissimum*, *Xanthium occidentale, Xanthium orientale* and *Xanthium spinosum*. Twelve weed species are considered to be priority weeds in the Lower Murray Darling CMA (Table 9).

Soil disturbance, vehicle movements and movement of soil are likely to facilitate the spread and proliferation of weed species within the Project areas.

Management approach

Weed prevention and control in the Project areas would be described in the proposed Biodiversity Management Plan. This is particularly important near newly created edges, for example where vegetation would be cleared for the Project and the Ivanhoe Rail Facility and in stockpile locations.

The following key principles are recommended for weed management:

- Long-term commitment;
- Minimising disturbance and spread of weeds;
- Strategic weed management of priority areas; and
- Preventing new incursions into the proposed offset area.

6.2.4 Alteration to hydrology

Alteration to the terrain and diversion of surface water during the life of the mine could impact on remaining vegetation which is dependent on surface flow, subsurface flow and pooling. After substantial rain events, surface water in the locality generally flows towards depressions in the landscape. In these locations, water collects and temporarily persists before being utilised by plants, evaporating or seeping to the regional groundwater. Clay loam and sandy clay loam are the dominant topsoil textures in the run-on depressions in the Atlas-Campaspe Mine footprint (Ogyris, 2012).

The proposed mining at Atlas and Campaspe is expected to have a limited, localised and temporary effects on areas where temporary surface ponding occurs at the Atlas Campaspe Mine site (i.e. through excavation) (GEO-ENG 2013). This also applies to depressions located beside and 2.5 km to the south of the Campaspe footprint.

These depressions in the landscape provide habitat for Black Box Woodlands and Grass/Herblands of Drainage Depressions (Figure 10). Black Box Woodland is potential habitat for the threatened species *Lepidium monoplocoides*.

Eucalyptus largiflorens (Black Box) trees have a higher water requirement than surrounding Eucalypts (such as the mallees) and the periodic filling of the depressions by rain and water flows is required to sustain them. The Black Box trees occur around the perimeter of the depressions, and extend into the surrounding areas to a point where soil retention of water reduces and will no longer sustain the trees. Grass/Herblands of Drainage Depressions generally occurs as small (gilgai) areas within other vegetation communities and are unlikely to be affect as they may be less dependent on extensive surface flows that the Black Box Woodland.

There is a patch of Black Box Woodland (approximately 43.5 ha) on the edge of the Campaspe mine path and mining of the Campaspe deposit (between Years 11 to 13) would remove part of the clay associated with the water holding capacity in the depression. The total water holding capacity of the depression may be affected if the clay material to be removed was replaced with overburden and process waste after mining. To minimise this, Cristal Mining would selectively place clay material in low-lying portions of the re-profiled landform within the mine path to reinstate the water holding capacity of, and run-on to adjacent depressions. The management of the rehabilitation in this way is likely to maintain the Black Box Woodland in this location.

Management approach

The mining of the Campaspe deposit (between Years 11 to 13) would affect the local catchment area reporting to this Black Box Woodland next to the Campaspe footprint. The proposed mine water management system includes a range of measures to minimise any potential impacts on the ephemeral waterbodies located immediately adjacent to, or ‘downstream’ of the Atlas-Campaspe Mine site including (Evans & Peck 2012):

- Construction of temporary diversions banks to divert any off-site runoff around the active mine path in order to maintain the opportunity for runoff to reach the relevant ephemeral water-bodies. Once mining is complete, the land levels along the main flow paths would be restored to levels that allow cross drainage to occur;
- Runoff from areas undisturbed by mining would be separated from water generated within active mining areas;

- Surface runoff from disturbed areas would be collected and preferentially re-used any for dust suppression or make-up of the water supply for on-site processing of the mineral sands. Sediment basins would be constructed and operated in accordance with the relevant requirements of Managing Urban Stormwater: Soils & Construction; and
- Potentially contaminated mine site water, principally associated with sand processing, would be retained within a 'closed' mine water management system. There would be no provision for surface water discharge from this system, with the exception of disposal of excess water to water disposal dams within the mine path (i.e. to the deep underlying saline groundwater system) (GEO-ENG 2013).

6.2.5 *Use of saline water for dust control and road maintenance works*

Dust would be suppressed on internal haul roads within the active mining area (i.e. areas of high dust generation potential) at the Atlas-Campaspe Mine by routinely spraying water sourced from the groundwater supply borefield (i.e. naturally saline) or from sumps which collect mine runoff water. In addition, as part of ongoing road maintenance works (i.e. for road conditioning and safety purposes) saline water would be applied as required to the internal access roads at the Atlas-Campaspe Mine and to the unsealed sections of the mineral concentrate transport route following completion of the roadworks (i.e. in the order of once a week).

During drought periods large areas of soil are exposed. Compared to the total exposed areas of soils which are naturally high in salts, residual saline dust from trafficking along the haul roads, access roads and unsealed sections of the mineral concentrate transport route subject to watering with saline water and/or wind-blown dust from associated road verges would be negligible (Katestone Environmental, 2013). Therefore, based on the information provided by Katestone Environmental, impacts on surrounding vegetation are expected to be negligible.

The use of saline water could potentially impact the vegetation nearby if residue salts dissolve in rainwater and wash from the roads after rain events. However, as referred below, the internal roads within the active mining area would be contained (i.e. would not wash to surrounding vegetation). Further, application of saline water to internal access roads and the unsealed sections of the mineral concentrate transport route (for road maintenance works) would be infrequent and any runoff water would be directed to road verges/drains.

Management Approach

- Watering of internal haul roads to control dust emissions.
- Runoff water from internal haul roads within the active mining area would be directed to the evaporation/sediment sumps for containment and re-use.
- Runoff water from the internal access roads and unsealed sections of the mineral concentrate transport route would be directed to road verges/drains.

6.2.6 *Groundwater dependant vegetation*

Groundwater Dependant Ecosystems are ecosystems that have their species composition and their natural ecological processes determined by groundwater (DLWC 2002). No evidence has been found to indicate that that vegetation associated with groundwater dependant ecosystems would be impacted by the Project.

A review of the regional water level indicates that the groundwater table is at least 10 m below ground level in the Benanee basin, apart from the southern and south-western boundaries along the Murray River and Murrumbidgee River to the south-west. The water table was measured to be approximately 36 m below surface at the test bore (AB1) at the Atlas-Campaspe Mine.

The groundwater table is estimated to be at least 20 m below surface at Lake Mungo to the west of the Atlas-Campaspe Mine. There is no evidence of any groundwater dependent ecosystems that would be affected by the Atlas-Campaspe Mine (GEO-ENG 2013).

Groundwater salinity mapping of the region indicates generally saline conditions (GEO-ENG 2013). Water sampling from the test bore at Atlas-Campaspe Mine site indicates a salinity of about 32,000 mg/L. This chemistry is typical of the region, and indicates that groundwater has a low value for any use apart from industry (GEO-ENG 2013). The region is characterised by low-gradient groundwater flow from east to west (GEO-ENG 2013).

Black Box (*Eucalyptus largiflorens*) is known to use groundwater, particularly in drought periods (Slavich et al. 1999), and can tolerate salinity up to 60 ds/m (Streeter et al. 1996) which is equivalent to 36,000 mg/L (DPI Victoria 1999). Most of the research into Black Box and its use of groundwater has been undertaken in floodplain environments where the ground water can be within 10 m of the ground surface (Streeter et al. 1996).

In the locality of the Atlas-Campaspe Mine, the groundwater table is associated with the underlying saline groundwater systems and generally sits within the shallow Shepparton Formation or underlying Loxton-Parilla Sands (GEO-ENG 2013). Between the Atlas and Campaspe deposits the topographic low sits at 75 m AHD (Australian Height Datum) (GEO-ENG 2013) which is where water ponding is most likely to occur. Water levels in the Atlas Test Bore indicate that the local water table is at 45 m which is approximately 30 m below this topographic low (GEO-ENG 2013). At these depths, it appears unlikely that the Black Box has a dependence on the regional groundwater and more likely that it is sustained from surface water flows.

The majority of the ore extraction areas within the Atlas and Campaspe footprints would be located above the groundwater table. The mine path is planned to drop below the natural water table level over 2.9 km at the Atlas deposit and 7.4 km at the Campaspe deposit. The maximum mining depth below the groundwater table is approximately 7 m for the deepest section of the Campaspe deposit, and up to approximately 15 m at the Atlas deposit (GEO-ENG 2013). Extraction of groundwater for water supply purposes from the groundwater borefield and dewatering systems (where the ore body lies below the groundwater table) would form localised groundwater sinks (GEO-ENG 2013).The majority of the Atlas and Campaspe open pits would be located above the groundwater table.

6.2.7 Grazing by rabbits and goats

Competition and grazing by the feral European rabbit (NSW Scientific Committee 2002) and *Competition and habitat degradation by feral goats* (NSW Scientific Committee 2004) are listed as key threatening processes under Schedule 3 of the TSC Act and the EPBC Act. A Threat Abatement Plan has been prepared for goats, and rabbits, under the EPBC Act (DEWHA 2008a, 2008b).

Grazing and burrowing rabbits have the potential to cause major erosion problems, reduce recruitment and survival rate of native plants and alter entire landscapes. Grazing by feral rabbits appears also to have marked effects on the structure and composition of vegetation communities in many areas (Williams et al. 1995), and a number of EEC's (NSW Scientific Committee 2002). The impact of rabbits on the *Acacia melvillei* Shrubland EEC has been documented by Batty and Parsons (1992).

Feral goats are versatile generalist herbivores (Harrington 1986). They will browse shrubs and trees, graze forbs and grass, and eat fallen fruit capsules, bark and other dead plant material (Dawson et al. 1975; Squires 1980; Dawson and Ellis 1996). When green foliage is abundant, feral goats obtain sufficient water from their food, but during summer and in drought they require drinking water (Dawson et al. 1975; Parkes et al. 1996).

Rabbits and goats are known to occur in the Project area and surrounds (AMBS 2013). Opening up of the vegetation canopy, areas of disturbed ground and open water sources would provide an environment that would allow rabbits and goats to increase in numbers. Rehabilitation areas would provide young plants palatable to rabbits and goats. Protection of the vegetation within the MLA during the life of the mine and the rehabilitation areas would require the control of rabbits and removal of goats.

Both Key Threatening Processes are important threats to *Acacia melvillei* Shrubland EEC and the threatened species *Brachyscome papillosa, Lepidium monoplocoides* and *Pterostylis cobarensis*.

Management approach

- Vegetation clearance procedures to minimise the land cleared ahead of mining.
- Feral animal control programme should be implemented to control rabbits and remove goats.
- Introduce methods to prevent goats accessing water.
- Protect rehabilitation areas from rabbits and goats.
- Decommissioning of all post-operative water storage facilities.
- Artificial watering points would be fenced to exclude rabbits and goats in the mining lease and offset area.

6.2.8 *Alteration to fire regimes*

High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition is a key threatening process under schedule 3 of the TSC Act (NSW Scientific Committee 2000). The long-term survival of plants and animals over repeated fires is dependent upon two key features namely the ability of species to maintain life cycle processes; and the maintenance of vegetation structure over time as habitat for animal species. Where fires occur very close together in time (high frequency fire) both these key features can be disrupted (NSW Scientific Committee 2000).

High frequency fire is defined as two or more successive fires close enough together in time to interfere with or limit the ability of plants or animals to recruit new individuals into a population, or for plants to build-up a seedbank sufficient in size to maintain the population through the next fire. Sustained high frequency fire would consequently lead to a loss of plant species, a reduction in vegetation structure and a corresponding loss of animal species (NSW Scientific Committee 2000).

The specific frequency of fire that would be detrimental to a species or community varies depending upon the survival mechanisms that the species or community exhibit, and local conditions. The number of fires over any set time period that would constitute a detrimental high fire frequency is location and community specific (NSW Scientific Committee 2000).

Given the changing understanding of the role of fire in a semi-arid landscape (Nano et al. 2012; Parr & Anderson 2006) strategies to control fire within the Project area should be carefully planned. Fires in remnant vegetation should be prevented.

Historically, arid-zone bushfires tend to be associated with a proficient growth of native grasses following large rain events. During hot summer days following large rain events, dry swards of grasses pose a significant bushfire hazard when they are placed near a source of ignition. Vehicles driven through long grass often collect grass on the vehicle's crossmember and underbody protection plates. The hot exhaust could eventually ignite the dry grass.

Management Approach

- Develop a fire management strategy for the Project areas (Section 7.11.2).

6.2.9 *Dust and pollution*

Studies have shown that excessive dust generation can impact on the health and viability of surrounding vegetation. Dust can affect vegetation by inhibiting physiological processes such as photosynthesis, respiration and transpiration, and allow penetration of phytotoxic gaseous pollutants (Farmer 1993; Eller 1977). Sand mining has the potential to result in the generation and dispersion of atmospheric dust. The activities that would generate dust include:

- dust created by construction activities in all locations;
- dust created by the onsite mining activities;
- dust created by trucks travelling along the MCTR; and
- dust created by the loading and unloading of HMC at Ivanhoe Rail Facility.

Spills of liquid pollutants (e.g. diesel fuel) and gross pollutants (e.g. general garbage) could also potentially occur. If not properly contained and managed, these pollutants can degrade natural areas and flora habitats.

Management approach

- Minimise dust generation where relevant by minimising the extent and time bare soil is exposed (Section 7.11.3).
- Develop procedures to deal with potential spills (Section 7.11.3).
- Mandatory requirements for all vehicles to carry spill kits (Section 7.11.3).

6.2.10 *Anthropogenic climate change*

Anthropogenic climate change is listed as a key threatening process under Schedule 3 of the TSC Act. *Loss of climatic habitat caused by anthropogenic emissions of greenhouse gases* is listed as a key threatening process under the EPBC Act.

An assessment of this potential impact is outside the scope of the report and is instead addressed in Section 4 of the Main Report of the EIS.

6.3 Cumulative impacts

Cumulative impacts are the successive, incremental and combined impacts (both positive and negative) of an activity on society, the economy and the environment (Franks *et al.,* 2010). They can arise from the compounding activities of a single operation given the interaction of that operation with past, current and future activities that may or may not be related to the existing development. Cumulative impacts may also arise through the interaction of one development with other types of activities and industries, such as grazing and broad scale agriculture.

In relation to the Project, the cumulative impacts are considered to be the total impact on the environment that would result from incremental impacts (including both direct and indirect impacts) from the Project works added to other existing impacts. The likely direct impacts of the Project may be obvious; however, the indirect impacts may be less identifiable. Clearing of vegetation during construction of the Project and the mining process would result in a number of cumulative effects.

The regional setting of the Project and surrounding land use are described in Section 2. Currently there are two proposed sand mining projects for the Balranald area, the Atlas-Campaspe Mine (this Project) located approximately 80 km north of Balranald and the Balranald Mineral Sands Project comprising of two proposed mineral sand mines located approximately 12 km and 70 km north-west of Balranald. The Balranald Mineral Sands project considered in conjunction with this Project would result in cumulative impacts from vegetation clearing and from the reduction in extent of potential habitat for threatened flora.

The Balranald Mineral Sands Project would consist of the mining of two deposits (EMGA Mitchell McLennan 2012a).

1. West Balranald: located approximately 12 km north-west of Balranald. This deposit is approximately 20 km long, 80 to 300 m wide and 50 to 80 m below the surface.
2. Nepean: approximately 30 km to the north-west of the West Balranald deposit. The deposit is approximately 12 km long, approximately 80 to 130 m wide and 40 to 60 m below the surface.

Transportation routes for the mineral extract from the Balranald Mineral Sands Project have not yet been finalised (EMGA Mitchell McLennan 2012a).

The Nepean deposit is located approximately 10 km south of the Atlas-Campaspe Mine in semi-arid woodland (Ecotone Ecological Consultants 2012a). The West Balranald deposit is located approximately 45 km south of the Atlas-Campaspe Mine. Vegetation within the West Balranald deposit consists of semi-arid woodlands and arid shrublands with claypans and dry lakes (Ecotone Ecological Consultants 2012b).

The Balranald Mineral Sands Project would result in the clearance of a significant area of native vegetation within private conservation areas set aside via covenants established under Western Lands Lease agreements enacted by the Crown under the NSW *Western Lands Act 1901* (Anon 1998; EMGA Mitchell McLennan 2012a). The Project is not expected to result in a cumulative impact in relation to conservation areas as the Atlas and Campaspe deposits are not located under any such areas.

No threatened flora species or ecological communities were identified during the flora surveys of the West Balranald and Nepean deposits (Ecotone Ecological Consultants 2012a, 2012b). Two threatened species, *Santalum murrayanum* (Bitter Quandong) listed as endangered under the TSC Act and *Swainsona pyrophila* (Yellow Swainson-pea) listed as vulnerable under the TSC Act and EPBC Act, were assessed as potentially occurring based on the availability of habitat for these species in the study area for the West Balranald and Nepean deposits (Ecotone Ecological Consultants 2012a, 2012b). These species have not been identified in the Atlas-Campaspe Mine area or surrounds (Appendix D).

The main industries and land uses in the locality surrounding these proposed developments are cattle, sheep and goat grazing on native semi-arid pasture along and cropping.

The majority of the Project area and the study areas for the West Balranald and Nepean deposits still retain native vegetation although clearing for agriculture, timber harvesting and the impacts of grazing have altered the structure and composition of the vegetation.

This assessment has considered the following:

- flora species present;
- vegetation type and patterns of vegetation community distribution; and
- presence of threatened flora species or EECs.

The condition and composition of the vegetation to be cleared for the Project area is described Section 5. Impacts which are likely to be cumulative within the mining areas are clearing of vegetation, changes to hydrology, increases in feral animal populations and weed invasion (Sections 6.1 and 6.2). It is likely that the accumulating impacts would increase linearly and proportionally with the area of disturbance. The cumulative impacts listed may not be fully expressed until well after completion of mining due to the characteristics of semi-arid woodland (dependent on sporadic rainfall for completion of reproductive processes, seedlings and young plants significantly prone to grazing by goats and rabbits).

No biodiversity impacts from other mining projects currently exist in this locality. The cumulative impact, clearing of native vegetation, would include the removal of habitat for threatened species and an EEC. It is estimated that a total of 4,158 ha of native vegetation would be cleared for the Project. This would include 195 ha of *Acacia melvillei* Shrubland EEC, 3 ha of Sandhill Pine Woodland EEC and 1,620 ha of potential threatened flora habitat[4] (*Lepidium monoplocoides*, *Pterostylis cobarensis*). However, extensive areas of native vegetation occur within the region and 16,270 ha would be included in the proposed offset area.

The proposed offset area includes 390 ha of *Acacia melvillei* Shrubland EEC and 12,865 ha of known and/or potential threatened flora habitat[4] (*Lepidium monoplocoides*, *Pterostylis cobarensis*).

The proposed impact avoidance and mitigation measures, including the Biodiversity Management Plan (Section 7.2) and the rehabilitation plan (Section 7.12) are likely to assist with the mitigating these cumulative impacts in the Project areas. They would help to maintain flora biodiversity in the short-term and to address the impact of vegetation clearance in the medium to long-term. The offset measure described in Section 8 would maintain and improve regional biodiversity values in the medium to long-term once the area has been conserved in perpetuity and management plan protocols have been implemented.

[4] Does not include habitat from third unconfirmed location of *Lepidium monoplocoides*

6.4 Willandra Lakes Region World Heritage Area

The Willandra Lakes Region World Heritage Area is located approximately 10 km to the west of the Atlas-Campaspe Mine (SEWPaC, 2008). The Willandra Lakes Region World Heritage Area covers 240,000 ha of a semi-arid landscape mosaic comprising dried saline lake bed plains vegetated with saltbush communities, fringing sand dunes and woodlands with grassy understoreys (SEWPaC, 2008). The Region extends from between Spring Hill and Mulurulu (approximately 50 km north of Boree Plains), south-west to Mungo Station (33 km west of Boree Plains) and further south to Prungle (68 km south-west of Boree Plains) (SEWPaC, 2008).

The Willandra Lakes Region World Heritage Area is characterised by both cultural and natural values. It provides examples of major stages in the earth's evolutionary history, ongoing geological processes, and a cultural testimony to past civilisation (SEWPaC 2008). No direct impacts to the flora of the Willandra Lakes Region World Heritage Area are likely as a result of the Atlas-Campaspe Mine. At its closest point, the Atlas-Campaspe Mine is located 10 km to the east of the Willandra Lakes Region World Heritage Area.

Potential indirect impacts on the flora can relate to changes to surface hydrology and/or groundwater, wildfire, dust, changes to the abundance of feral animal populations, and/or the introduction of weeds, feral animals or pathogens to the area. The Surface Water Assessment (Evans & Peck 2012) concluded that the possibility of any runoff from the Atlas-Campaspe Mine site reaching, or having any impact on, the World Heritage Area could only occur under rainfall conditions that are unlikely to have been experienced in the region for thousands of years. The Hydrogeological and Water Supply Assessment (GEO-ENG 2013) concluded:

- no impact on any surface ponding areas or shallow groundwater systems associated with the Willandra Lakes Region World Heritage Area or Mungo National Park; and
- no drawdown of the deep underlying saline groundwater aquifer below the Willandra Lakes Region World Heritage Area or the Mungo National Park.

No changes to surface water or groundwater in the Willandra Lakes Region World Heritage Area are expected as a result of the Project (GEO-ENG 2013; Evans & Peck 2012). Provided that other indirect impacts are effectively controlled, the Atlas-Campaspe Mine is not likely to have an impact on the flora of the Willandra Lakes Region World Heritage Area. Measures that would be undertaken to manage and control fires, dust, feral animals and other potential indirect impacts are discussed in Section 7. The addition of the proposed offset area to the existing conservation reserve system has the potential to have a positive impact on the flora of the areas adjacent to the proposed offset area, including the Willandra Lakes Region World Heritage Area.

6.5 Mungo National Park

The Mungo National Park is located approximately 5 km to the west of the Atlas-Campaspe Mine. Mungo State Conservation Area adjoins Mungo National Park on the eastern border (Figure 1). Mungo National Park covers an area of 112,586 ha of which approximately 65% falls within the Willandra Lakes Region World Heritage Area (DEC 2006). The flora of the Mungo National Park is characterised by shrublands dominated by *Maireana* sp., *Atriplex* sp. and semi-arid woodlands of mallee, *Callitris* sp. and *Casuarina pauper* (DEC 2006).

No direct impacts to the flora of Mungo National Park are likely as a result of the Atlas-Campaspe Mine. At its closest point, the Atlas-Campaspe Mine is located 5 km to the east of Mungo National Park.

Potential indirect impacts on the flora can relate to changes to surface hydrology and/or groundwater, wildfire, dust, changes to the abundance of feral animal populations, and/or the introduction of weeds, feral animals or pathogens to the area.

The Surface Water Assessment (Evans & Peck 2012) concluded that the possibility of any runoff from the Atlas-Campaspe Mine site reaching, or having any impact on, the Mungo National Park could only occur under rainfall conditions that are unlikely to have been experienced in the region for thousands of years. The Hydrogeological and Water Supply Assessment (GEO-ENG 2013) concluded:

- no impact on any surface ponding areas or shallow groundwater systems associated with the Willandra Lakes Region World Heritage Area or Mungo National Park; and
- no drawdown of the deep underlying saline groundwater aquifer below the Willandra Lakes Region World Heritage Area or the Mungo National Park.

Provided that other indirect impacts are effectively controlled, the Atlas-Campaspe Mine is not likely to have an impact on the flora of Mungo National Park or Mungo State Conservation Area. Measures that would be undertaken to manage and control fires, dust, feral animals and other potential indirect impacts are discussed in Section 7. The addition of the proposed offset area to the existing conservation reserve system has the potential to enhance biodiversity values resulting in a positive impact on the flora of the areas adjacent to the proposed offset area, including Mungo National Park.

6.6 Significance of impacts on threatened species and communities

6.6.1 *TSC Act – assessments of significance*

Three threatened flora species (*Brachyscome papillosa, Lepidium monoplocoides* and *Pterostylis cobarensis*.) and two EEC's (*Acacia melvillei* Shrubland and Sandhill Pine Woodland listed under the TSC Act have been recorded within the Project area. Assessments of significance (pursuant to section 5A of the EP&A Act (the Seven Part Test) for these species were undertaken and are included as Appendix L.

Species have been assessed individually. Information on species descriptions and distribution used in the assessments was obtained from OEH threatened species profiles, EPBC Conservation Advice documents, OEH or SEWPaC Final Determinations and recovery plans where relevant, unless stated otherwise.

A large *Brachyscome papillosa* population was recorded along a section of Magenta Road that was originally proposed to be upgraded and widened for the MCTR. Cristal Mining have committed to not widening the section of road in the area of the *Brachyscome papillosa* population and to sealing the surface of the road to minimise damage from dust. Sealing would be undertaken as soon as practicable to minimise dust from extra vehicle movements related to all aspects of the Project. As such, the *Brachyscome papillosa* population would not be significantly impacted by the Project.

Lepidium monoplocoides was identified within the Atlas-Campaspe Mine area (two individual plants in two different locations). A third location was recorded in October 2012 (FloraSearch 2012). Specimens from this location have not been confirmed by the NSW Herbarium. If the 'local population' as defined under the TSC Act is considered to be represented by these occurrences of the *Lepidium monoplocoides* then the available information on other *Lepidium* species would suggest that the Project is not likely to have a significant impact on a population such that it is placed at risk of extinction.

If it is assumed that each single plant found in the Project area represents a viable 'local population' (and not an isolated occurrence), then land clearance by the Project would have a significant impact on three local populations of the *Lepidium monoplocoides*. If this were the case, there are many populations in the offset area (Figure 9).

Pterostylis cobarensis was identified from two locations within the Atlas footprint growing in mallee woodland complex vegetation and it was anticipated that the species was not confined to the mining lease, given that there is a larger area of adjoining and continuous potential habitat outside of the lease area. Surveys undertaken in October 2012 (FloraSearch 2012) found three more locations of the orchid, two within the Atlas footprint (Site 3 with 1 individual and Site 4 with 4 individuals) and another at a location approximately 25 m to the east of the Atlas footprint boundary (Site 5 with 11 individuals) within the proposed offset area. The mine plan has since been altered such that mining activities would avoid direct impacts to the location where individuals were recorded at Site 4.

The Project would therefore remove three of the five occurrences of *Pterostylis cobarensis* that are known from the area. It is considered the Project would have a significant impact on this species. However, as indicated above, one location where the species was recorded (Site 5) is located in the proposed offset area and the mine plan will avoid direct impacts on another (Site 4).

Both sites are nonetheless located in close proximity to the mine and there is potential for indirect impacts (e.g. edge effects) at these locations. A number of measures are proposed with the objective of minimising or mitigating the impact of the Project on this species and these are described in Section 7.

Approximately 195 ha of *Acacia melvillei* Shrubland EEC would be directly impacted by the Atlas-Campaspe Mine. The local occurrence of *Acacia melvillei* Shrubland EEC would also be fragmented by the Atlas-Campaspe Mine footprint. These impacts are considered to be significant.

A total of 390 ha of Yarran Shrubland representing the *Acacia melvillei* shrubland EEC would be maintained and enhanced in the proposed offset area. A further 40 ha within the Atlas-Campaspe Mine study area would be retained during the mining activities. The mapped occurrence of Yarran Shrubland EEC is generally in poor condition. Through removal of grazing pressure from livestock, goats and rabbits and facilitation of regeneration in the proposed offset area, there is significant potential for substantial areas of *Acacia melvillei* Shrubland EEC to improve in the long-term.

Sandhill Pine Woodland EEC has been mapped in 7 locations in the MCTR study area. Widening of the road would impact an area approximately 10 m each side from the centreline of the existing road and this would impact the Sandhill Pine Woodland EEC in three of these locations. The margins of the existing road are already heavily disturbed. A series of development controls designed to protect the Sandhill Pine Woodland EEC would be implemented. As such the Project would not have a significant impact on the Sandhill Pine Woodland EEC.

Refer to Appendix L for details relating to these assessments. Impact mitigation measures for the Project area are provided in Section 7. Management actions for the proposed offset area are provided in Section 8.

6.6.2 EPBC Act – assessments of significance

Three threatened flora species (*Brachyscome papillosa, Lepidium monoplocoides* and *Pterostylis cobarensis*.) listed under the EPBC Act have been recorded within the Atlas-Campaspe Mine area.

Assessments of significance against the *Significance Impact Guidelines 1.1: Matters of National Environmental Significance* (DEWHA 2009) for *Brachyscome papillosa, Lepidium monoplocoides* and *Pterostylis cobarensis* were undertaken and are included as Appendix M.

An important population of *Brachyscome papillosa* (Mossgiel Daisy) would not be significantly impact by the Project. A series of development controls would be implemented to avoid impacts to the *Brachyscome papillosa* population. No road widening would be undertaken in the location of the known population and dust would be suppressed by sealing the section of Magenta Road which passes through its habitat (Figure 3).

The occurrences of *Lepidium monoplocoides* are considered to represent a single 'population' in accordance with the *Significant Impact Guidelines 1.1: Matters of National Environmental Significance* (DEWHA 2009). On this basis, *Lepidium monoplocoides* would not be significantly impact by the Project. The construction of the Atlas-Campaspe Mine would remove two individuals from two locations out of a known population of 301 individuals distributed across six locations. The proposed offset area would protect *Lepidium monoplocoides* at three locations and the management plan for the area would implement the management practices consistent with those outlined in the *Lepidium monoplocoides* recovery plan.

Based on current knowledge of the extent of this species in the area the Atlas-Campaspe Mine would have a significant impact on *Pterostylis cobarensis*. Cristal Mining has refined the mine plan to avoid direct impacts on one location where *Pterostylis cobarensis* was recorded and another occurrence is located in the proposed offset area (comprising of 4 and 11 plants, respectively). As well as the occurrence within the proposed offset area further potential habitat for this species exists and populations of the orchid may occur there. There would be a minimum of 25 m distance between these locations and any surface mine activity.

Impact mitigation measures for the Atlas-Campaspe Mine area are provided in Section 7. Management actions for the proposed offset area are provided in Section 8.

7 Measures to Avoid and Mitigate Impacts on Flora

7.1 Design of the Project

Impact avoidance techniques have been applied to the Project in relation to the positioning of the areas of disturbance and minimisation of disturbance activities. The occurrence or potential occurrence (based on the presence of suitable habitat) of threatened biota has played a key role in the minimisation of impacts. The following sections detail in each Project area, how impact avoidance has or would be applied.

7.1.1 *Atlas-Campaspe Mine*

As previously described in Section 6.2.1, the Project will avoid the removal of Pterostylis cobarensis at one location (Site 4). The area where the plants were recorded and a 25 m buffer will be fenced off and surface mining activity will be performed at least 25 m distance away. Another site where the species was recorded (Site 5) was located in the offset area. The design of the stockpiles would therefore avoid direct impacts on the 4th and 5th locations of *Pterostylis cobarensis* (Site 4 comprising of 4 individuals; Site 5 comprising 11 individuals) (Figure 9). Measures to minimise or mitigate indirect impacts on the orchid and its habitat where practicable (Figure 9). In addition, a number of measures (such as fencing labelled with signage) are described to avoid impacts on this occurrence.

7.1.2 *Roadworks along the MCTR*

The MCTR mostly follows existing road alignments to reduce the amount of vegetation clearance required. The initial footprint included roadworks to widen the existing road along a 40 km section from the Atlas-Campaspe Mine to Balranald-Ivanhoe Road. Upon identification of an extensive population of *Brachyscome papillosa* in this section, Cristal Mining has modified the design. The final design does not involve widening the road where it passes through the *Brachyscome papillosa* population. This section of the road would be sealed. Sealing would minimise erosion of the road and dust emissions from its use.

7.1.3 *Ivanhoe Rail Facility*

Vegetation would be selectively cleared, i.e. only removing vegetation necessary for the construction of the siding, access road and associated facilities.

7.2 Biodiversity management plan

A Biodiversity Management Plan would be prepared to assist Cristal Mining with the management of biodiversity in the Project area and surrounds. The plan would address the following impact avoidance and mitigation issues in relation to flora and vegetation within these areas.

- Impact avoidance measures (Section 7.1).
- Vegetation clearance procedures (Section 7.3).
- Threatened species and EEC management measures (Sections 7.4 and 7.5).
- Weed management (Section 7.6).
- Management of rabbits and goats (Section 7.8).
- Management of vehicles (Section 7.11.1).
- Fire prevention, control and management (Section 7.11.2).
- Dust control (Section 7.11.3).

These aspects are described in the following sections.

7.3 Vegetation clearance procedures

7.3.1 Pre-clearance threatened flora species surveys

A Threatened Species Management Protocol would be prepared and implemented to facilitate the management and minimisation of potential impacts on threatened flora species. Key components of the Threatened Species Management Protocol would include site observations/surveys, threatened species management strategies, monitoring programs (with feedback systems to provide for adaptive management) and reporting.

Threatened species management would include pre-clearance surveys for the *Pterostylis cobarensis* and *Lepidium monoplocoides* and retention of *Pterostylis cobarensis* tubers and *Lepidium monoplocoides* seed for use in revegetation trials and rehabilitation (Section 7.12).

7.3.2 Plant resource retention during vegetation clearance

The following would be undertaken during vegetation clearance to retain reuseable plant resources:

- The collection of seed from felled trees for seedling propagation on rehabilitated areas.
- Ground cover (e.g. logs, fallen branches and leaf litter) should be collected and retained with stripped topsoil to improve the viability of the soil when it is used in rehabilitation.
- The collection of seed bank and topsoil around *Lepidium monoplocoides* and *Pterostylis cobarensis* populations within the Atlas-Campaspe Mine for reuse on rehabilitation (where practicable).

7.3.3 Staging of impacts

The progressive clearance of native vegetation ahead of the advancing extraction area and active mine area would be followed by progressive rehabilitation of the backfilled pit and overburden emplacements (Section 7.12). The staged progression of mining is shown on Figures 14 to 16. Much of the infrastructure for the Project would be decommissioned and revegetated at the end of the mine life, although the MCTR would be retained for public use.

Vegetation clearing would be undertaken progressively over the life of the Project retaining vegetation until mining operations require its removal. As described above, vegetation would be cleared in staged ‘campaigns’, where the area cleared in each campaign would be no greater than that required to accommodate the mine’s needs for the following 12 months.

7.3.4 Efficient, careful clearance

Clearance activities for the Project should include the following:

- clear delineation of the disturbance areas on the ground (e.g. flagging tape and posts) and restriction of clearing to within these areas;
- sign posts to alert personnel not to enter vegetation outside of the disturbance areas; and
- mine staff and contractors would be made aware of clearing limits and restricted access areas.

7.4 Threatened species

7.4.1 *Brachyscome papillosa*

Mitigation for local populations of *Brachyscome papillosa* would consist of the following:

- Development Controls:
  - No road widening would be undertaken in the location of the *Brachyscome papillosa* population and habitat (Figure 10).
  - Stockpiles and machinery associated with road-sealing would be located and stored outside of known habitat.
  - Temporary signage and fencing would be erected in the location of *Brachyscome papillosa* to protect population and habitat (Figure 10) during construction activities.
  - Road way would be sealed for the length of the known *Brachyscome papillosa* habitat (Figure 10). Sealing would be undertaken as soon as practicable.
  - Loads to be covered to prevent dust or sediment exiting trucks during transport.
- Controls during the life of the mine:
  - Signage would be erected to encourage drivers to reduce speed and to remain on the sealed surface.
- Awareness and education:
  - Mine staff and contractors would be made aware of the *Brachyscome papillosa* population along the proposed MCTR.

7.4.2 *Lepidium monoplocoides*

Avoidance measures for populations of *Lepidium monoplocoides* include:

- Designing the area of disturbance for the Campaspe footprint to avoid some direct impact on potential habitat (Black Box Woodland).

Mitigation for populations of *Lepidium monoplocoides* would consist of the following consistent with the National Recovery Plan for the Winged Peppercress *Lepidium monoplocoides* (Mavromihalis 2010):

- Habitat protection and improvement:
  - Protection of Black Box Woodland and Grass/Herblands of Drainage Depressions outside of the disturbance areas for the Atlas-Campaspe Mine (but inside the MLA) by removing grazing by stock.
  - Pre-clearance surveys for *Lepidium monoplocoides* and retention of seeds for use in revegetation trials and rehabilitation.
  - Feral animal control (goats and rabbits) to reduce erosion and grazing pressure.
  - Controlling and monitoring of weeds to improve the likelihood of recruitment of this species.

7.4.3 *Pterostylis cobarensis*

Avoidance measures for the local populations of *Pterostylis cobarensis* include:

- Refining the mine plan to avoid *Pterostylis cobarensis* at Sites 4 – Figure 9). Site 5 is within the proposed offset area and a minimum 25 m distance between the surface mining activity and these locations would be maintained..

Mitigation for the local populations of *Pterostylis cobarensis* would consist of the following:

- Habitat Protection and improvement:
  - Protection of potential habitat (i.e. mallee woodland) outside of the disturbance areas for the Atlas-Campaspe Mine (but inside the MLA) by removing grazing by stock.
  - Feral animal control to reduce erosion and grazing pressure. Control of goats and rabbits.
- Protection of remaining population:
  - Fencing to be erected to prevent incursions into two locations where the species was recorded.
  - Pre-clearance surveys for the *Pterostylis cobarensis* and retention of plants/bulbs for use in revegetation trials and rehabilitation.
  - Weed management and monitoring to prevent weed invasion.
  - Dust suppression so that dust from vehicle does not damage the population or habitat.
  - Signage would be erected to prevent off road incursions into the known habitat
  - Fencing to be erected to protect from grazing by goats and rabbits.

7.5 Endangered Ecological Communities

7.5.1 *Acacia melvillei Shrubland EEC (Yarran Shrubland)*

Measures to reduce impact to *Acacia melvillei* Shrubland EEC from the Project include:

- Vegetation clearance procedures (Section 7.3):
  - Plant resource retention during vegetation clearance.
  - Staging of impacts.
  - Efficient, careful clearance.
- Protection and enhancement of vegetation outside the disturbance areas for the Atlas-Campaspe Mine (but inside the MLA):
  - Protection of areas of Yarran Shrubland inside the MLA not removed during mining activities with fencing.
  - Exclusion of stock from the areas of Yarran Shrubland inside the MLA.
  - Feral animal control to reduce erosion and grazing pressure. Remove goats and control rabbits.
  - Habitat rehabilitation/restoration to increase connectivity between remnant patches.
  - Weed control with continued monitoring programs.
  - Fire sensitivity is considered when planning hazard reduction burning. Protect sites from inappropriate burning.
- Awareness and Education
  - Mine staff and contractors would be made aware of the location of areas of Yarran Shrubland in the Atlas-Campaspe Mine area.

7.5.2 *Sandhill Pine Woodland EEC*

Measures to reduce impact to Sandhill Pine Woodland EEC from the Project include:

- Minimise impacts from vegetation clearing:
  - Stock piles and machinery would not be located in mapped location of the community.
  - Signage and roadside fencing to indicate location of Sandhill Pine Woodland EEC during construction activities.
- MCTR use and management:
  - Revegetation of additional disturbed areas once the roadway has been upgraded.

7.6 Management of weeds

Weed Management would be planned in a strategic manner within the Biodiversity Management Plan. This Biodiversity Management Plan would be implemented for the Project area. Weed Management would consider the following guidelines:

- *Habitat Management Guide – Rangelands: Ecological principles for the strategic management of weeds in rangeland habitats* (Grice et al. 2008):
- *Biodiversity Priorities for Widespread Weeds – Lower Murray Darling CMA region* (DPI & OEH 2011b).

The following key measures would be implemented to prevent and control the spread of weeds:

- Weed management and control would be undertaken in and outside of the proposed disturbance areas.
- Weed management would be undertaken over the life of the mine and during the rehabilitation of the Atlas-Campaspe Mine areas.
- Disturbance areas would be monitored to prevent the outbreaks of weeds.
- Strategic weed management of priority areas with realistic goals.
- Monitoring programs to determine if implemented management actions are working appropriately (feedback system) and if not, then alternative actions can be applied.

7.6.1 *Long-term commitment*

A commitment to continue weed management throughout the life of the Project and during rehabilitation of the Project areas is essential to minimise the impact of weeds on native flora.

7.6.2 *Minimising disturbance and spread of weeds*

Minimisation of unnecessary disturbance would be important part of controlling weed infestations and reducing the spread of weeds.

Minimisation of seed transport into, around and out of the site during construction and operation would be achieved through the use of vehicle wash down stations.

7.6.3 *Strategic management*

A strategy for weed management in areas of highest priority would be implemented. The weed strategy would include:

- Identification of priority areas. Priority areas would include, but not be limited to:
  - Maintenance of newly created edges in moderate to good condition.
  - Control of areas of potential new outbreak (e.g. soil stockpiles, roadsides, disturbed areas, surface water diversions).
  - Weed infestations in areas of low resilience that are likely to spread would be contained and incursions into them avoided. Areas subject to previous disturbance and currently subject to high degrees of weed invasion are likely to be of low resilience. Areas of low resilience to be identified.
  - Specific control of noxious weeds, including those which have been recorded in the area.
- Appropriate timing for the mechanical removal of identified weeds and/or the application of approved herbicides in authorised areas.
- Regular site inspections to monitor the effectiveness of weed control.

7.7 Water management

Alteration of surface and groundwater hydrology by the Atlas-Campaspe Mine footprint may have an impact on remaining vegetation which is dependent on surface flow, subsurface flow and pooling, i.e. Black Box Woodland. Clearing of the area of Black Box Woodland in the Atlas-Campaspe Mine footprint would largely be avoided however changes to the surrounding landscape may interfere with the natural flow of water to this remaining area.

To mitigate the impact of the Project on the Black Box Woodland the following would be undertaken:

- construction of temporary diversions banks to divert any off-site runoff around the active mine path in order to maintain the opportunity for runoff to reach the relevant ephemeral waterbodies (Evans & Peck 2012);
- selective placement of clay material in low-lying portions of the re-profiled landform within the mine path to reinstate the water holding capacity of, and run-on to adjacent depressions;
- once mining is complete, restoring land levels along the main flow paths to allow cross drainage to occur toward the Black Box Woodland; and
- the Ivanhoe Rail Facility would not impede water flows to adjacent Black Box Communities.

7.8 Management of grazing by rabbits and goats

Pest management and control would be undertaken in and outside of the proposed disturbance area. A feral animal control programme would be implemented to control rabbits and goats in the Atlas-Campaspe Mine area. This programme would be integrated with a programme in the offset area. A feral herbivore control programs would need to be coordinated with feral predator control programs (e.g. for foxes and feral cats) given foxes and cats prey upon small native fauna more readily when populations of rabbits diminish. Artificial watering points would be fenced to exclude rabbits and goats.

7.9 Land management

Cristal Mining will enter into agreements with the leaseholders for the lease of the land in the vicinity of the Atlas-Campaspe Mine for the Project. Cristal Mining would manage Boree Plains Station and Wampo Station in accordance with the requirements of the Western Lands Lease (e.g. control of noxious weeds and management of grazing). The management of the land would be consistent with the *Guidelines for Developments Adjoining Department of Environment and Climate Change Land* (DECC, 2008).

7.10 Ivanhoe rail siding facility

The Ivanhoe Rail Facility would include retention and management of 15 ha of existing vegetation comprising 14.8 ha of Belah-Rosewood/Acacia Woodland and 0.2 ha of Native Grassland/Sparse Acacia/Chenopod Shrubs. The perimeter of the area would be fenced with a goat proof fence to facilitate regeneration of the native vegetation. Cristal Mining would undertake control of noxious weeds within this area.

7.11 Other programs

7.11.1 Management of vehicles

Make sure vehicle cleaning stations are constructed and vehicles are cleaned free of weed material (e.g. seeds).

To reduce the potential for vehicular related vegetation disturbance, the number of roads constructed for the Project would be minimised and employees and contractors would be instructed to only use the official mine roads.

7.11.2 Fire prevention, control and management

A fire management strategy would be developed for the Project area in consultation with the local Rural Fire Service (Wentworth/Balranald Bush Fire Management Committee) which integrates:

- Fire Prevention;
- Fire Control; and
- Fire Regimes for Biodiversity

Fire prevention

The following fire prevention measures would be implemented to minimise the potential for fire ignition:

- Clearing restrictions:
  - Clearing would be minimised during periods of extreme fire danger (as defined by the Bureau of Meteorology) to mitigate risk of fire ignition from machinery, where practicable
- On site precautions:
  - Provision and maintenance of fire fighting equipment on-site.
  - Training of mine personnel and contractors in fire awareness and response procedures.
  - Establishment and maintenance of fire breaks to contain fires within the mining tenements.
  - Prohibition of smoking in fire prone areas.
  - Appropriate management of dangerous goods.

Fire control

The following fire prevention and control measures would be implemented:

- Controlling outbreaks of fire in consultation with the local Rural Fire Service (Wentworth/Balranald Bush Fire Management Committee);
- All mine personnel and contractors would receive training in fire awareness and response procedures; and
- Construct a fire break along perimeter fence at the Ivanhoe Rail Facility to prevent spread of grass fire into surrounding property.

Fire for biodiversity

Fire should be managed in conjunction with the proposed Biodiversity Management Plan (Section 7.2) to maintain and enhance biodiversity.

- Fire in remnant vegetation would be prevented to remove the risk of spread to surrounding areas e.g. proposed offset area.

- Impact of fire fighting machinery on remnant vegetation in the Project area would be considered.

7.11.3 *Dust and spill control*

- Minimise dust generation where relevant by minimising the extent and time bare soil is exposed.
  - Water spraying of internal unsealed haul roads in the active mine area.
  - Cleared areas are sprayed regularly with water during any construction activities, where appropriate.
  - Progressive rehabilitation of disturbance areas including topsoil and subsoil stockpiles.
  - Soil stripping is avoided during periods of high wind and/or low soil moisture as to minimise dust.
  - Section of MCTR which passes through Mossgiel Daisy population to be sealed as soon as practicable prior to its use for the Project.
- Develop pollution and spill management plan to deal with potential spills from vehicles and plant machinery and release of other pollutants during construction and operation activities associated with the mines.

7.12 Post-mine rehabilitation and revegetation

A Rehabilitation Management Plan would be prepared to facilitate the progressive rehabilitation of the post mine landforms. The progressive clearance of native vegetation ahead of the advancing extraction area and active mine area would be followed by progressive rehabilitation of the backfilled pit and overburden emplacements.

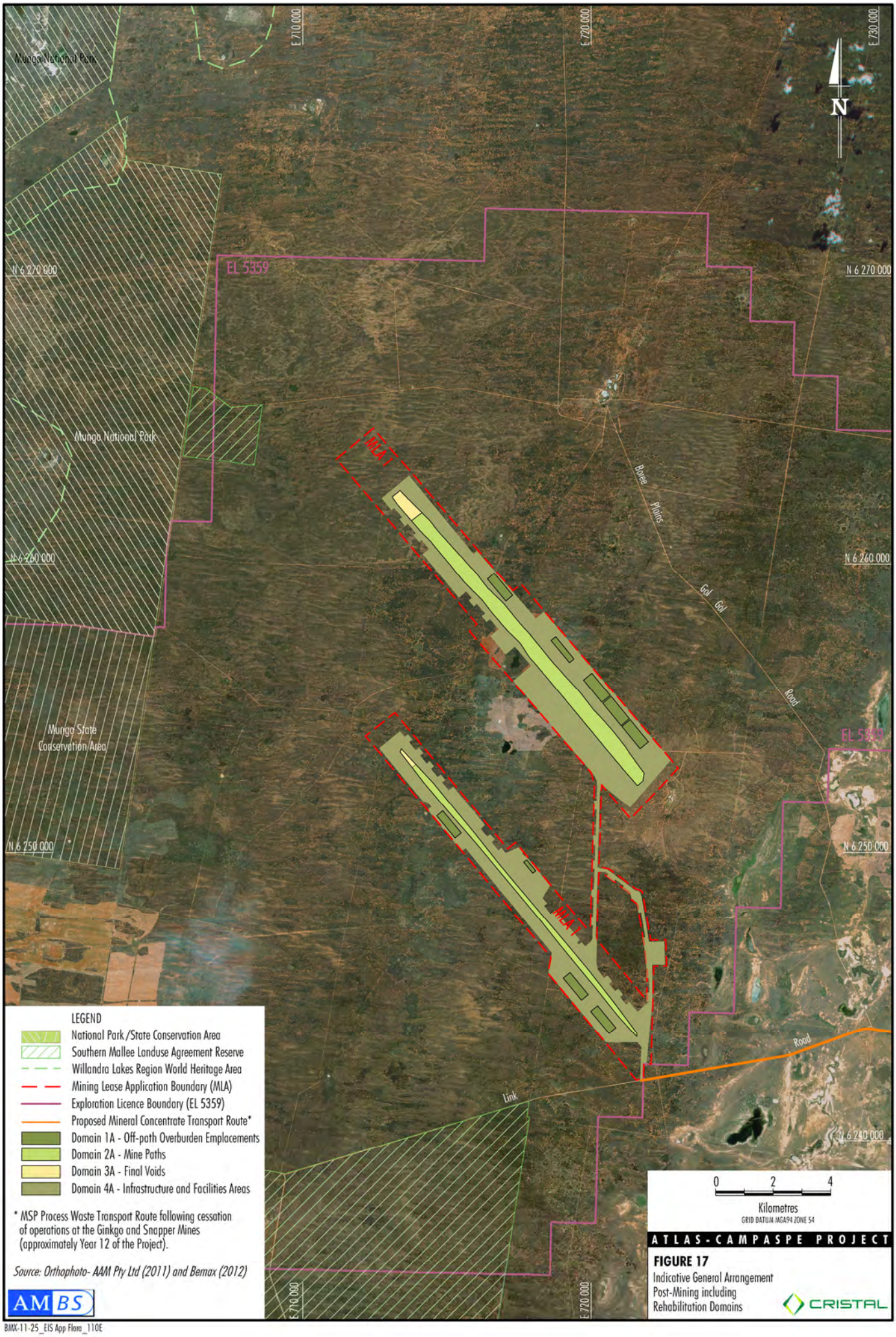
Conceptual rehabilitation domains have been developed by Cristal Mining in consideration of the DTIRIS-DRE's (2011) *Interim Mining Operations Plan Guidelines - Guidance Note 1* to assist rehabilitation planning for the Project. The rehabilitation domains are relevant to the Project's post mine landforms and the Project's final land use. The conceptual rehabilitation domains are shown on Figure 17 and include:

- Domain 1A – Off-Path Overburden Emplacements;
- Domain 2A – Mine Paths;
- Domain 3A – Final Voids; and
- Domain 4A – Infrastructure and Facilities Areas.

Rehabilitation objectives for the domains have been developed by Cristal Mining based on the objectives for the Project's rehabilitation strategy and are as follows:

- the domain would be safe, stable and non-polluting;
- the domain would be revegetated with native vegetation species characteristic of vegetation communities cleared and include suitable Woodland and Shrubland species; and
- the domain would include self-sustaining ecosystems suitable for a final use to be determined in conservation with the relevant authorities.

Cristal Mining have experience with revegetation (Mallee and Shrubland) on post-mine landforms at the Ginkgo Mineral Sands Mine, Snapper Mineral Sands Mine and the former Wemen Mineral Sands Mine. Results from revegetation campaigns undertaken at these mines would be used to inform the Project's revegetation programme.



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Rehabilitation and revegetation would be progressive and would aim to re-establish vegetation across the disturbance area in order to reduce the impact on habitat connectivity. Propagules for regeneration and revegetation would be supplied by immediate reuse of removed topsoil and seed stocks collected prior to clearing or from local provenance sources. Yarran (*Acacia melvillei*) would be included in the seed mix. A mix of species associated with the *Acacia melvillei* Shrubland EEC including Yarran (*Acacia melvillei*) would be used to revegetate suitable areas in the rehabilitation areas. Threatened species management would include pre-clearance surveys for the *Pterostylis cobarensis* and *Lepidium monoplocoides* and retention of plants/seeds/bulbs and/or cuttings for use in revegetation trials and rehabilitation.

A rehabilitation monitoring programme based on sound scientific principles would be developed to assess the performance of the rehabilitated areas, in particular the progression of rehabilitated land and the effectiveness of rehabilitation techniques used. Results from the monitoring program would be regularly reviewed to allow for adaption of rehabilitation strategies as required to improve outcomes.

A key rehabilitation objective for the Project would be to reinstate clay soils in those locations where Black Box Woodland previously occurred in a manner to mimic the pre-mining maximum water holding capacity of the depression and restore the local catchment to these locations and adjacent remnant Black Box Woodland depressions. To do this, clay materials would be selectively placed in low-lying portions of the re-profiled landform within the mine path, with the objective of reinstating the water holding capacity of, and the run-on to adjacent depressions. Following rehabilitation, species representative of Black Box Woodlands, e.g. *Eucalyptus largiflorens* would be re-established and would provide areas where revegetation trials for Winged Peppercress could be perfomed.

As described in the Main Text of the EIS (Section 5.7.2) and in this report (Section 7.4.3), *Pterostylis cobarensis* collected from the mining lease would be included in revegetation trials for rehabilitated post mine landforms.

A detailed description of the Project's revegetation programme and rehabilitation monitoring programme would be included in the Rehabilitation Management Plan.

8 Offset Strategy

The offset strategy aims to address impacts that cannot be mitigated. The objective of the offset strategy is to maintain or improve biodiversity values (including fauna habitat) in the region in the medium to long-term, through the conservation, management and improvement of habitat near the Atlas-Campaspe Mine in perpetuity. The land within the proposed offset area would be subject to ongoing management, monitoring and independent audits, allowing for ongoing adaptive management.

Specific information relating to the flora species and vegetation communities was obtained from baseline flora surveys undertaken in the offset study area. A copy of the full survey report is provided as a separate document in Appendix A.

The proposed offset area (its size, location and proposed management regime) were selected on the basis of a range of factors:

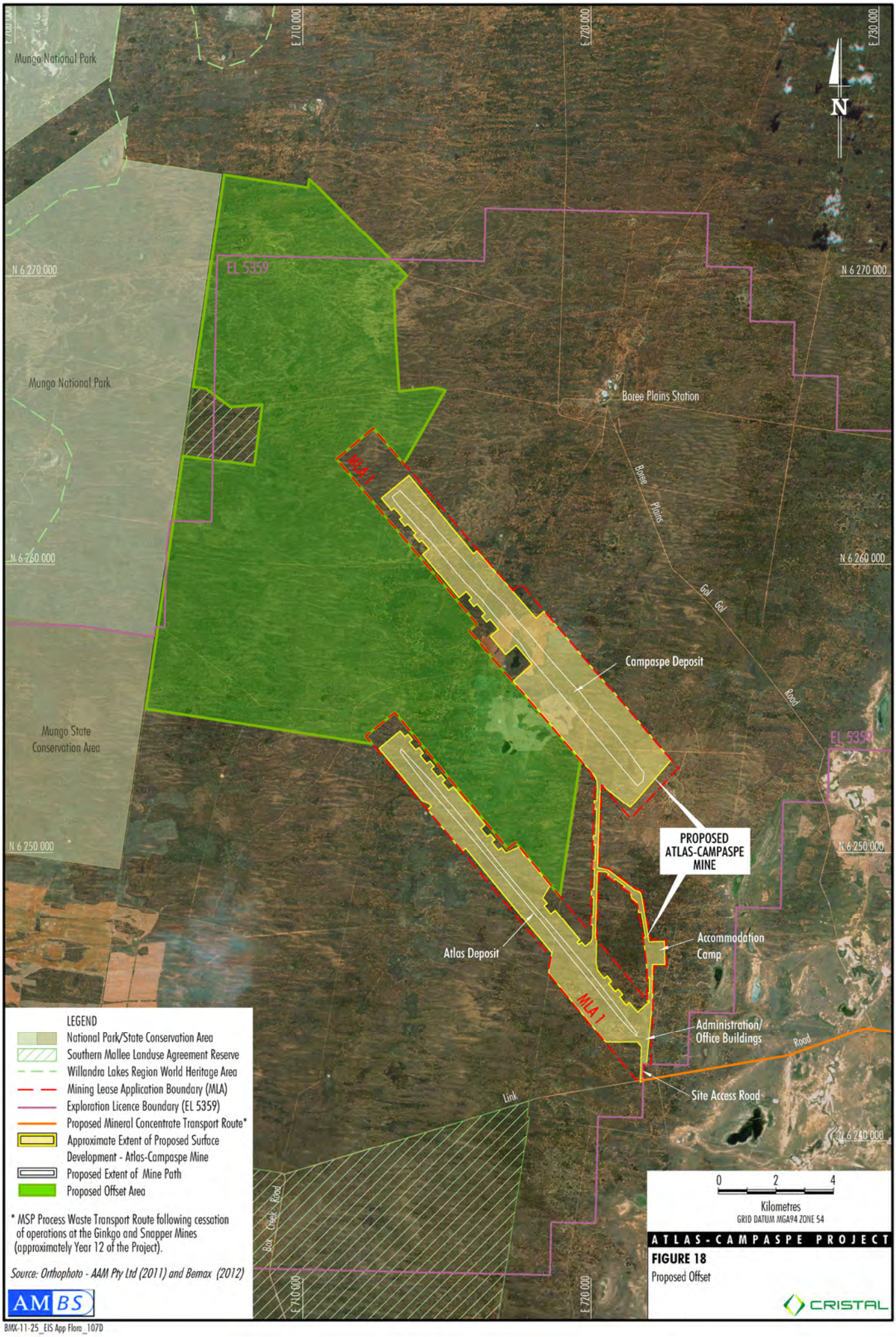
- the location of the offset area relative to the proposed disturbance area.
- how the offset could complement the existing reserve system (e.g. Mungo National Park, Mungo State Conservation Area and Southern Mallee Land Use Agreement Reserves).
- the land tenure available on which to locate a proposed offset area (i.e. Cristal Mining controlled land).
- the location of existing fencelines and tracks (to minimise the need to create new ones).
- the size of the proposed offset area relative to the proposed disturbance area.
- the shape of the proposed offset area in relation to the spatial arrangement of existing vegetation in the landscape.
- the regional conservation priorities and habitats most in need of conservation (e.g. Yarran Shrubland).
- the vegetation/flora habitat composition of the proposed disturbance area relative to the proposed offset area.
- the flora species present (including threatened species) and the habitat needed to maintain local populations of the species.
- the ecosystem resilience and condition of the proposed offset area.
- a range of fauna considerations (refer to AMBS 2013).

These factors are further discussed below in relation to the offset area.

8.1 Location

The proposed offset area for the Project is located adjacent to the Atlas-Campaspe Mine and therefore has the capacity to benefit biodiversity values in the same region (Figure 18).

The proposed offset area adjoins Mungo National Park and a Southern Mallee Landuse Agreement Reserve and as such would be an important addition to the conservation network.



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8.2 Tenure of the proposed offset area

The proposed offset area is located on leasehold land. Cristal Mining will enter into agreements with the leaseholders for the lease of the land in the vicinity of the Atlas-Campaspe Mine for the Project. The land tenure underlying the proposed offset areas would be secured in perpetuity.

8.3 Characteristics of the proposed offset area

8.3.1 *Size*

The Project area covers 4,463 ha of land, comprising approximately 4,158 ha of native vegetation communities and 305 ha of cleared land/road and railway easement. The proposed offset area for the Project covers approximately 16,540 ha of land, comprising approximately 16,270 ha of native vegetation communities and 270 ha of cleared cultivated land which would be rehabilitated. The cleared land would be allowed to regenerate and trials of assisted regeneration of the EEC Yarran Shrubland would be undertaken, if natural regeneration isn't occurring. Table 14 provides a summary of the quantity of offset land in relation to the Project disturbance areas.

The proposed offset area represents approximately 12% of the land already dedicated for conservation in the adjoin Mungo National Park (122,436 ha), Mungo State Conservation Area (5,794 ha) and the small Southern Mallee Land Use Agreement Reserve on Boree Plains Station (529 ha). The Southern Mallee Land Use Agreement Reserve south of the proposed offset area comprises 18,117 ha.

Table 14. Quantification of vegetation types in the Project area and proposed offset area (does not include cleared land).

Vegetation Community	Project area (ha)	Proposed offset area (ha)
Semi-arid Woodlands		
Belah-Rosewood Woodland	2,035	2,560
Black Box Woodland	50	90
Linear Dune Mallee Woodland	1,040	9,640
Mulga Woodland	5	25
Sandplain Mallee	535	3,125
Sandhill Pine Woodland*	3	0
Belah-Rosewood/*Acacia* Woodland	10	0
Arid Shrublands		
Yarran Shrubland*	195	390
Disturbed Area Shrubland Complex (A)	170	430
Bluebush Shrubland	70	0
Chenopod Shrubland Depressions	5	0
Saltbush Shrubland	5	0
Scalded Chenopod Shrubland	5	0
Grass/Herbland		
Grass/Herblands of Drainage Depressions	0	10
Native Grassland/Sparse *Acacia*/Chenopod Shrubs	30	0
Total	**4,158**	**16,270**

* EEC listed under the TSC Act.

8.3.2 Shape

The shape of the proposed offset area is defined by an attempt to complement the existing reserve system including the Mungo National Park and to encompass a representative example of the vegetation types and threatened flora habitat to be impacted by the Atlas-Campaspe Mine.

8.3.3 Proximity to existing reserve system

The proposed offset area is located adjacent to Mungo National Park and a Southern Mallee Landuse Agreement Reserve associated with past vegetation clearing activities on Boree Plains Station (Figure 18). The proposed offset area would also provide some connectivity between these existing reserves and another Southern Mallee Landuse Agreement Reserve located to the south-west (Figure 18). The proposed offset area would contribute a considerable area to conservation.

8.3.4 Existing infrastructure

The following infrastructure occurs in the proposed offset area.

- Water tanks (open dams and closed containers).
- Water pipelines to transport water from Boree Plains Station to some tanks in the proposed offset area.
- Fencing.
- Tracks associated with fencing, cropping areas and tanks.

8.3.5 Mining exploration

The proposed offset area is located within EL 5359 held by Cristal Mining. No mining exploration would occur within the proposed offset area.

8.4 Flora of the proposed offset area

8.4.1 Threatened species

One species listed as endangered under the TSC Act and the EPBC Act was located in the proposed offset area. *Lepidium monoplocoides* was found at three locations which represents 195 extant individuals.

Pterostylis cobarensis is known to occur in one location adjacent to the Atlas footprint but within the proposed offset area. Potential habitat for *Pterostylis cobarensis* is represented by 12,765 ha of Sandplain Mallee and Linear Dune Mallee in the proposed offset area.

8.4.2 Vegetation types

The major vegetation formations of the proposed offset area are semi-arid woodland and arid shrublands (Keith 2006). Table 14 compares the area of vegetation communities within the proposed offset area with those within the approximate extent of proposed surface disturbance for the Atlas-Campaspe Mine.

The proposed offset area contains a similar suite of flora species and vegetation communities to those in the Atlas-Campaspe Mine footprint.

8.4.3 Endangered Ecological Communities

One EEC is represented in the offset area. Yarran Shrubland conforms to the description of '*Acacia melvillei* Shrubland in the Riverina and Murray-Darling Depression bioregions' a listed EEC under the TSC Act (Appendix J). It is not listed under Commonwealth legislation. Approximately 390 ha of Yarran Shrubland has been mapped within the proposed offset area (Table 14).

8.4.4 Vegetation resilience and condition

The condition of the vegetation in the offset study area is strongly related to the vegetation type. For example mallee vegetation is generally in good condition while Black Box Woodland or Yarran Shrubland is in moderate to poor condition. Vegetation in the proposed offset area is in similar condition to the vegetation in the Atlas-Campaspe Mine footprint. The vegetation in the proposed offset area is expected to improve in condition with the removal of grazing. Reducing grazing includes the removal of domestic stock and goats and the control of rabbits.

Cleared land is represented in both the offset and Project areas. In the proposed offset area there is potential for native vegetation to regenerate in the cleared land as some native shrubs and herbs still occur. The removal of grazing and cessation of cultivation may allow these native species to recolonise the cleared land.

8.4.5 Comparison of flora values of the Atlas-Campaspe Mine area and proposed offset area

Table 15 shows the comparative flora values of the Project area and the proposed offset area.

Table 15. Summary of the flora values of the Project area and proposed offset area.

Project Area Unit	Threatened Plants	Vegetation Communities	EECs	Offset Area
Atlas-Campaspe Mine footprint	*Lepidium monoplocoides* *Pterostylis cobarensis*	Linear Dune Mallee Sandplain Mallee Belah-Rosewood Woodland Disturbed Area Shrubland Complex, Mulga Woodland Yarran Shrubland Sandhill Pine Woodland, Black Box Woodland Grass/Herblands of Drainage Depressions Cleared land	Yarran Shrubland (*Acacia melvillei* Shrubland EEC)	All vegetation communities are represented in the proposed offset area. Three populations (approximately 195 individuals) of *Lepidium monoplocoides* would be protected within the offset area. One occurrence (11 individuals) and potential habitat for *Pterostylis cobarensis* occurs within the proposed offset area. Approximately 390 ha of Yarran Shrubland (*Acacia melvillei* Shrubland EEC) has been mapped within the proposed offset area.
MCTR footprint	None located	Chenopod Shrubland Depressions Saltbush Shrubland Bluebush Shrubland Scalded Chenopod Shrublands	Sandhill Pine Woodland EEC	Vegetation communities are not represented in the proposed offset area.
Ivanhoe Rail Facility footprint	None located	Belah-Rosewood/*Acacia* Woodland Native Grassland/Sparse *Acacia*/Chenopod Shrubs	None located	The Ivanhoe Rail Facility would include retention and management of Belah-Rosewood/Acacia Woodland and Native Grassland/Sparse Acacia/Chenopod Shrubs (Section 7.10).

8.5 Mungo National Park

The proposed offset area adjoins directly to the eastern edge of Mungo National Park and would therefore increase the area of conservation for a selection of vegetation communities and flora habitat within the bioregion. The availability of and condition of habitat resources within the bioregion is also likely to be enhanced in the medium to long term with the introduction of the proposed offset area given the implementation of mitigation measures to ameliorate existing impacts (refer to Section 7). That is, by connecting the proposed offset area to the Mungo National Park, local populations of threatened species and EECs, overtime may multiply with the greater availability of resources and habitat area and reduced impacts.

8.6 Proposed offset area management, security, monitoring and auditing

The sub-sections below provide detail on the proposed method of conserving the proposed offset area in perpetuity, and the proposed management, monitoring and independent audits. These sub-sections have been cross referenced with the offset sections of the Terrestrial Fauna Assessment (AMBS 2013) (Appendix B of the EIS) to maintain consistency between the flora and fauna offset management procedures.

8.6.1 *Conservation in perpetuity*

An arrangement would be made for the enduring protection and management of the biodiversity offset area within 12 months of grant of Development Consent. A voluntary conservation agreement pursuant to section 69B of the *National Parks and Wildlife Act 1974* or similar arrangement, would be sought. Separately, Cristal Mining would seek an agreement with the NSW Government so that the proposed offset area can be permanently added to the adjoining Mungo National Park.

8.6.2 *Management*

A management plan would be prepared for the proposed offset area within 12 months of the Project being approved to facilitate its management prior to integration into Mungo National Park. A management plan would provide a framework for the management of the proposed offset area and would incorporate adaptive management strategies to monitor management activities so that management priorities can be updated to reflect the observations of the monitoring programs, environmental changes and availability of resources.

The management plan would also include management strategies for *Lepidium monoplocoides, Pterostylis cobarensis* and Yarran Shrubland EEC based on principles of the national recovery plan for the *Lepidium monoplocoides* (Mavromihalis 2010), priority actions in the conservation advice for *Pterostylis cobarensis* (DEWHA 2008c) and information currently available on the regeneration of *Acacia* shrublands in semi-arid and arid environments (Batty and Parsons 1992, Auld 1990, 1995, Hodgkinson 2002, Nano et al. 2012).

Should populations of other threatened species be located management strategies for these would be incorporated in to the management plan. The management plan would provide guidelines to undertake the core activities discussed below.

Removal of Livestock

Grazing by stock across the entire proposed offset area has led to the following range of observable impacts on vegetation including a lack of seedling trees or shrubs, stunted shrub growth, disturbance of the biological soil crust by trampling, removal of ground layer vegetation near watering points and along an extensive network of animal tracks, and moderate to severe erosion of bare areas. The removal of stock is likely to facilitate a significant improvement to flora in the proposed offset area.

Removal and exclusion of stock would be achieved by the following actions.

1. A series of stock musters and the construction of traps around tanks.
2. Fencing of the proposed offset area to prevent stock from entering.

Closure of Artificial Watering Points

Artificial watering points within the proposed offset area would be closed to prevent access by livestock and feral animals. It is clear from the information accumulated during the survey of the proposed offset area that proximity to watering points is equated to high levels of disturbance. This method is being used in other conservation areas in the semi-arid region of NSW e.g. Mungo National Park And the Scotia Sanctuary.

Animal Pest Management

Feral goats present a potential threat to plant communities given the large number of plant species that are palatable to them, their ability to browse and graze in inaccessible areas such as in trees or in dense thickets and contribute substantially to total grazing pressure in the woody rangelands of NSW, and that they probably have the greatest potential for causing grazing impacts in the region (NSW Scientific Committee 2004).

Control of goats and rabbits (combined with stock removal) is expected to facilitate the most significant improvement to flora in the proposed offset area compared to all other management options.

Control of feral animals would be achieved by the following actions.

- Removal of goats from the offset area. This could be undertaken with a series of stock musters and the construction of traps around tanks.
- Control of rabbits, foxes and cats by an appropriately qualified contractor using standard methods.
- Monitoring of feral animals to determine the effectiveness of the program.

Weed Control

Weed cover within the proposed offset area is comparatively low with the greatest diversity of weed species occurring in areas where grazing is more intense and hence disturbance is greatest. The removal of grazing may result in an increase in the density of weed species in these areas and strategies may need to be developed to prevent a population explosion of existing weed species. Weeds in the proposed offset area would be monitored and controlled by an appropriately qualified contractor using standard methods.

Regeneration

Approximately 270 ha of marginal land in the proposed offset area has been cleared for cultivation. Native vegetation would be allowed to naturally regenerate in these areas through the cessation of cultivation and the removal of grazing by livestock, goats and rabbits.

Should the native vegetation not regenerate naturally due to the extent of prior disturbance to the seed bank and/or the dominance of introduced flora species, revegetation would be assisted through:

- removal of weed species; and
- revegetation with appropriate plantings of seedlings of species represented in the surrounding native vegetation communities.

Fire

The long-term survival of plants and animals over repeated fires is dependent upon two key features namely the ability of species to maintain life cycle processes; and the maintenance of vegetation structure over time as habitat for animal species (NSW Scientific Committee 2000). There is increasing evidence that a mosaic approach to fire is not as applicable to the semi-arid landscape as other landscapes within Australia (Nano et al. 2012).

Bushfire prevention and control measures would be developed for the proposed offset area that encompass the latest understanding of fire and its impact on biodiversity (both flora and fauna)in semi-arid landscapes. Fire breaks would be constructed and maintained around the perimeter of the proposed offset area. A fire break would potentially allow managers of the offset study area to control fire at the boundary, preventing it from entering or leaving the offset study area.

Species composition of *Acacia melvillei* Shrubland EEC is known to be dependent on fire frequency and intensity (NSW Scientific Committee 2008). Further expertise would need to be consulted to determine the appropriate fire regime for the community, so that it can be upheld within the proposed offset area.

Fire regimes would also be considered in relation to threatened flora species known to or potentially occurring in the proposed offset area (Table 16).

Table 16. Fire regimes for threatened flora known to or potentially occurring in the proposed offset area.

Threatened Species	Fire interval	Conditions relating to Mechanical Forms of Hazard Reduction
Lepidium monoplocoides	No fire more than once every 10 years	No slashing, trittering or tree removal
Pterostylis cobarensis	No fire	No slashing, trittering or tree removal

Source: NSW RFS (2006)

Given the changing understanding of the role of fire in a semi-arid landscape, strategies to manipulate fire within the offset area should be carefully researched and experiments be utilised to probe the complex responses of flora to fire and rainfall in this landscape.

Threatened Species
The construction of the Atlas-Campaspe Mine would result in the loss of two *Lepidium monoplocoides* individuals. This loss would be mitigated by the conservation of approximately 195 individuals in the proposed offset area. The following management measures are proposed to protect existing individuals and enhance potential habitat for *Lepidium monoplocoides* in the offset area.

- Exclusion of livestock.
- Control of goats and rabbits.
- Monitoring and control of weeds.

The management measures listed above are in accordance with the *National Recovery Plan for the Winged Peppercress* (*Lepidium monoplocoides*) (Mavromihalis 2010).

Endangered Ecological Communities
Approximately 390 ha of Yarran Shrubland (*Acacia melvillei* Shrubland EEC) occurs within the proposed offset area. All patches of Yarran Shrubland in the proposed offset area are in moderate to poor condition. The removal of grazing by livestock and goats and the control of rabbits would be undertaken to assist in the regeneration of Yarran Shrubland. A set of management actions for this EEC have been recommended by OEH (2011a).

Liaise with Stakeholders
The proposed offset area is surrounded by OEH and leasehold property. Liaison with these and other stakeholders such as OEH, the local council and the CMA would be an important part of the management of the proposed offset area.

8.6.3 *Monitoring*

A monitoring programme would be implemented to assess and report on the effectiveness of the measures and the performance of the offset in maintaining and improving native vegetation and habitat for native flora. This would include, as a minimum, standardised flora surveys performed every three years, in selected locations across the proposed offset area. Surveys would be best undertaken during spring/early summer. Observation would be made of criteria that allows for assessment overtime via an independent audit.

Summary reporting would be carried out annually and comprehensive reporting would be carried out following the independent environmental audit (see below). The monitoring would be performed by suitably qualified person(s).

8.6.4 *Independent audits*

The proposed offset area would be independently audited at intervals agreed to with relevant authorities. The audits would be performed by a suitably qualified person(s) to:

- assess compliance with the management plan;
- assess the performance of the offset area;
- review the adequacy of the management measures and monitoring programme; and
- recommend actions or measures to improve the performance of the offset, management plan, or monitoring programme.

8.7 Reconciliation of the offset strategy against OEH offset principles

Biodiversity offsets are designed to balance the relative environmental, social and economic merits of development proposals and outcomes must meet the 'maintain or improve' standard (OEH 2011c). A set of principles have been provided as a framework for considering environmental impacts and developing offset proposals (OEH 2011c). A reconciliation of the offset proposal against these principles is provided in Table 17.

Table 17. Reconciliation of the offset strategy against OEH offset principles.

OEH Offset Principles (OEH 2011c)	Description of How the Offset Addresses the OEH Offset Principles
Impacts must be avoided first by using prevention and mitigation measures.	Section 7 describes measures to avoid and mitigate the impacts from the Atlas-Campaspe Mine on flora. The offset strategy is proposed to address residual impacts.
All regulatory requirements must be met.	Cristal Mining is required to meet all statutory requirements. The offset strategy is not proposed to substitute other licence/approval requirements.
Offsets must never reward ongoing poor performance.	The offset strategy is proposed to address residual impacts associated with the Project only.
Offsets would complement other government programs.	An arrangement would be made for the enduring protection and management of the biodiversity offset area within 12 months of grant of Development Consent. A voluntary conservation agreement pursuant to section 69B of the *National Parks and Wildlife Act 1974*, Change of Lease Purpose or similar arrangement is proposed, which may include an agreement with the NSW Government so that the proposed offset area can be permanently added to the adjoining Mungo National Park.
Offsets must be underpinned by sound ecological principles.	The biodiversity offset is underpinned by sound ecological principles such as: • consideration of structure, function and compositional elements of biodiversity; • enhancement of biodiversity at a range of scales through a number of proposed management measures; and • measures to protect the long-term viability and functionality of biodiversity (e.g. enhancing the existing habitat as well as securing and managing the land for conservation purposes).
Offsets should aim to result in a net improvement in biodiversity over time.	A net improvement in biodiversity is likely because: • The proposed offset area (16,540 ha) would be conserved in perpetuity. • The proposed offset area contains a similar suite of flora species and vegetation communities to those in the majority of the Atlas-Campaspe Mine area. • Approximately 270 ha of cleared land would be regenerated. • Measures to monitor and independently audit the proposed offset area are provided.
Offsets must be enduring. They must offset the impact of the development for the period that the impact occurs.	The land tenure underlying the proposed offset areas would be secured in perpetuity for flora and fauna conservation.
Offsets should be agreed prior to the impact occurring.	The offset strategy is proposed as part of the Project. The implementation of the biodiversity offset is likely to be a condition of Project Approval.
Offsets must be quantifiable. The impacts and benefits must be reliably estimated.	The flora in the proposed offset area has been surveyed by AMBS. This report (Appendix A) provides an assessment of: • area of the proposed offset and area of impact; • flora species present and their conservation status • connectivity and condition of habitat; and • management actions and security for the offset site.
Offsets must be targeted.	The proposed offset area has been targeted to offset impacts of the Atlas-Campaspe Mine. The proposed offset area contains a similar suite of flora species and vegetation communities to those in the majority of the Atlas-Campaspe mine area. The proposed offset area also contains one known threatened flora species and one

OEH Offset Principles (OEH 2011c)	Description of How the Offset Addresses the OEH Offset Principles
	EEC and provides potential habitat for several other threatened flora species.
Offsets must be located appropriately.	The proposed offset area is located adjacent to the disturbance area in a similar topographic, climatic and geographic environment. It is also located adjacent to Mungo National Park and would add 16,540 ha to the conservation network in south-western NSW.
Offsets must be supplementary.	The implementation of the offset strategy is beyond existing requirements, in that it is not part of any private conservation reserve system.
Offsets and their actions must be enforceable through development consent conditions, license conditions, conservation agreements or a contract.	Measures to monitor and independently audit the biodiversity offset are provided. The implementation of the biodiversity offset is likely to be a condition of Project approval.

The EPBC Act and supporting guidelines (refer to EPBC Act Environmental Offsets Policy, 2012; SEWPaC 2012b) contain a number of requirements for environmental offsets (Table18). Table 18 highlights the elements of the Project proposed offset area that address the requirements for protected matters relevant to this Offsets Policy.

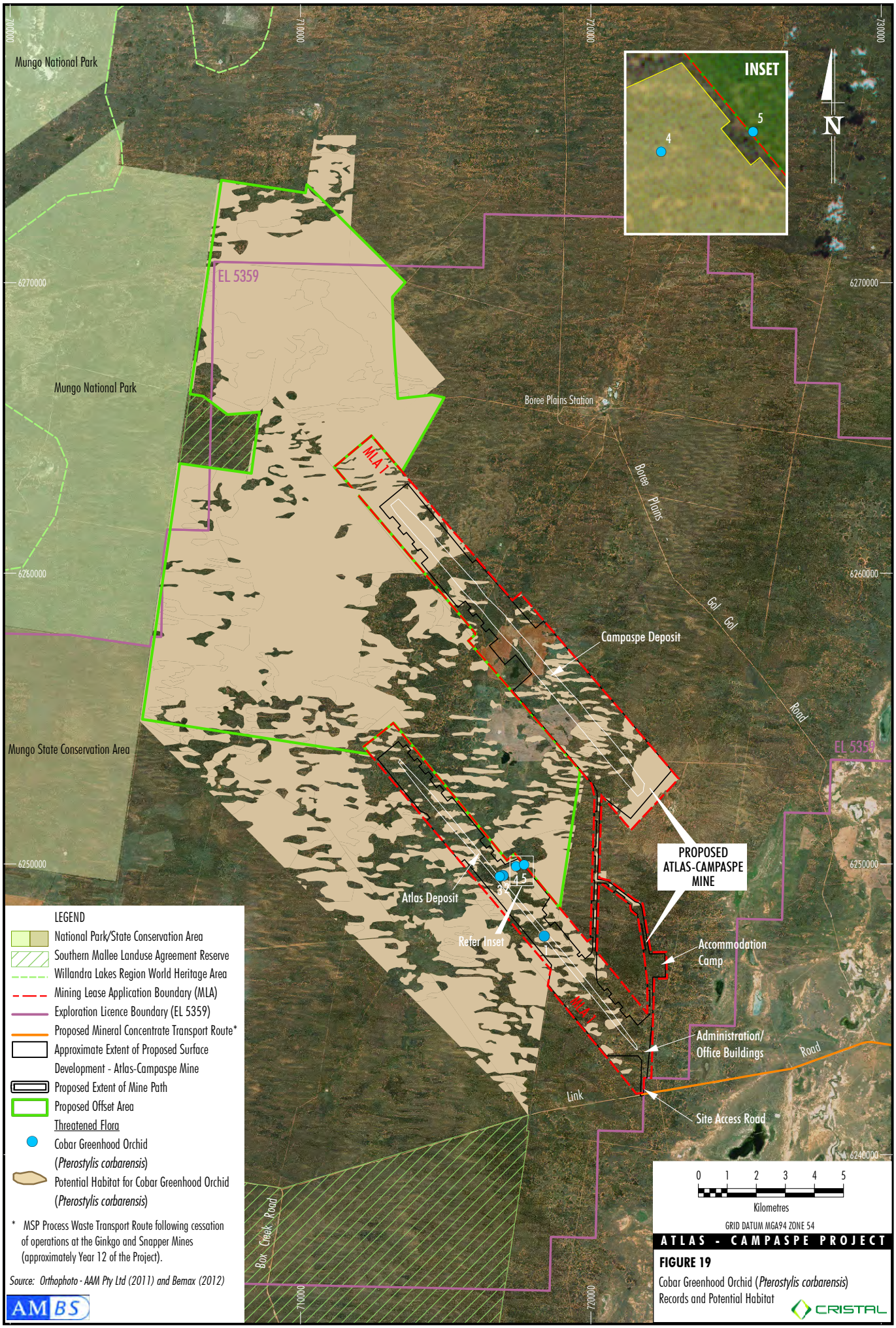
Table 18. Reconciliation of the offset strategy against SEWPaC offset principles.

Offset Requirements	Elements of the Project Offset that address these Requirements
Deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environmental law and affected by the Project.	A conservation outcome that improves or maintains the viability environmental matters that are protect by national environmental law and affected by the Project because: • The proposed offset area contains two known nationally threatened flora species (*Lepidium monoplocoides* and *Pterostylis cobarensis)* and provides potential habitat for these and several others. • management of the proposed offset would include a series of measures likely to improve flora and vegetation values and reduce pressure on native flora species, including removal of stock, ecological fire management and feral animal control; • 270 ha of cleared land would be rehabilitated or revegetated; • the proposed offset area (totalling 16,540 ha) would be conserved in perpetuity; and • measures to monitor and independently audit the proposed offset are provided.
Be built around direct offsets but may include other compensatory measures.	The proposed offset area would maintain and improve a similar suite of flora species and vegetation communities to those in the majority of the Atlas-Campaspe Mine area.
Be in proportion to the level of statutory protection that applies to protected matter.	Nationally threatened species which are considered to have potential to be impacted by the Atlas-Campaspe Mine are all likely to benefit in the medium to long-term from the offset proposal. All species listed under the EPBC Act that have been recorded in the Atlas-Campaspe Mine area and would be significantly impacted have known and/or potential habitat greater than the area which would be impacted, maintained and improved in the proposed offset area.
Be of a size and scale proportionate to the impacts on the protected matter.	The Atlas-Campaspe Mine would disturb approximately 4,158 ha of native vegetation and 305 ha of cleared land. The proposed offset area would conserve and improve in perpetuity approximately 16,270 ha of native vegetation (composed of equivalent and/or additional flora vegetation types, with the exception of Chenopod Shrubland vegetation communities and Sandhill Pine Woodland) and approximately 270 ha of cleared land, which would be revegetated. Two threatened flora species (*Lepidium monoplocoides* and *Pterostylis cobarensis*) found in the Atlas-Campaspe Mine area are represented by a number of individuals in the proposed offset area.
Effectively account for and manage the risks of the offset not succeeding.	Measures to monitor and independently audit the proposed offset area included in the management plan would provide for ongoing adaptive management in the unlikely event that the offset is not succeeding. The implementation of the offset is likely to be a condition of Project Approval.
Be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or	The implementation of the offset strategy is beyond existing requirements, in that it is not part of any private conservation reserve system. The proposed offset is new and additional under duty of care or any environmental planning laws.
Be efficient, effective, transparent, proportionate, scientifically robust and reasonable.	The flora in both the proposed disturbance area and the proposed offset area has been extensively surveyed by AMBS. Results are supported by rigorous data analysis and mapping. This report provides an assessment of: • area of the offset and area of impact; • flora species present and their conservation status; • connectivity and condition of habitat; and • management actions and security for the proposed offset site.
Have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.	An arrangement would be made for the enduring protection and management of the biodiversity offset area within 12 months of grant of Development Consent. A voluntary conservation agreement pursuant to section 69B of the *National Parks and Wildlife Act 1974*, or similar arrangement, would be sought. Separately, Cristal Mining would seek an agreement with the NSW Government so that the biodiversity offset arera can be permanently added to the adjoining Mungo National Park.

8.8 Ecological gains from the offset

It is considered the proposed offset area meets the standard in the DGRs and that flora biodiversity values in the region would be maintained and improved in the long-term. The proposed offset area contains a very similar array of natural vegetation communities in a similar condition to those in the majority of the Project area. The proposed offset area has a number of features that mean it meets the 'maintain or improve' test, including the following:

- The offset is bordered to the west by Mungo National Park. Consequently, the offset is not isolated in the landscape and its high connectivity helps its long-term viability.
- The addition of the offset as a new protected area enhances nature conservation over the whole region.
- The offset protects habitat suitable for two threatened flora species located within in the Project area, *Lepidium monoplocoides* and *Pterostylis cobarensis* (Figure 19) and one EEC (*Acacia melvillei* Shrubland EEC).
- The proposed offset area contains a similar suite of flora species and vegetation communities to those in the Project area.
- The vegetation in the proposed offset area is in similar condition to that of the Project area, so that when it is removed from agricultural production (i.e. grazing and some cropping), the biodiversity values of the vegetation can be expected to improve.
- There is capacity for the ecological function of the vegetation in the proposed offset area to significantly improve with the removal of grazing by livestock and goats, control of feral animals such as rabbits and closure of artificial watering points.



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9 Conclusion

The Project would involve the development, construction and operation of the Atlas-Campaspe Mine and associated infrastructure, roadworks along a 37 kilometre section of the MCTR and the construction of rail siding at the township of Ivanhoe. As such, it would inevitably impact on flora and flora habitat within the local area. The aims of this study were to identify flora that are known or likely to occur in the Project area, on the basis of desktop reviews and field surveys, to assess the impacts of the Project on the flora, to describe mitigation measures for the flora and to consider the offset area.

A total of 368 native flora species and 77 introduced species were recorded across the Atlas-Campaspe study area and the MCTR roadworks study area (Appendices E and F). A total of three flora species recorded during the survey work are listed as threatened species under both the TSC Act and EPBC Act, namely, *Pterostylis cobarensis* listed as vulnerable under the TSC Act and EPBC Act, *Lepidium monoplocoides* listed as endangered under the TSC Act and EPBC Act and the *Brachyscome papillosa* listed as vulnerable under the TSC Act and EPBC Act.

A total of 14 map units were identified within the Project area and surrounds, consisting of 13 native vegetation communities and one vegetation community dominated by introduced species (Cleared land); two endangered ecological communities listed under the TSC Act were recorded, namely the Yarran Shrubland (*Acacia melvillei* Shrubland EEC) and the Sandhill Pine Woodland EEC. The condition of vegetation ranged from good to poor.

A total of 75 native flora species and 11 introduced species were recorded across the Ivanhoe Rail Facility study area (Appendix G). Two vegetation map units were identified. No threatened flora species or EEC were found in this study area.

Potential impacts from the Project are likely to include vegetation clearance, changes to hydrology, loss of threatened flora species and potential habitat and the loss of and fragmentation of threatened ecological communities. A number of proposed impact avoidance and mitigation measures were assessed and details are provided regarding the value and management of a proposed offset area, which would be managed for conservation purposes and conserved in perpetuity.

It was considered that three species of threatened flora and two EEC's listed under the TSC Act and/or EPBC Act are likely to be impacted to some extent by the Project. These likely impacts include the direct loss of populations of threatened flora species and potential habitat for threatened flora species; impacts on EEC's include clearing of vegetation, fragmentation and consequent edge effects.

Assessments of significance were performed for all species and EEC's considered likely to be affected by the Project. The conclusion of these assessments was that the Project would not have a significant impact on the *Brachyscome papillosa* population or the Sandhill Pine Woodland EEC.

The occurrences of *Lepidium monoplocoides* are considered to represent a single 'population' in accordance with the *Significant Impact Guidelines 1.1: Matters of National Environmental Significance* (DEWHA 2009). On the basis of this guideline, the species would not be significantly impact by the Project under the EPBC Act assessment.

The NSW definition of a 'population' differs from the Commonwealth definition. Under the NSW assessment, an assumption that each site found in the Project area represents a viable 'local population' (and not an isolated occurrence), would result in a finding of a significant impact on two confirmed local populations of *Lepidium monoplocoides* in accordance with Section 5A of the EP&A Act. Notwithstanding, based on known information about the lifecycle of other *Lepidium* species, the six confirmed local *Lepidium monoplocoides* occurrences could be considered to be part of one population in which case the loss of the species at two of these sites within the Project area is not likely to have a significant impact on the species. In the long-term, management initiatives in the offset area have the potential to considerably improve the status of this species in the locality.

One further record unconfirmed by the NSW Herbarium (FloraSearch 2012) may also be impacted by the Project and five additional occurrences, also unconfirmed by the NSW herbarium (FloraSearch 2012), have been recorded in the proposed offset area. Future confirmation of specimens from these additional locations would increase the number of locations to be protected in the proposed offset area and this would reduce the risk that the Project would have a significant effect on populations of *Lepidium monoplocoides*.

Three of the five known occurrences of the *Pterostylis cobarensis* would be removed by the land clearance required for the Project. Impacts to this species were considered to be significant for the TSC Act and the EPBC Act assessments. The mine layout has been designed to avoid the 4th location of *Pterostylis cobarensis* (comprising of 4 individuals) and provide a 25 m distance between the location the plants were recorded and any surface mine activity. The 5th occurrence (comprising 11 plants) is located within the proposed offset area and a minimum 25 m distance between surface mining activity and these two locations would be maintained. In addition, a number of measures aimed at avoiding, minimising or mitigating impacts on this species are described, such as fencing, pre-clearance surveys, collection of soil and plants for use in revegetation and weed management.

Potential impacts associated with the Project would be minimised through a variety of impact avoidance and mitigation measures. These measures include refinement of the Atlas-Campaspe Mine design and extent of roadworks along the MCTR to reduce the overall footprint of the Project. A Biodiversity Management Plan would include measures to minimise impacts of vegetation clearance and reduce impacts on threatened species and ecological communities. Other management actions would include fencing and livestock removal, control of weeds and feral animals, fire management, dust and pollution control and post-mine rehabilitation.

An arrangement would be made within 12 months of the Project being approved so that the proposed offset area is conserved and managed in perpetuity. The proposed offset area contains most vegetation types that would be lost as a result of the Project. The area of vegetation in the offset is greater than that which would be cleared, and a number of management measures would also be implemented to enhance flora values of the proposed offset area. These measures would include removal of grazing, fencing and control of weeds and feral animals to benefit native flora and vegetation communities, improving soil stability, supporting regeneration, managing bushfire, the protection and enhancement of habitat for threatened species and ecological communities, removal of tanks and other artificial water sources and controlling access. Management measures would be monitored and independent audits would report on the progress of the management measures.

The establishment of an offset area would complement the biodiversity values of the Mungo National Park.

It is considered that the Project meets the standard in the requirements of the Director-General of the NSW DP&I for the Project because flora biodiversity in the region would be maintained and improved in the medium to long-term in a proposed offset area. The proposed offset area contains threatened species and potential habitat, and ecological communities that would be maintained and improved under the initiatives described in the proposed management plan. The exclusion of livestock and goats and the control of rabbits would be the most significant of these initiatives. The proposed offset would represent a new and extensive protected area in the region and would conserve in perpetuity habitat for threatened species, an EEC and other examples of semi-arid vegetation. As well, extensive areas of semi-arid vegetation that has been under pressure from agricultural practical would be conserved. The proposed offset area has high connectivity with other existing conservation reserves and this would help to maintain the long-term viability of biodiversity in these reserves and across the region.

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Appendix A: Flora survey of the properties east of Mungo National Park

Flora Survey of the Properties East of Mungo National Park

Prepared by Australian Museum Business Services
for Cristal Mining Australia Limited

Final Report

November 2012

AMBS Reference 110955

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Executive Summary

This document presents the aims, methods and results of a study performed by Australian Museum Business Services in a broad area east of Mungo National Park in western New South Wales (NSW). The study area includes sections of the Boree Plains and Wampo properties. The study was commissioned by Cristal Mining Australia Limited (Cristal), formerly known as Bemax Resources Limited (Bemax) in order to identify, describe and map the flora present within the study area. The area of investigation covers approximately 22,000 hectares of semi-arid vegetation occurring on tertiary and quaternary sediments. The geomorphology of the study area consists primarily of Aeolian dune fields and sandplains.

Data from the study area and surrounds were quantitatively analysed to interpret and classify compositional patterns in the vegetation across the study area. Data were collected from 320 full floristic surveys (254 located in areas adjacent to the study area and 66 located in the study area). The data were combined for the analyses as they were collected from sites in the same general location that had comparable combinations of plant species, vegetation structure and edaphic factors. A vegetation map was produced on the basis of interpreting assemblage groupings delineated in the analysis, interpretation of Rapid Data Point site data, opportunistic observations, aerial image interpretation and field verification.

Nine mapping units were described: Sandplain Mallee, Linear Dune Mallee, Belah-Rosewood Woodland, Disturbed Area Shrubland Complex, Yarran Shrubland, Mulga Woodland, Black Box Woodland, Grass/Herbland of Drainage Depressions and Cleared land. Yarran Shrubland conforms to the description of '*Acacia melvillei* Shrubland in the Riverina and Murray-Darling Depression bioregions', a listed Endangered Ecological Community under NSW legislation. This community is not listed under Commonwealth legislation.

No other threatened ecological communities listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act) and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) were recorded in the study area.

A total of 326 native plant species were recorded in the study area. One species, *Lepidium monoplocoides* (Winged Peppercress), listed as endangered under the TSC Act and the EPBC Act was recorded at four locations within the study area. Potential habitat may exist within the study area for the following species; *Acacia acanthoclada* (Harrow Wattle), *Acacia carneorum* (Needle Wattle), *Lasiopetalum behrii* (Pink Velvet Bush), *Santalum murrayanum* (Bitter Quandong), *Swainsona murrayana* (Slender Darling-pea) and *Swainsona pyrophila* (Yellow Swainson-pea). A number of additional plant species were of significance as extensions of known range within the botanical region, new records for the region or because they are uncommon across their known range.

A total of 63 introduced species were recorded within the study area. Higher numbers of introduced species were recorded in highly disturbed communities and on soils with higher clay content. Five noxious weed species were recorded in the study area: *Asphodelus fistulosus* (Onion Weed), *Cuscuta campestris* (Golden Dodder), *Lycium ferocissimum* (African Boxthorn), *Xanthium occidentale* (Noogoora Burr) and *Xanthium spinosum* (Bathurst Burr).

The condition of the native vegetation of the study area was assessed and the impact of grazing, clearing and timber harvesting on the structural and species composition of the vegetation in the study area was described. In general, sites located on soils with higher clay content (Black Box Woodland, Grass/Herbland of Drainage Depressions, Yarran Shrubland and Disturbed Area Shrubland Complex) were more inclined to be in moderate/poor or in poor condition than the Belah-Rosewood Woodland, Linear Dune Mallee and Sandplain Mallee vegetation.

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1 Introduction

1.1 Background

This document presents the aims, methods and results of a study performed by Australian Museum Business Services (AMBS) in a broad area approximately 30 kilometres (km) west of Hatfield in western New South Wales (NSW). The study was commissioned by Cristal Mining Australia Limited (Cristal) in order to obtain information about the flora present.

1.2 Objectives and Scope

The purpose of this study was to identify, describe and map the flora present within a study area approximately 30 km west of Hatfield in western NSW. The scope of the study included:

- collation and summary of existing information regarding the flora of the study area and region;
- field surveys of the study area, including targeted searches for threatened plant species;
- identification and mapping of plant communities within the study area;
- description of the plant communities and their condition; and
- identification of habitat for potentially occurring threatened plant species.

Techniques used in the study were designed in consideration of the recommended survey techniques and methods for flora survey described by the NSW Department of Environment and Conservation (DEC 2004), Cropper (1993) and the NSW Department of Environment and Climate Change (DECC 2008a). The survey effort applied was designed to provide an understanding of the type, location, size and condition of the plant communities present and the potential for threatened plant species to occur.

1.3 Regional Setting and General Description of the Study Area

The study area is located in south-west NSW within the Lower Murray Darling Catchment Management Area (CMA) (Figure 1), and is covered by the Pooncarie 1:250,000 and Turlee 1:100,000 topographical survey sheets. It is situated approximately 80 km north of the township of Balranald and 135 km south-west of Ivanhoe, and is within the Balranald Local Government Area (LGA) (Figure 1). It is located on leasehold land (Wampo and Boree Plains) currently used for agriculture (mainly grazing, with some cropping). Mungo National Park adjoins the study area to the west. The study area is located within The Murray Darling Depression Bioregion and the South Far Western Plain (SFWP) botanical region.

The study area (Figure 2) encompasses approximately 22,000 hectares of semi-arid vegetation occurring on tertiary and quaternary sediments. The geomorphology of the area consists primarily of Aeolian dune fields and sandplains overlaying clay. Soils are of red and orange sands in the dune fields and sandplains to grey, brown or red calcareous clay sediments that underlie the sand deposits and are exposed in low-lying areas and depressions (Porteners *et al.* 1997). The dunes, which occupy a considerable proportion of the area, are relatively low in height with gentle slopes; however, some higher steep-sided dunes occasionally occur. The sandplains consist of a thin ‘veneer’ of sand overlaying the clays.

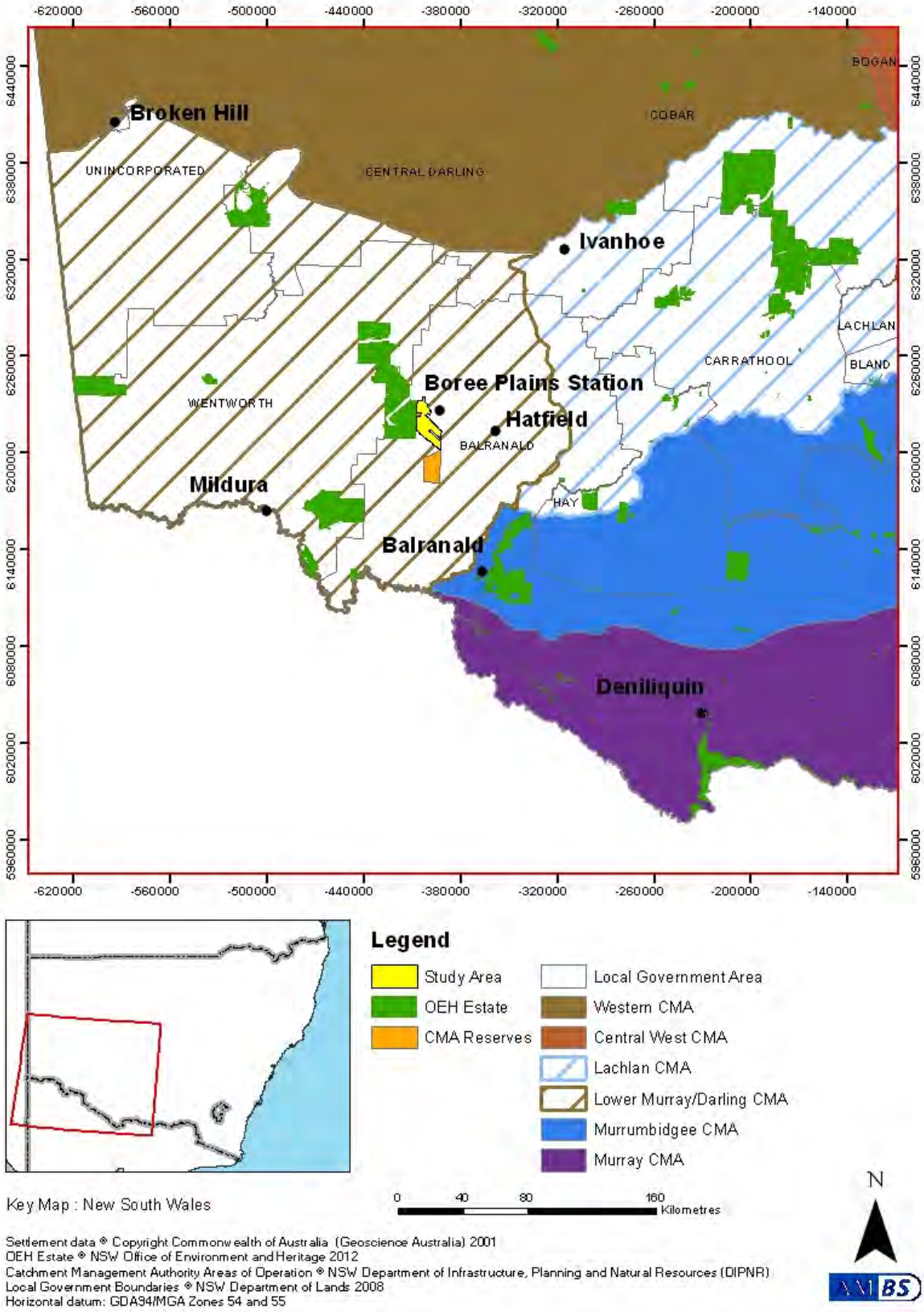

Figure 1: The geographic position of the study area.

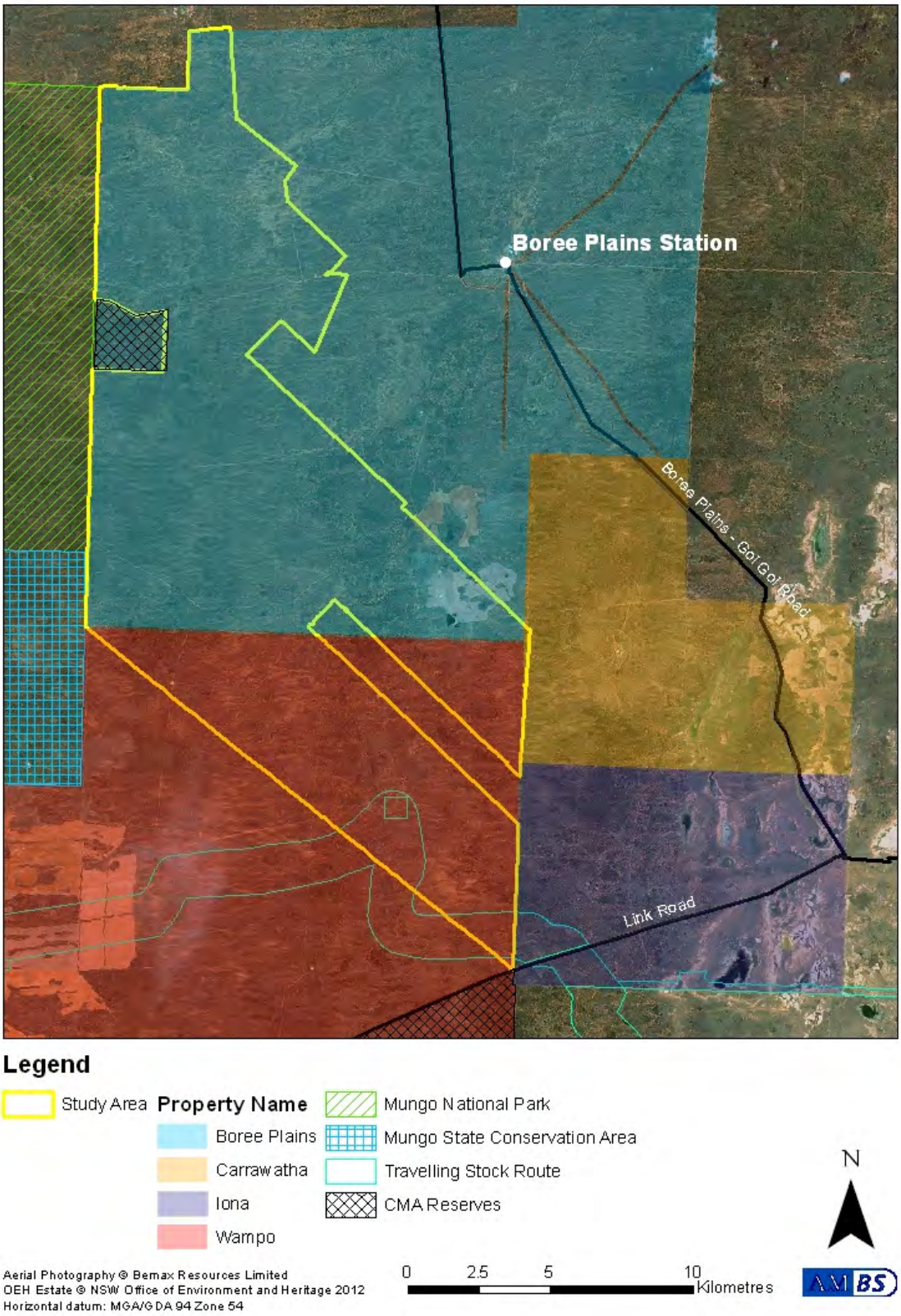

Figure 2: The study area.

The study area has been grazed by sheep and cattle for the past 100 years and in the recent past sections have been cleared for agriculture. A travelling stock route is located in the southeast corner of the study area (Figure 2). Feral goats and rabbits occur in high numbers across the area.

Nearby conservation areas include Mungo National Park to the west, a private conservation area on Boree Plains adjoining the National Park to the east and another private conservation area to the south on Wampo Station (Figure 2). The private conservation areas have been established as Southern Mallee Landuse Agreement Reserves.

1.4 Climate

Long-term, monthly average daily maximum and minimum temperatures from the Pooncarie Mail Agency, Balranald (RSL) and Ivanhoe Post Office meteorological stations show that temperatures are warmest from November to March and coolest in the winter months of June, July and August (Table 1) (BoM 2012).

The long-term average annual rainfall at meteorological stations proximal to (i.e. less than approximately 50 km) from the Atlas-Campaspe Mine varies from approximately 268 millimetres (mm) at the Pooncarie (Top Hut) meteorological station to approximately 323 mm at the Oxley (Walmer Downs) meteorological station (Table 1).

Average monthly rainfall is relatively uniform throughout the year and no seasonal variation is obvious (Table 1).

Based on an analysis by Evans & Peck (2012) of the Hatfield (Clare) meteorological station rainfall data (which has 140 years of complete records), the data shows that long-term droughts are a feature of the climate of the area. In particular (Evans & Peck 2012):

- an extended drought occurred between about 1880 and 1900;
- a further extended drought occurred between about 1930 to 1950;
- since 1950, rainfall has generally been above the long-term average with the exception of droughts in the late 1960's and from 2000 to the end of 2009; and
- rainfall has been significantly above average since 2010 with 650 mm of rainfall in that year and 440 mm in 2011, which is evident by water ponding in low-lying areas surrounding the Atlas-Campaspe Mine site.

The above is also supported by the fact that the nearest BoM meteorological station to the Atlas-Campaspe Mine site (Euston [Turlee]) recorded its highest daily total of 110 mm on 14 January 2011 in 53 years of record (BoM 2012).

Over the two years prior to this assessment (i.e. 2010 and 2011), the region received approximately double the annual average rainfall. In comparison, in the three preceding years (i.e. 2007, 2008 and 2009) only 222 mm, 266 mm and 207 mm of rainfall was recorded, respectively (Figure 3) (BoM 2012). This resulted in ideal conditions during the survey period.

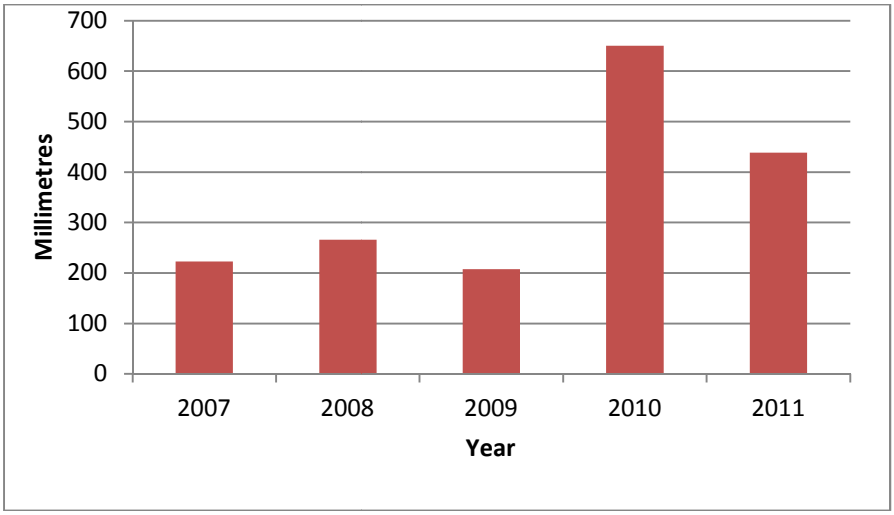

Figure 3: Annual Rainfall in the Years Preceding the Field Surveys - Hatfield (Clare) Meteorological Station (Source: BoM 2012).

Long-term evaporation records are available from the Menindee Post Office and Mildura Airport meteorological stations, which have recorded an average annual evaporation of approximately 2,208 and 2,190 mm, respectively (Table 1).

The highest monthly-average evaporation is in January (332.6 and 328.6 mm at Menindee Post Office and Mildura Airport, respectively) (Table 1). The lowest monthly evaporation is in June (57.7 and 57.0 mm for Menindee Post Office and Mildura Airport, respectively) (Table 1).

Based on the available datasets, measured monthly-average evaporation exceeds the measured monthly-average rainfall in all months (Table 1).

Based on an analysis by Evans & Peck (2012) of the Menindee Post Office meteorological station daily pan evaporation data recorded since 1955, and use of monthly potential evapotranspiration derived from the electronic spatial data on the Bureau of Meteorology (BoM) dataset *Climatic Atlas of Australia – Evapotranspiration*, the following conclusions were made (Evans & Peck 2012):

- Net open water evaporation in excess of 1.5 metres (m) per year can be expected. Accordingly, any runoff collected in the shallow depressions that characterise the landscape can be expected to evaporate rapidly.
- Potential evapotranspiration from vegetation exceeds the average rainfall in each month. Under these conditions, vegetation is under continual water stress and actual evapotranspiration is governed by the ability of vegetation to access moisture deep in the soil profile.

Table 1: Average climate statistics.

Period of Record	Average Daily Temperature (°C)[1] [Minimum-Maximum]			Average Monthly Rainfall (mm)[1]									Average Monthly Evaporation (mm)[1,2]	
	Pooncarie Mail Agency [47029]	Balranald (RSL) [49002]	Ivanhoe Post Office [49019]	Hatfield (Clare) [49008]	Euston (Turlee) [49111]	Hatfield (The Vale) [49047]	Hatfield (Benikie) [49049]	Pooncarie (Mulurulu) [47024]	Pooncarie (Top Hut) [47018]	Oxley (Walmer Downs) [49055]	Ivanhoe (Kilfera) [49063]	Ivanhoe Post Office [49019]	Menindee Post Office [47019]	Mildura Airport [76031]
	1882-2012	1879-2012	1884-2012	1873-2012	1960-2012	1924-2012	1876-2012	1882 - 2012	1920-2012	1922-2012	1872-2012	1884-2012	1968-2012	1965-2012
January	33.4-38.5	29.5-38.1	29.5-39.5	25.6	33.1	28.0	23.6	24.0	22.9	28.2	20.7	30.0	332.6	328.6
February	31.8-37.0	28.6-37.1	30.1-38.4	25.9	22.7	24.7	25.0	22.7	27.0	29.4	29.0	28.4	268.3	274.0
March	27.6-33.4	25.3-33.8	26.3-37.6	27.4	21.2	24.1	22.1	23.2	20.1	24.9	24.5	29.8	225.1	229.4
April	22.9-30.0	16.3-28.6	22.1-31.2	21.5	20.1	20.4	18.9	19.1	16.7	23.0	19.4	19.1	143.1	141.0
May	18.8-23.4	16.4-23.3	17.1-23.6	29.0	24.9	25.5	27.9	29.0	22.7	29.1	27.7	27.1	85.3	83.7
June	14.8-18.5	13.2-20.0	14.8-19	26.1	20.2	24.0	25.6	25.7	19.7	26.6	27.6	26.6	57.7	57.0
July	16.0-19.6	12.4-21.0	13.7-19.5	22.9	25.1	21.6	21.6	21.8	23.5	26.1	20.1	22.9	64.7	62.0
August	16.8-21.4	14.7-25.4	15.8-23.4	24.0	25.8	23.7	24.0	23.8	22.5	26.1	22.7	23.5	99.5	93.0
September	20.5-24.7	16.9-24.9	18.5-25.8	22.9	24.8	21.2	22.7	23.4	19.7	22.8	22.4	22.2	147.0	138.0
October	23.3-28.9	19.8-30.0	21.9-30.2	26.6	28.1	28.2	27.2	26.7	29.1	31.9	25.6	28.6	212.2	201.5
November	27.2-33.9	23.4-32.8	25.2-35.1	23.7	25.9	25.0	23.2	23.2	19.3	26.1	25.3	24.0	260.4	255.0
December	30.9-35.4	24.5-34.9	29.5-37.1	22.0	22.9	22.5	21.8	23.7	20.8	26.4	20.6	26.1	319.9	310.0
Average Annual	**25.1-26.9**	**22.1-26.6**	**24.8-28.1**	**299 [297.6]**	**300 [294.8]**	**286 [283.6]**	**281 [283.6]**	**282 [286.3]**	**268 [264]**	**323 [320.6]**	**284.0 [285.6]**	**306 [308.3]**	**2,208.0 [2,215.8]**	**2,190.0 [2,173.2]**

[1] Source: BoM (2012)
[2] As measured by Class A Evaporation Pan
°C degrees Celsius
AWS automatic weather station

1.5 Definitions

This report applies the following definitions:

The **study area** for this report is shown on Figure 2. Flora surveys were conducted in the study area and in areas adjacent to the study area. The data from all of the flora surveys were used in the analysis; however, the information presented in this report is that which is relevant to the study area shown on Figure 2.

The **locality** is defined in this report as the area within the boundaries defined for database searches for threatened flora (the area bounded by the coordinates -34.178, 142.934; -32.547, 142.921; -32.307, 145.032; -34.313, 145.111; and -34.178, 142.934).

The **bioregion** is defined according to the Interim Biogeographic Regionalisation for Australia, version 6.1.

The **region** is the CMA region defined by the NSW Office of Environment and Heritage (OEH).

Threatened flora are defined as threatened plant species, populations and Endangered Ecological Communities (EECs) listed on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and/or NSW *Threatened Species Conservation Act 1995* (TSC Act).

1.6 Authorship and Acknowledgements

Field surveys for this study were performed by four botanists; Dr John Hunter, Dr Dorothy Bell, Belinda Pellow and James Bevan. Plant identification was undertaken by Belinda Pellow, John Hunter, Dorothy Bell and James Bevan, with samples confirmed by the NSW Herbarium. Data analyses and vegetation mapping was undertaken by John Hunter and Belinda Pellow. This report was prepared by Belinda Pellow and James Bevan, with editing and advice provided by AMBS Senior Project Manager Glenn Muir.

2 Methods

2.1 Database Searches and Literature Review

A desktop review of existing information regarding the flora of the study area and locality was performed. Information sources included:

- a search of the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) *Protected Matters* database for records of nationally listed threatened flora (within the area bounded by the coordinates -34.178, 142.934; -32.547, 142.921; -32.307, 145.032; -34.313, 145.111; -34.178, 142.934) (SEWPaC, 2011);
- a search of the OEH *Wildlife Atlas* database for records of State-listed threatened flora (within the area bounded by the coordinates -34.178, 142.934; -32.547, 142.921; -32.307, 145.032; -34.313, 145.111; -34.178, 142.934) (OEH, 2011a);
- examination of the OEH *Threatened Species Profile Database* (OEH, 2011b);
- PlantNET (The Royal Botanic Gardens and Domain Trust, 2012);
- topographic maps;
- satellite imagery and aerial photographs;
- *The Vegetation and Pastures of Western NSW with Special Reference to Soil Erosion* (Beadle 1948);
- *NSW Vegetation Classification and Assessment: Part 1 Plant communities of the NSW Western Plains* (Benson *et al*. 2006);
- *Murray Darling Basin M305 Structural Vegetation Layer VIS ID 917* (NSW Department of Environment, Climate Change and Water [DECCW], 2011);
- *Ocean Shores to Desert Dunes: The Native Vegetation of NSW and the ACT* (Keith 2006);
- *Semi-arid vegetation in south-eastern Australia* (Noy-Meir 1971);
- *Natural Vegetation of the Hay Plain* (Porteners 1993);
- *Mungo National Park Threatened Acacia Shrubland Survey* (Porteners 2001);
- *The Vegetation of the Pooncarie 1:250,000 map* (Porteners *et al.* 1997);
- *The Natural Vegetation of the Balranald-Swan Hill area* (Scott 1992);
- *The Vegetation of Mungo National Park* (Westbrooke & Miller 1995);
- *Wampo Station Draft Voluntary Property Agreement under the Native Vegetation Conservation Act 1998* (Anon 1998);
- *Boree Plains Land Use Agreement Environmental Assessment* (Anon 2002);
- *Mungo National Park Plan of Management* (DEC 2006);
- *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities* (DEC 2004);
- *Biodiversity Survey of the Lower Murray Darling* (Val *et al*. 2001);
- *Native Vegetation Interim Type Standards* (Sivertsen 2009);
- *Flora and Fauna Baseline Studies Balranald Mineral Sands Project – Nepean Deposit Near Balranald NSW* (Ecotone Ecological Consultants 2012); and
- *Flora and Fauna Baseline Studies Balranald Mineral Sands Project – West Balranald Deposit, Balranald NSW* (Ecotone Ecological Consultants 2012).

2.2 Survey Design

The locations of existing records of threatened plant species were mapped using ArcGIS. The habitat requirements and appropriate survey times for the plants known or considered likely to occur within the locality were determined using the OEH *Threatened Species Profile Database* (OEH, 2011b), PlantNET (The Royal Botanic Gardens and Domain Trust 2012) and (for nationally listed flora) the relevant Listing Advice provided by SEWPaC (2012). This information was used to assist in determining field survey locations and timing.

Maps produced by the Lower Murray Darling CMA (DECCW, 2011) and 1:250,000 mapping of the Pooncarie (Porteners 1997) and Balranald/Swan Hill (Scott 1992) areas were utilised to predict the vegetation communities likely to be found in the study area.

The study area was then divided into 17 field survey segments based on road access (Figure 4). Using aerial imagery interpretation and preliminary vegetation mapping of areas adjacent to the study area (AMBS, 2012), each segment was assessed for the location of different vegetation types (e.g. Belah, Mallee, Black Box, Yarran Shrubland, other). Field surveys were then designed to access as many representatives of each vegetation type as possible. A further five segments (segments 18-22, Figure 4) were subsequently added to the study area and sampled in April 2012 (see below).

2.3 Field Surveys

2.3.1 Approach

Field surveys of the majority of the study area were performed during the periods 1 to 12 November 2011, 6 to 15 December 2011, 1 to 6 February 2012 and 24 to 29 April 2012. Field surveys in November 2011 in the study area involved targeted searches for the threatened plant species *Lepidium monoplocoides* (Winged Peppercress) as this species was flowering at the time. Field surveys in December 2011 included collection of data from rapid data points (RDPs) and flora survey plots, performed throughout the southern, central and far northern part of the study area (segments 1-17, Figure 4). RDPs were used to provide a rapid assessment of vegetation for the purpose of ground-truthing and refining the vegetation mapping. Further verification of map units was undertaken in February 2012. Surveys of additions to the study area (segments 18-22, Figure 4) were performed in April 2012.

A team of two botanists worked within each of the 22 segments. Within each segment a number of RDPs were undertaken in representatives of the different vegetation associations. Full floristic plots (20 x 20 m) were undertaken if the field surveys came across vegetation associations not previously sampled, or where the data would improve the data analysis (for example, in Black Box Woodland or potential Yarran Shrubland communities) (Appendix A).

2.3.2 Rapid Data Points

At each RDP site the dominant species in decreasing order of dominance for the canopy layer, the shrub layer and ground layer were recorded. Notes were made on the percentage cover of each structural layer and the general condition/disturbance issues of the vegetation at each site. Photographs were taken at each site and the location of the site was recorded using a Global Positioning System (GPS) (Appendix B).

Utilising the information collected and photographic images each RDP was used during mapping to interpret imagery and assist in assigning boundaries for vegetation map units.

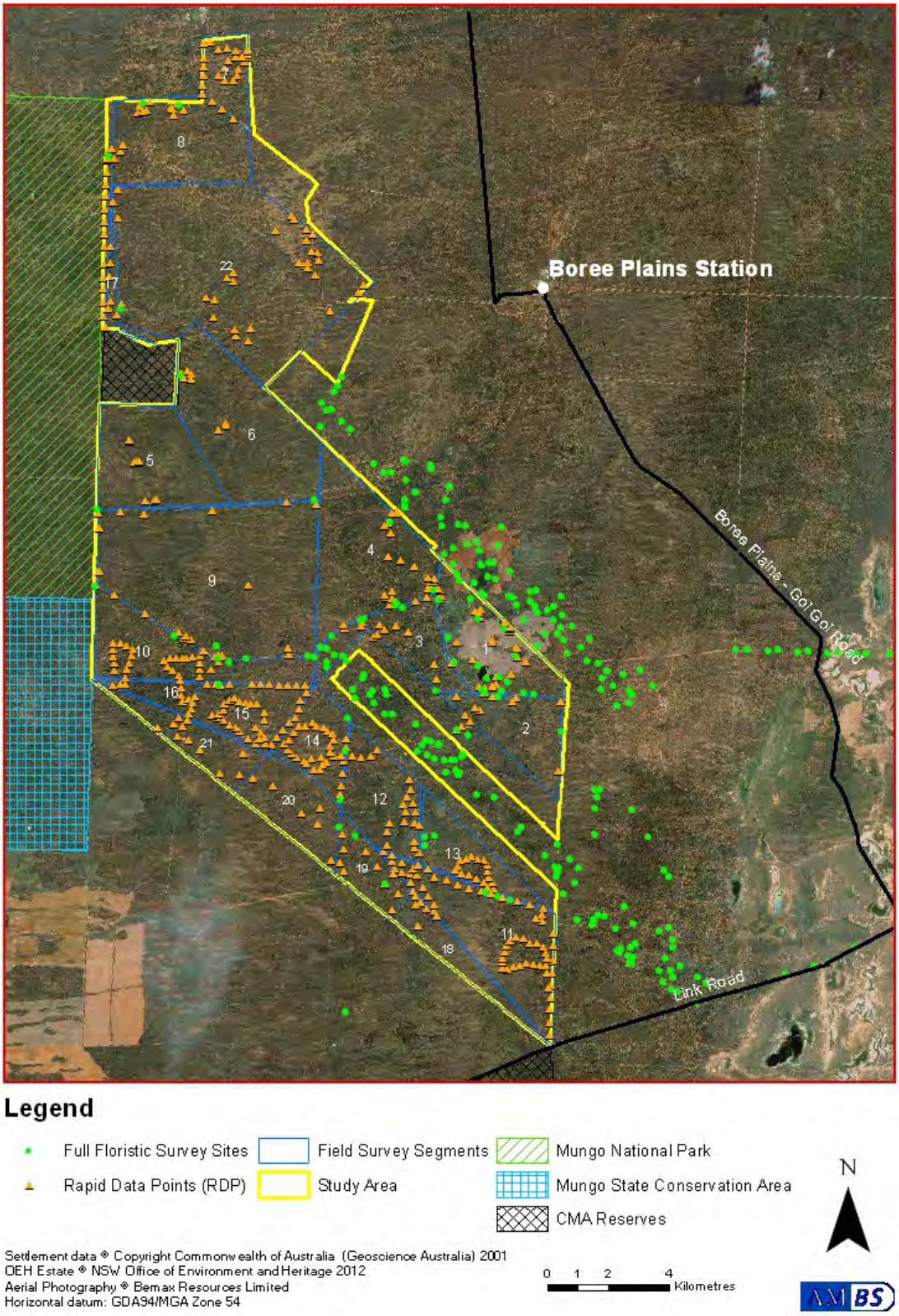

Figure 4: Location of field survey segments, full floristic and rapid data point surveys.

2.3.3 Full Floristic Plots

Within each full floristic plot all vascular plant species rooted in, or overhanging a 20 x 20 m quadrat were identified and recorded. A cover/abundance estimate was assigned to each species based on a modified Braun-Blanquet scale (Table 2). Details of location, physiographic and soil features were recorded at each site. Vegetation structure was described by estimating the height and cover of each recognizable horizontal stratum of trees, shrubs and ground vegetation. The type and severity of disturbance at each site was also noted and recorded (Appendix B). Species were identified in the field or collected and identified in the laboratory. Specimens requiring further identification or confirmation of identification were sent to the National Herbarium of NSW.

Table 2: Modified Braun-Blanquet scale.

Cover Score	Projected Canopy Cover
1	<5% few individuals
2	<5% any number of individuals
3	6-25%
4	26-50%
5	51-75%
6	>75%

Note: % = percent
Source: Braun-Blanquet (1982)

2.3.4 Opportunistic Observations

Opportunistic observations were made throughout the field work and information was transferred onto hard copies of imagery. This information was used during mapping to assist in resolving vegetation map unit boundaries.

2.3.5 Threatened Flora Searches

Searches for potential threatened flora were performed in the study area at all RDP and full floristic sites and during traverses to and from these locations.

Surveys for *Lepidium monoplocoides* (Winged Peppercress) within the study area were undertaken in November and December 2011. During the November field survey a series of 100 x 20 m plots were located at random in vegetation identified as potential habitat (Black Box Woodland, large drainage depressions and Belah-Rosewood Woodland with associated gilgai). If the species was located a count was made of the number of individuals occurring within the plot. During the December field survey of the study area any potential *L. monoplocoides* habitat encountered was searched, and if the species was found, the method outlined above was used to count individuals. The following information was recorded at each location where *L. monoplocoides* was found: GPS coordinates; the extent of each occurrence; population counts or estimates; notes on condition and reproductive state; and a detailed habitat description.

2.3.6 Recording Vegetation Condition

Vegetation condition was assessed at each site to gauge a comparative degree of disturbance. Factors used to determine condition included: presence of a biological soil crust (in relevant communities), presence of cryptogam, litter cover, dominance of weeds, seedling regeneration, extent of clearing (presence of natural shrub and or tree strata) and extent of grazing. As grazing was evident at almost all sites to some degree, a general level of grazing was assumed. A broad three-tier condition score was used (good, moderate and poor). For example, sites in good condition were relatively intact with negligible signs of disturbance (other than a low degree of grazing); these sites generally possessed an intact biological soil crust (in relevant communities) and/or a cover of cryptogam (e.g. mosses and or/lichens), some litter, no weeds, no evidence of clearing (with a natural shrub and or tree strata) and in some cases regenerating seedlings. Sites in poor condition were heavily disturbed with significant evidence of grazing, clearing and erosion.

Poor sites often had a relatively higher percentage cover of introduced species and did not possess an intact biological soil crust or a cover of cryptogams or litter. Sites in moderate condition displayed a broad mix of attributes of both good and poor condition sites. At each survey site an assessment was made of each of the attributes described above and the appropriate score applied.

2.3.7 Survey Limitations

The main limitation imposed on the surveys was the relative size and inaccessibility of much of the study area. The majority of the survey work was conducted in summer as this was likely to be the time to find many plant species flowering, including some threatened flora. However, the large distances between tracks and high daytime temperatures meant that much of the area could not be accessed on foot. Accordingly, vegetation mapping of the more inaccessible parts of the area was of necessity based on interpretation of satellite and aerial imagery.

2.4 Data Analysis

2.4.1 Vegetation Communities

Data collected in 320 full floristic survey sites located in the study area and adjacent areas (66 located in the study area) (Figure 4) were quantitatively analysed to interpret and classify compositional patterns in the vegetation of the study area. Data from sites in both the study area (Appendix C) and adjacent area were combined for these analyses as both areas occurred in the same general location and had comparable combinations of plant species, vegetation structure and edaphic factors.

Plant species identifications were checked prior to analysis against descriptions and distribution information provided by PlantNet (The Royal Botanic Gardens and Domain Trust 2012) to confirm that species identified were known for the region and the habitat they were located in. Those species which were considered to be unusual for the location were confirmed at the National Herbarium of NSW.

Cover/abundance scores for native species from each site were analysed using PATN V3.1: Pattern Analysis Package (Belbin 2004) which undertakes hierarchical clustering of sites into groups using the symmetric version of the Kulzcynski coefficient applied to the unstandardised cover-abundance data. The resulting hierarchical clustering is displayed diagrammatically as a dendrogram.

Delineation of clusters of sites into groups was undertaken by interpreting lineages at successively lower levels in the hierarchy and assessing differences between sister groups (Keith & Sanders 1990) with respect to diagnostic species, vegetation structure and physical attributes (distribution, topography and soil type). Interpretation using such attributes is consistent with JANIS (1996), which defines groups in terms of floristic composition and in combination with substrate and position in the landscape. Floristic groups (species assemblages) are recognised when further splitting fails to discernibly resolve the variation in these factors. The number of groups in the classification is therefore limited by the identification of prominent differences in species composition, vegetation structure and physical habitat. The resulting groups are used to define the vegetation associations or ‘communities’ present within the study area.

Differences between sister groups can be established using a SIMPER analysis. Once established each group is defined by a factor (or number) which is applied to each individual site. The application of factors can be used in a SIMPER analysis to identify the species primarily providing the discrimination between and contributing to the clustering of each group. A SIMPER analysis undertaken using the multivariate ecological analysis package Primer 6 6.1.13 (Clarke and Gorley 2006), was used to finalise groupings which were then reflected in the vegetation map units.

2.4.2 Vegetation Condition

Vegetation condition scores for each RDP site were collated and used to explore the relationship between vegetation community and vegetation condition.

2.5 Vegetation Mapping

Production of the vegetation map was undertaken by interpreting assemblage groupings delineated in the analysis, interpretation of the RDP site data, opportunistic observations, field marking of hard copies of aerial imagery and field verification. A final map showing the location and extent of vegetation communities including any threatened ecological communities was produced using ArcMap 10. Resolution of the aerial imagery plays an important part in the interpretation of boundaries between communities. Imagery provided for the mapping of the study area was of a resolution which allowed interpretation to a minimum of 1:10,000 m. Errors in topology were corrected using the ArcMap topology tool.

To provide an indication of the reliability of the map unit applied to each polygon, each mapping polygon was assigned a confidence score. The score represents the confidence of mapping for each polygon based on the presence or absence of assessment sites within a polygon, difficulty in delineating between map units, whether the polygon area was visited during field surveys and the quality of the imagery available for the mapping work. Three levels of confidence were assigned:

1. Polygon had at least one full floristic site or a number of rapid assessment sites or alternative information points; vegetation boundaries on imagery were relatively clear.
2. Polygon was visited during field survey and notes made on the vegetation present and vegetation boundaries on imagery were relatively clear; or one full floristic site or a number of rapid assessment sites or information points were recorded, but vegetation boundaries on imagery were unclear; or vegetation boundaries on imagery were relatively clear but the polygon area was not visited during field survey.
3. Polygon was not visited during field survey and interpretation was made based on imagery available; or some interpretation during field survey but vegetation boundaries of imagery were unclear.

Confidence scores are not listed in this report, but were included in the spatial data provided (in the attribute tables of each vegetation mapping shape file).

3 Results

3.1 Database Searches

3.1.1 Threatened Plant Species

The database searches provided records of 18 threatened plant species known or expected to occur within the region (Table 3). Of these, 11 species were considered to have the potential to occur within the study area based on existing knowledge of each species (Table 4). An additional species, *Acacia carneorum*, was not identified during the database searches; however, an unconfirmed record for this species was made on Boree Plains in 2002 (Anon 2002) and it was therefore included as a potential occurrence (Table 4). These 12 species were targeted during survey work. More detailed information regarding these species and their distribution and potential habitat is included in Appendix D.

Table 3: Threatened plant species known or expected to occur within the region based on database searches.

Scientific Name	Common Name	TSC Status	EPBC Status
Acacia acanthoclada	Harrow Wattle	E	-
Atriplex infrequens	A saltbush	V	V
Austrostipa metatoris		V	V
Austrostipa nullanulla	Club Spear-grass	E	-
Austrostipa wakoolica	A spear-grass	E	E
Brachyscome papillosa	Mossgiel Daisy	V	V
Convolvulus tedmoorei		E	-
Cratystylis conocephala	Blue-bush Daisy	E	-
Eleocharis obicis	Striate Spike-sedge	V	V
Lasiopetalum behrii	Pink Velvet Bush	CE	-
Lepidium monoplocoides	Winged Peppercress	E	E
Phyllanthus maderaspatanus		E	-
Pimelea serpyllifolia subsp. serpyllifolia	Thyme Rice-flower	E	-
Santalum murrayanum	Bitter Quandong	E	-
Solanum karsense	Menindee Nightshade	V	V
Swainsona colutoides	Bladder Senna	E	-
Swainsona murrayana	Slender Darling-pea	V	V
Swainsona pyrophila	Yellow Swainson-pea	V	V

Key: CE = critically endangered; E = endangered; V = vulnerable

Note: current as at July 2012

Table 4: Threatened flora species considered likely to occur within the study area listed according to broad vegetation class.

Broad Vegetation Class/Scientific Name	Common Name	Flowering Time
Aeolian Chenopod Shrublands		
Solanum karsense	Menindee Nightshade	Spring
Dune Mallee Woodlands		
Acacia acanthoclada	Harrow Wattle	August to December
Lasiopetalum behrii	Pink Velvet Bush	Late winter to spring
Pimelea serpyllifolia subsp. serpyllifolia	Thyme Rice-Flower	Most of the year especially July to November
Santalum murrayanum	Bitter Quandong	August to January
Swainsona pyrophila	Yellow Swainson-pea	September to December
Sand Plain Mallee Woodlands		
Acacia acanthoclada	Harrow Wattle	August – December
Acacia carneorum	Needle Wattle	All Year
Atriplex infrequens	A saltbush	Spring
Lasiopetalum behrii	Pink Velvet Bush	Late winter – spring
Pimelea serpyllifolia subsp. serpyllifolia	Thyme Rice-flower	Most of the year especially July to November
Santalum murrayanum	Bitter Quandong	August to January
Swainsona pyrophila	Yellow Swainson-pea	September to December
Riverine Chenopod Shrublands		
Atriplex infrequens	A saltbush	Spring
Brachyscome papillosa	Mossgiel Daisy	June to December
Solanum karsense	Menindee Nightshade	Spring
Riverine Sandhill Woodlands		
Austrostipa wakoolica	A spear-grass	October to December
Inland Floodplain Shrublands or Woodlands		
Atriplex infrequens	A saltbush	Spring
Austrostipa wakoolica	A spear-grass	October to December
Brachyscome papillosa	Mossgiel Daisy	June to December
Convolvulus tedmoorei		All Year
Lepidium monoplocoides	Winged Peppercress	November to February
Solanum karsense	Menindee Nightshade	Spring

Note: a number of species are known for multiple broad vegetation classes.

3.1.2 Endangered Ecological Communities

Searches of the OEH *Threatened Species Profile Database* located three EEC's listed under the TSC Act known or with the potential to occur within the region (Table 5). No records of EEC's listed under the EPBC Act were found.

Table 5: Endangered Ecological Communities listed on the TSC Act known or expected to occur within the region based on database searches.

Broad Vegetation Class - Sand Plain Mallee Woodlands
Acacia loderi Shrublands
Acacia melvillei Shrubland in the Riverina and Murray-Darling Depression bioregions
Broad Vegetation Class - Semi-arid Sand Plain Woodlands & Riverine Sandhill Woodlands
Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions

3.2 Field Survey

3.2.1 Native Plant Species

A total of 325 native plant species were recorded in the study area and are listed in Appendix E. One of these plant species, *Lepidium monoplocoides,* is listed as endangered under the TSC Act and the EPBC Act. This species was recorded at four locations within the study area (Table 6; Figure 5). A specimen from each location has been confirmed and lodged with the NSW Herbarium. A profile of this species is provided in Section 4 of this report.

Table 6: Location of *Lepidium monoplocoides* (Winged Peppercress) populations, vegetation type and number of individuals recorded in the study area.

Population Number (refer to Figure 4)	Vegetation Community	Number of Individuals	Datum/Zone	Easting	Northing
3	Black Box Woodland	104	GDA94/ Zone 54	714572	6248285
4	Belah-Rosewood Woodland	4	GDA94/ Zone 54	711530	6254864
5	Black Box Woodland	188	GDA94/ Zone 54	707276	6256003
6	Grass/Herbland of Drainage Depressions	3	GDA94/ Zone 54	709553	6262694

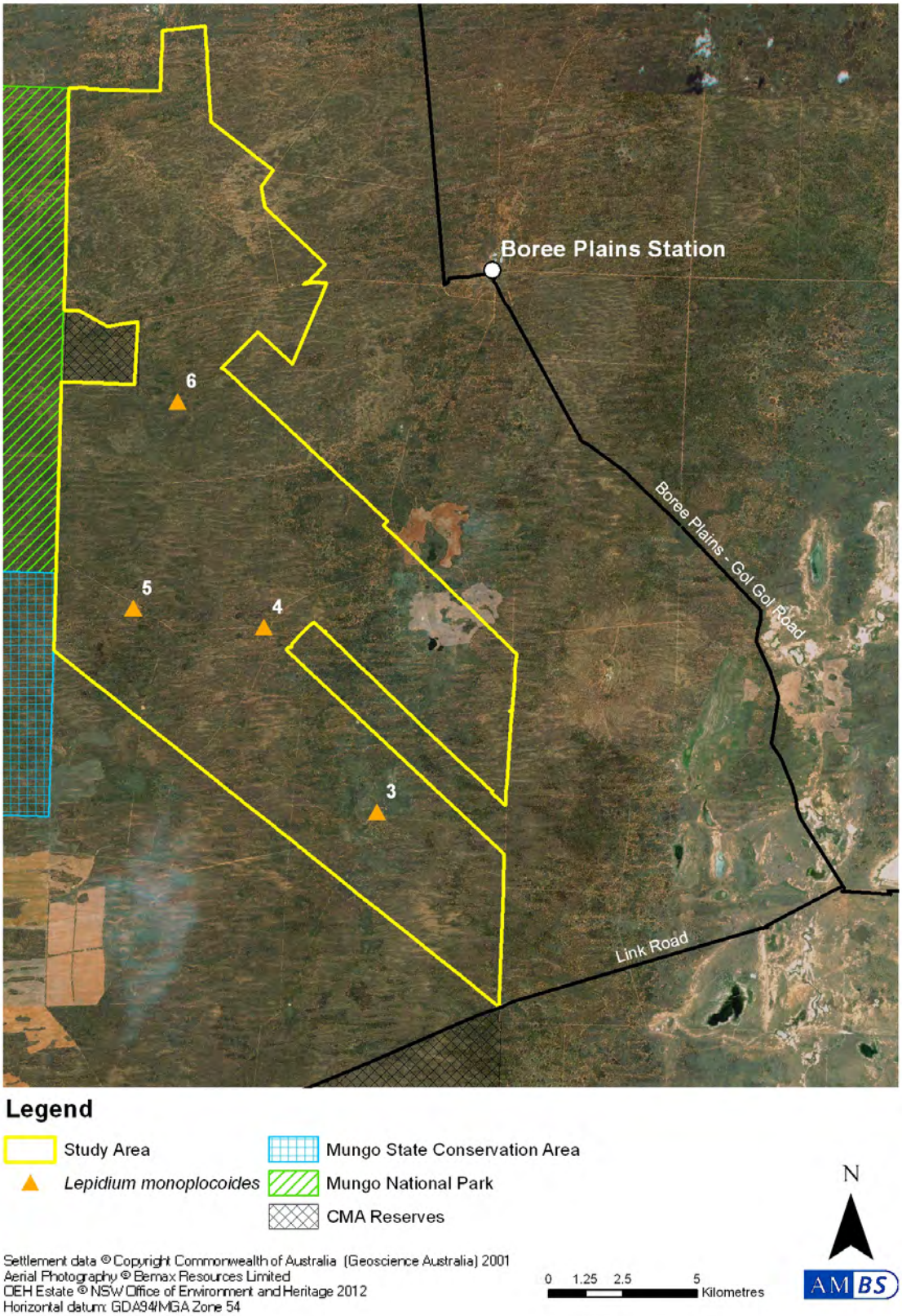

Figure 5: Location of *Lepidium monoplocoides* (Winged Peppercress) populations.

A number of plant species recorded were of interest as extensions of known range within the South Far Western Plain (SFWP) botanical region, new records for the SFWP or because they are uncommon across their known range (Table 7). The detection of a number of new records in the SFWP botanical region is likely to be the result, at least in part, of the high rainfall the region has received over the past 2.5 years.

One species recorded was identified as possibly being *Stenopetalum velutinum* that is presumed extinct in NSW, but does occur in other States. *Stenopetalum velutinum* was recently re-recorded in Victoria in 2003 (Cheal 2010). The specimen collected from one location during this survey was in poor condition and confirmation of the identification by the NSW Herbarium was not possible. A similar species *Harmsiodoxa brevipes* var. *brevipes* that belongs to the same plant family was also recorded in the study area. Searches for *Stenopetalum velutinum* in similar habitat did not located any other specimens. Due to the fact that confirmation of the species as *Stenopetalum velutinum* was not possible, no other specimens of the plant were found and the high probability that the specimen was in fact the more common *Harmsiodoxa brevipes* var. *brevipes* no further action was considered warranted.

Table 7: Native species of interest recorded during surveys of the study area.

Scientific Name	Common Name	Floristic Status
Lepidium monoplocoides	Winged Peppercress	Endangered on the TSC and EPBC Acts
Leiocarpa leptolepis	Pale Plover-daisy	Extension of range within SFWP botanical region
Senecio quadridentatus	Cotton Fireweed	Extension of range within SFWP botanical region
Abutilon otocarpum	Desert Lantern	Extension of range within SFWP botanical region
Eragrostis falcata	Sickle Lovegrass	Extension of range within SFWP botanical region
Acacia halliana		Extension of range within SFWP botanical region
Goodenia havilandii		New record for SFWP botanical region
Vittadinia pterochaeta	Rough Fuzzweed	New record for SFWP botanical region
Velleia arguta		New record for SFWP botanical region
Podolepis canescens	Large Copper-wire Daisy	New record for SFWP botanical region
Triptilodiscus pygmaeus	Common Sunray	New record for SFWP botanical region
Cynoglossum suaveolens		New record for SFWP botanical region
Gypsophila tubulosa	Annual Chalkwort	New record for SFWP botanical region
Isoetes muelleri	Quillwort	new record for SFWP botanical region
Eragrostis elongata	Clustered Lovegrass	New record for SFWP botanical region
Stenopetalum velutinum	Velvet Thread-petal	Presumed Extinct - unconfirmed record
Dodonaea lobulata		Second record for the region
Aotus subspinescens		Uncommon
Logania nuda		Uncommon
Vittadinia blackii	Western New Holland Daisy	Uncommon

3.2.2 Introduced Species

A total of 63 introduced species were recorded within the study area (Appendix F). Higher numbers of introduced species were recorded in highly disturbed communities and on soils with higher clay content (such as Black Box Woodland) (Table 8). A list of introduced species for each vegetation community is provided in Appendix G. Full floristic survey sites were not undertaken in the community Grass/Herblands of Drainage Depressions; however, opportunistic species lists were made in locations where this vegetation community was identified. A suite of introduced species similar to those recorded in Black Box Woodland were found in these locations.

Introduced or weed species generally possess reproductive or life history traits which facilitate opportunistic establishment in areas where disturbance of native vegetation and supporting topsoil creates gaps in the ground layer of litter, biological soil crust, native shrubs, grasses and herbs. As expected, weeds in the study area were associated with disturbance (grazing intensity) and the prevalence of water, with greatest diversity of weed species being recorded in Disturbed Area Shrubland Complex (including Mulga Woodland) and Black Box Woodland, followed by Yarran Shrubland, Belah-Rosewood Woodland, Sandplain Mallee and Linear Dune Mallee (Table 8). Also, the median Braun-Blaunquet cover-abundance of each weed species observed in every vegetation community across the study area was 1 (<5% - few individuals), indicating that no single weed species was observed to dominate.

Table 8: Number of weed species recorded in survey plots in each vegetation community.

Vegetation Community	Total Number of Weed Species Recorded	Median Cover/Abundance Score
Sandplain Mallee	9	1
Linear Dune Mallee	1	1
Belah-Rosewood Woodland	20	1
Disturbed Area Shrubland Complex (including Mulga Woodland)	37	1
Yarran Shrubland	22	1
Black Box Woodland	31	1

Five weed species considered noxious in the Balranald Shire Council area were recorded in the study area; namely *Asphodelus fistulosus* (Onion Weed), *Cuscuta campestris* (Golden Dodder), *Lycium ferocissimum* (African Boxthorn), *Xanthium occidentale* (Noogoora Burr) and *Xanthium spinosum* (Bathurst Burr) (Table 9). All were recorded in Belah-Rosewood Woodland, Disturbed Area Shrubland Complex, Mulga Woodland and Yarran Shrubland. Records for noxious weeds are only from full floristic survey sites and these weeds are likely to be spread throughout the study area.

A number of weed species are considered to be 'priority weeds' impacting on biodiversity in the region (Table 9) (NSW Department of Primary Industries [DPI] and OEH 2011).

3.3 Data Analysis

3.3.1 Overall

High rainfall over the past 2.5 years resulted in the appearance of many species that are difficult to detect during extensive drought periods and this contributed to the effectiveness of the vegetation association analysis. Sampling across a 12-month period resulted in some variation in the results of the analysis due to seasonal impacts on species composition.

The data analysis defined a series of lineages (groups) within the assemblage of species recorded. At the highest level of division two major lineages were defined, which were broadly attributed to the substrate on which the sites were located; i.e. soils influenced in varying degrees by sand and clay. At a lower level of division, vegetation associations on sandy soils grouped into five divisions and vegetation associations on clay soils also grouped into five divisions. These groups are described in the following sections. As the floristic data was collected in both the study area and adjacent areas, some communities included in the analysis are not present in the study area.

Table 9: Noxious and priority weed species recorded in the study area.

Scientific Name	Common Name	Priority Weed in the Lower Murray Darling CMA (DPI and OEH 2011)	Noxious Weed in the Balranald Shire Council Area	Class	Record Type	Location (GDA 94/MGA Zone 54)		Requirement under the *Noxious Weeds Act, 1993*
						Easting	Northing	
Asphodelus fistulosus	Onion Weed	X	X	4	Incidental record	-	-	The growth of the plant must be managed in a manner that reduces its numbers spread and incidence and continuously inhibits its reproduction.
Brassica tournefortii	Mediterranean Turnip	X	-	-	Incidental record	-	-	-
Bromus rubens	Red Brome	X	-	-	Incidental record	-	-	-
Carrichtera annua	Ward's Weed	X	-	-	Incidental record	-	-	-
Cuscuta campestris	Golden Dodder	-	X	4	Incidental record	-	-	The growth of the plant must be managed in a manner that reduces its numbers spread and incidence and continuously inhibits its reproduction.
Heliotropium supinum	Prostrate Hordeum	X	-	-	Full Floristic Survey Site	717094	6252986	-
						716948	6253899	
Lycium ferocissimum	African Boxthorn	X	X	4	Incidental record	-	-	The growth of the plant must be managed in a manner that reduces its numbers spread and incidence and continuously inhibits its reproduction.
Marrubium vulgare	Horehound	X	-	-	Full Floristic Survey Site	713353	6255787	-
						716225	6254082	
Psilocaulon tenue	Wiry Noon Flower	X	-	-	Full Floristic Survey Site	717207	6253448	-
					RDP	717534	6253448	
Schismus barbatus	Arabian Grass	X	-	-	Incidental record	-	-	-
Sisymbrium erysimoides	Smooth Mustard	X	-	-	Full Floristic Survey Site	716948	6253899	-
						717207	6253448	
						712636	6254704	
						712078	6254417	
Xanthium occidentale	Noogoora Burr	X	X	4	Incidental record	-	-	The growth of the plant must be managed in a manner that reduces its numbers spread and incidence and continuously inhibits its reproduction.
Xanthium spinosum	Bathurst Burr	X	X	4	Full Floristic Survey Site	713353	6255787	The growth of the plant must be managed in a manner that reduces its numbers spread and incidence and continuously inhibits its reproduction.

3.3.2 Sand Influenced Communities

Group 1 represents assemblages dominated by mallee Eucalypt species. Group 1 is further divided into subgroups 1a and 1b, which represent two forms of mallee woodland, Sandplain Mallee and Linear Sand Dune Mallee respectively. These subgroups reflect differences in structure and species composition within the mallee vegetation.

Subgroup 1a (**Sandplain Mallee**) is typically found in shallower sand on plains or in swales between the deeper dunes. Species associated with subgroup 1a include *Austrostipa nitida, Enchylaena tomentosa, Vittadinia curvispicatum, Olearia pimeleoides* and *Maireana georgei. Triodia scariosa* is occasionally present in this subgroup, but it occurs very sparsely.

Subgroup 1b (**Linear Sand Dune Mallee**) is typically found on deeper sands than subgroup 1a and includes species such as *Eucalyptus costata, Halgania cyanea, Lomandra leucocephala*, a ground layer dominated by *Triodia scariosa* and a lower cover of chenopod shrub species than subgroup 1a.

Group 2 (**Belah-Rosewood Woodland**) represents an assemblage of species found on brown sands or sandy loams with alkaline subsoil containing limestone nodules (Keith 2006). Group 2 is located on sandplains and as isolated occurrences in larger dune swales.

The dendrogram displays a number of subgroups within Group 2 (Appendix H). Examination of the differences between the subgroups using a SIMPER analysis reveal that they are the result of changes in the cover/abundance scores of some key species including *Chenopodium curvispicatum, Callitris glaucophylla, Sclerolaena obliquicuspis, Casuarina pauper, Geijera parviflora, Alectryon oleifolius, Maireana sclerolaenoides* and *Enchylaena tomentosa.* These differences in cover/abundance are considered to represent typical variation within this vegetation group and the low truncation level in the dendrogram for this group did not support further division. Also, boundaries between these subgroups were not detectible in the aerial imagery available. Several sites with a higher cover/abundance of *Callitris glaucophylla* that forms a small subgroup within Group 2 were further assessed using a SIMPER analysis and the final determination criteria for the EEC Sandhill Pine Woodland (NSW Scientific Committee 2008). None of the sites in this group had a species composition consistent with that described for the EEC and only one of these sites, CAL1_OFF, had characteristics considered to be similar in relation to topography. The latter site was located on a sand dune in semi-arid woodlands.

Group 3 represents an assemblage of species found on flat areas of crusted sandy loam soils or on an exposed subsoil surface in locations with signs of significant disturbance such as heavy grazing, erosion and clearing. These locations probably represent disturbed areas of other assemblages such as Mixed Belah-Rosewood Woodland, Black Box Woodland, Sandplain Mallee or Yarran Shrubland (**Disturbed Area Shrubland Complex**).

The dendrogram revealed a number of subgroups within Group 3 (Appendix H). Examination of these using a SIMPER analysis revealed that the subgroups were the result of changes in the density of some key species including *Austrostipa nitida, Dodonaea viscosa* ssp. *angustissima*, *Sclerolaena patenticuspis* and *Dissocarpus paradoxus.* Further division of the assemblages for mapping purposes was not supported by the analysis due to the low truncation level in the dendrogram. Boundaries between these subgroups were not detectible in aerial imagery interpretation.

Notwithstanding the above, a number of sites (CSO4-24, CSB60, CSB64, and CSB72) that formed part of one subgroup within the dendrogram were all highly disturbed and had a remnant canopy of *Acacia aneura* (Mulga) present. The distinctive canopy of this woodland makes it possible to distinguish it from other vegetation and it is restricted within the southern mallee region (Keith pers. comm; Benson *et al*. 2006). A map unit was allocated to these sites (**Mulga Woodland**).

Two sites (CSB28 and CSB30) placed in Group 3 in the dendrogram were in a location that has been cleared and used for cropping. The significant disturbance to the soil from repeated cultivation has resulted in a low cover of native species, a higher cover of weed species and significant erosion. This area was in very poor condition and was not considered to represent a native vegetation community even though some native species were present. Both sites are included in a map unit labelled **Cleared Land**.

Group 4 represents assemblages of species found on plains of grey to brown clay loam, often with gilgai (**Yarran Shrubland**). All but one site used in the analysis have been severely disturbed by clearing, grazing and soil erosion. The Group 4 species assemblage is found in similar locations and under similar conditions to those of Group 3 and it is not easy to distinguish between these groups in aerial imagery interpretation.

One site (CSB40) placed in Group 4 in the dendrogram was located in an area that has been cleared and used for cropping. The significant disturbance to the soil from repeated cultivation has resulted in a low cover of native species, a higher cover of weed species and significant erosion. This area was in very poor condition and was not considered to represent a native vegetation community even though some native species were present. Therefore, the site was allocated to a separate map unit labelled **Cleared Land**.

Group 5 represents assemblages of species that are generally found on red sand rises and dunes of flat alluvial plains (**Sandhill Pine Woodland**). This assemblage of species was not found in the study area.

3.3.3 Clay Influenced Communities

Group 6 represents an assemblage of species that are found on heavy alluvial clays in low lying areas which retain moisture for long periods after rainfall events (**Black Box Woodland**).

Group 7 represents an assemblage of species found on flat alluvial plains of brown to red clays in water retaining depressions of chenopod shrublands (**Chenopod Shrubland Depressions**). This assemblage of species was not found in the study area.

Group 8 represents an assemblage of species found on flat alluvial plains of deep grey to brown clays in damper area of chenopod shrubland with relatively higher salinity levels (**Saltbush Shrubland**). This assemblage of species was not found in the study area.

Group 9 and **Group 10** represent assemblages of species found on flat alluvial plains of brown to red clays and sandy loam soils (**Bluebush Shrublands**). This assemblage of species was not found in the study area.

3.4 Map Unit Descriptions for Vegetation Mapping

Vegetation community delineation is based on an analysis of data recorded for 320 full floristic sites across the study area and adjacent areas and reflects the vegetation associations as they currently occur. Areas cleared for cropping have been mapped as a distinct map unit and an additional map unit was ascribed to a vegetation community that does not appear in the analysis (Grass/Herbland of Drainage Depressions). Although other vegetation communities are discussed in the analysis only descriptions for map units found in the study area are provided below. The vegetation mapping for the study area is shown in Figures 6 to 9.

Table 10 lists the map units relevant to the study area and provides other information on conservation status, location, area and sites allocated to each unit.

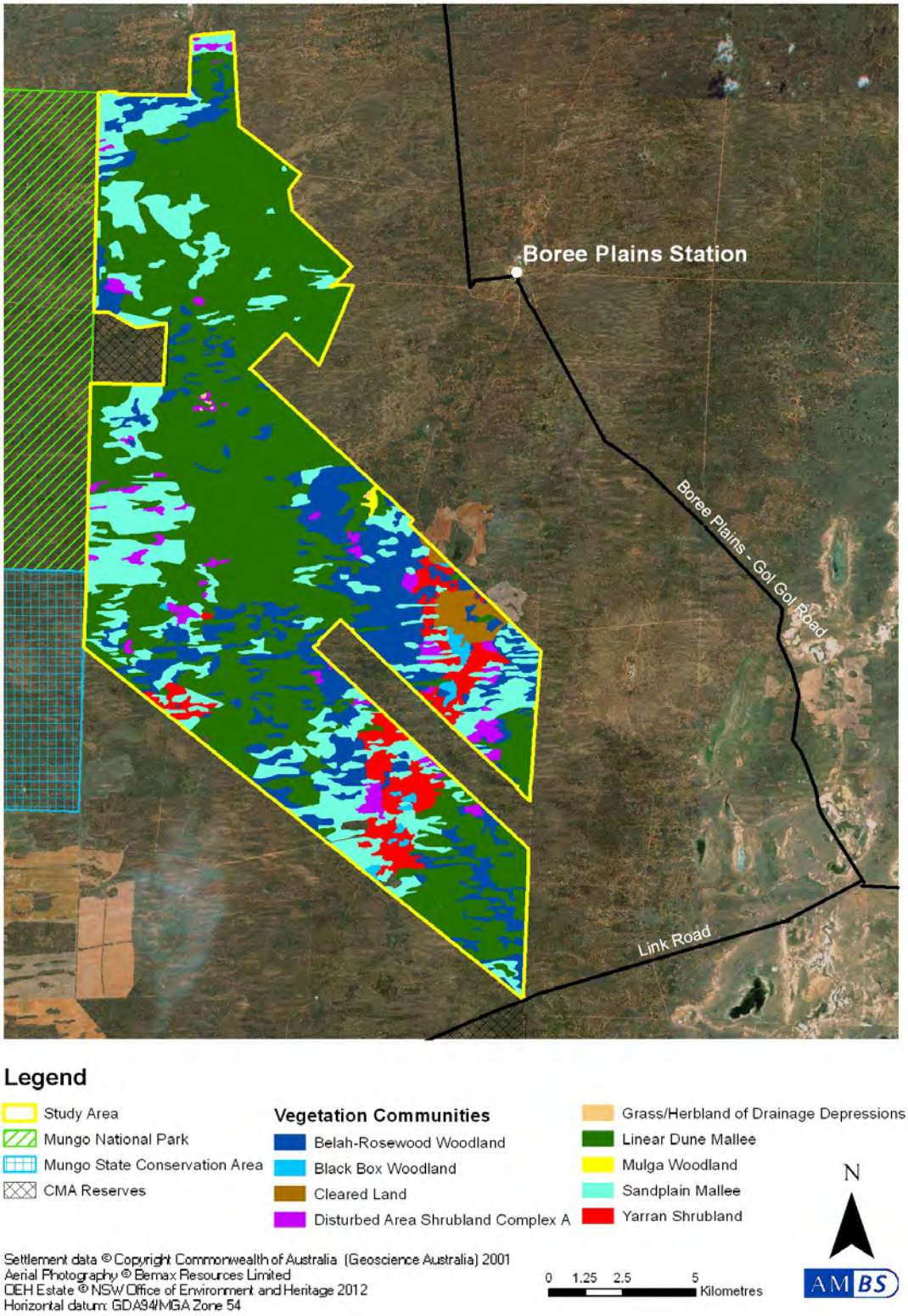

Figure 6: Mapped distribution of all communities within the study area.

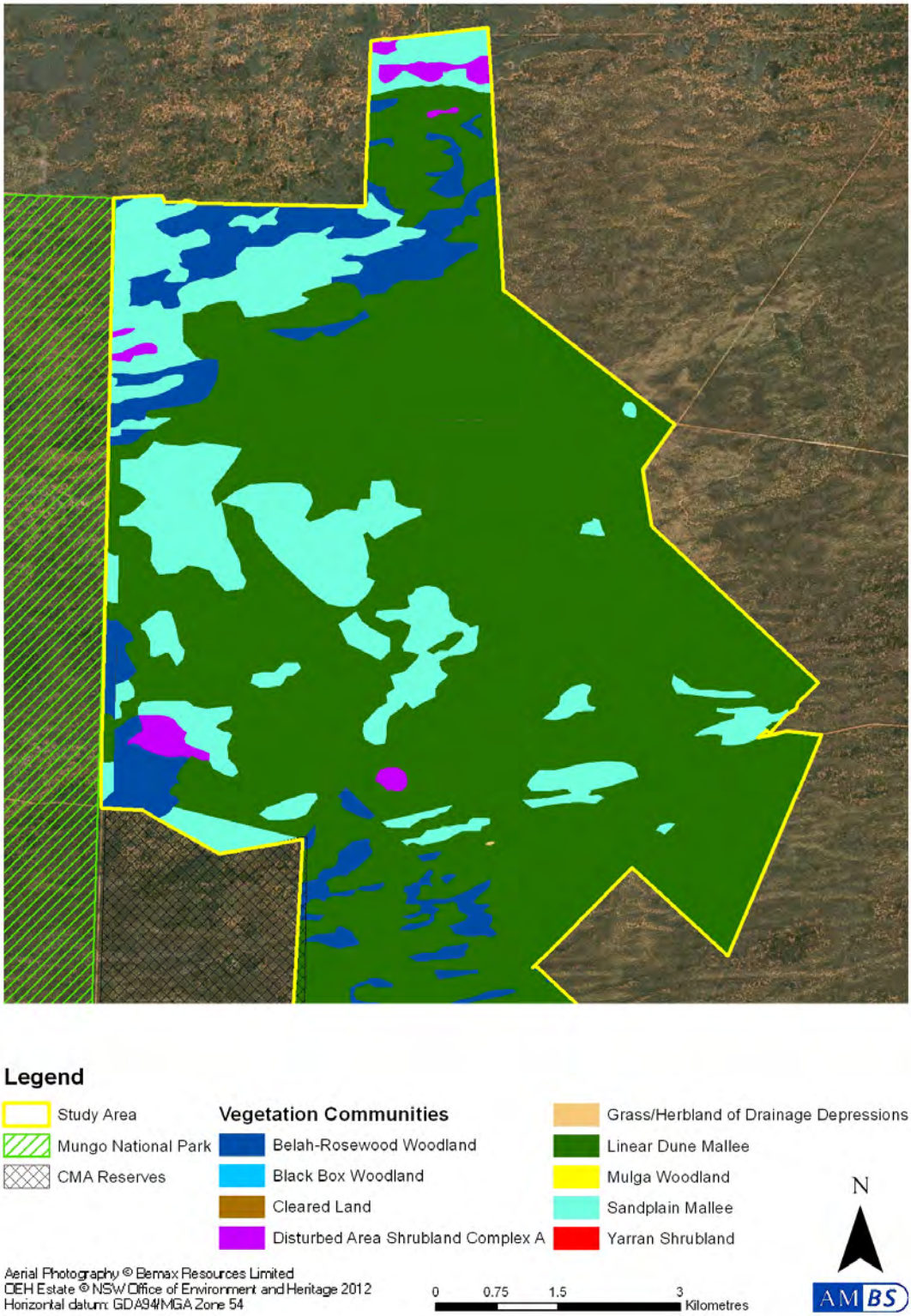

Figure 7: Distribution of vegetation communities in the northern portion of study area.

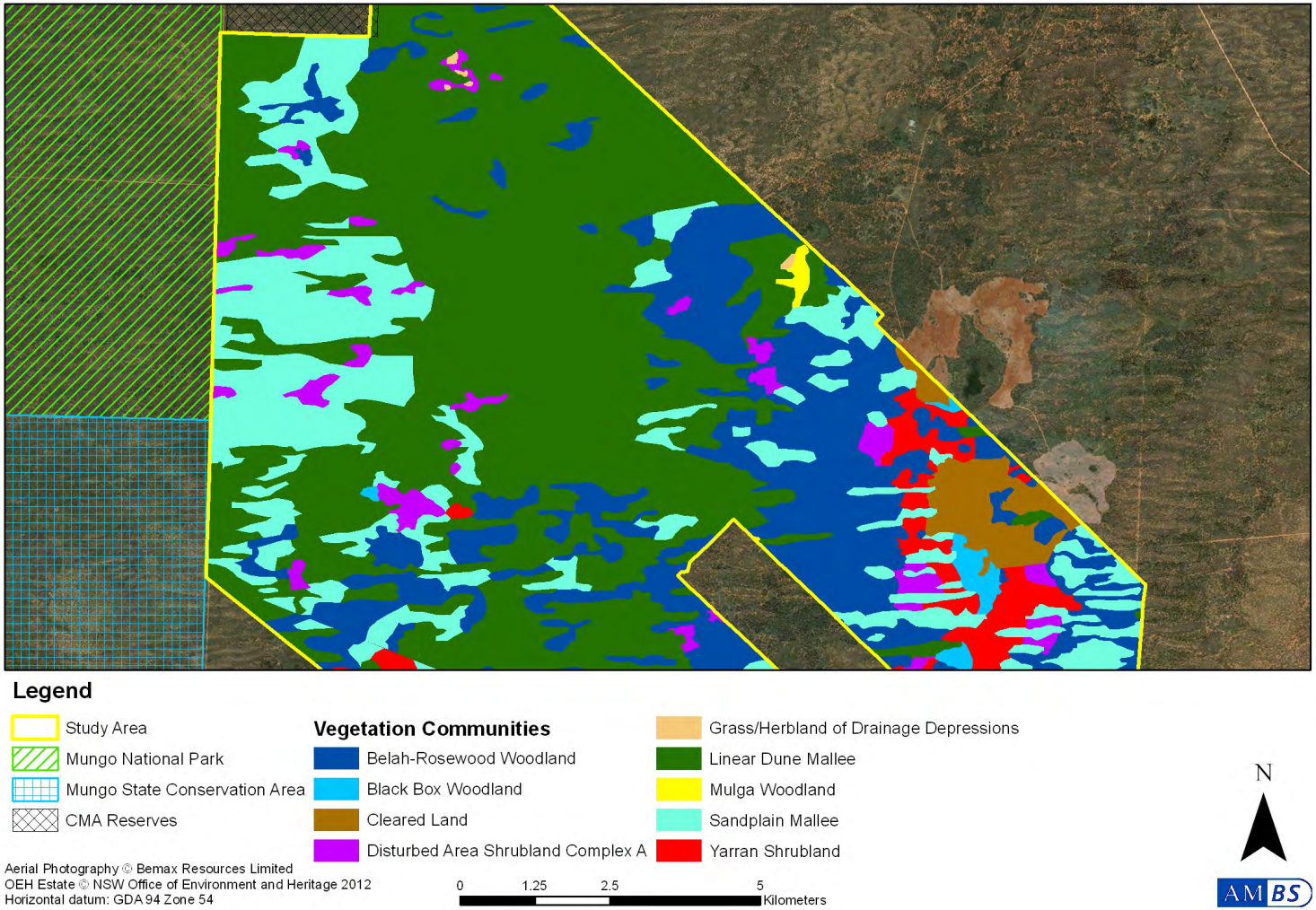

Figure 8: Distribution of vegetation communities in the central section of study area.

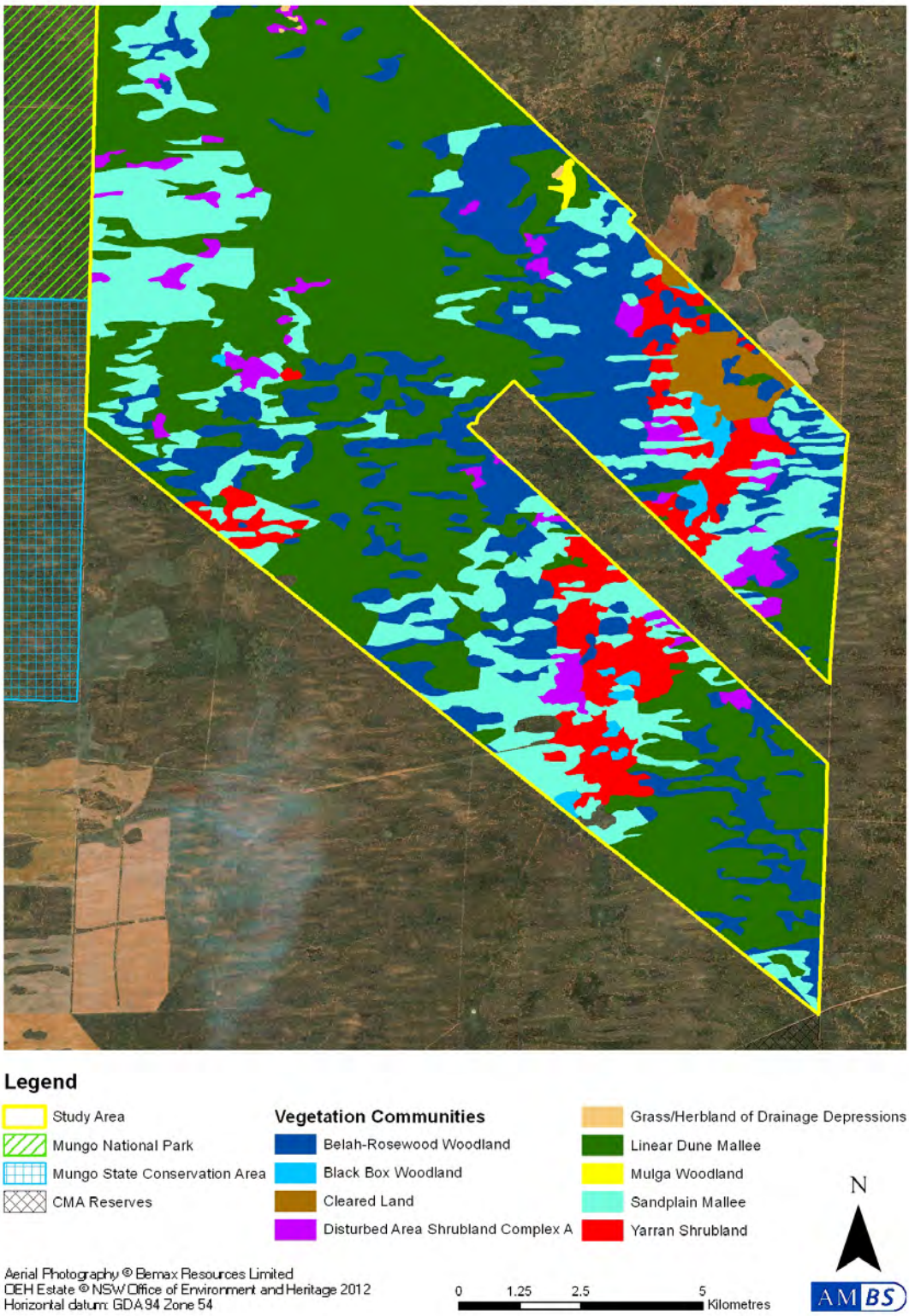

Figure 9: Distribution of vegetation communities in the southern section of study area.

Table 10: Map units, sites allocated, conservation status and area represented for each vegetation community in the study area.

Number	Map Unit	Floristic Survey Sites Assigned To Each Map Unit	Conservation Status	Overall Condition
1a	Sandplain Mallee	CS1, CS11, CS12, CS26, CS3, CS32, CS35, CS40, CS43, CS49, CS53, CS57, CS6, CS66, CS71, CS76, CSB0, CSB1, CSB13, CSB15, CSB2, CSB41, CSB42, CSB43, CSB5, CSB6, CSB7, CSB73, CSB74, CSB75, CSB76, CSB77, CSB78, CSE4, CSE6, CSE7, CSE8, CSH38[1], CSH39[1], CSH40[1], CSH41[1], CSH42[1], CSO6-50, CSO8-18	Not listed	Good
1b	Linear Dune Mallee	CS21, CS22, CS23, CS30, CS31, CS41, CS45, CS52, CS55, CS58, CS61, CS63, CS64, CS65, CS67, CS69, CSB10, CSB11, CSB12, CSB14, CSB16, CSB17, CSB3, CSB4, CSB8, CSB9, CSE5, CSE9	Not listed	Good to moderate
2	Belah-Rosewood Woodland	CS10, CS16, CS18, CS19, CS2, CS20, CS24, CS25, CS27, CS28, CS29, CS4, CS42, CS44, CS46, CS5, CS50, CS54, CS62, CS68, CS7, CS70, CS73, CS74, CS75, CS8, CS9, CSB18, CSB19, CSB20, CSB21, CSB22, CSB23, CSB25, CSB26, CSB27, CSB32, CSB33, CSB35, CSB36, CSB50, CSB62, CSC1, CSE1, CSE10, CSE11, CSE12, CSE2, CSE3, CSO3-12, CSO3-3, CSO4-16, CSO8-6, CSO9-T, CSP10, CSP12, CSP13, CSP14, CSP15, CSP16, CSP17, CSP18, CSP19, CSP20, CSP21, CSP22, CSP23, CSP24, CSP25, CSP26, CSP27, CSP30, CSP31, CSP35, CSP36, CSP8, CSP9, CAL1_OFF, CSH102, CSH57, CSO8-12	Not listed	Good to moderate
3	Disturbed Area Shrubland Complex	CS13, CS14, CS15, CS17, CS33, CS34, CS36, CS37, CS38, CS39, CS48, CS51, CS59, CS60, CS72, CS78, CSB24, CSB29, CSB31, CSB34, CSB37, CSB38, CSB39, CSB51, CSB52, CSB53, CSB54, CSB55, CSB56, CSB57, CSB58, CSB61, CSB63, CSB65, CSB66, CSB67, CSB68, CSB72, CSP1, CSP11, CSP2, CSP28, CSP32, CSP33, CSP37, CSP38	Not listed	Poor
3	Mulga Woodland[2]	CSO4-24, CSB60, CSB64, CSB72	Restricted in Region	Poor
4	Yarran Shrubland	CS77, CSA1, CSA2, CSA3, CSA5, CSA6, CSA7, CSA8, CSB40, CSB49, CSB70, CSB71, CSO1-2, CSO1-21, CSO1-27, CSO1-35, CSO2-1, CSO2-13, CSO4-1, CSO9-5, CSO1-6, CSP29, CSW1[3], CSO35	EEC under State legislation.	Moderate to poor
6	Black Box Woodland	CS47, CS56, CS79, CS80, CSB44, CSB45, CSB46, CSB47, CSB48, CSP3, CSP34, CSP4, CSP5, CSP6, CSP7	Not listed	Good to poor
N/A	Grass/Herblands of Drainage Depressions	Area was inspected but no sites were surveyed	Not listed	Moderate to poor
3/4	Cleared land[1]	CSB28, CSB30, CSB40	Not listed	Poor

[1] These sites are located outside the study area.
[2] Sites assigned to this map unit are a subset of dendrogram group 3; see Section 3.3.2.
[3] This site was located in a relatively intact stand of Yarran Shrubland to the south of the study area.

3.4.1 Mallee Woodland Complex

Extensive areas of mallee woodland occur within the study area, occupying dune crests, swales and adjacent sand plains. Dunes in the study area may be irregularly placed and surrounded by other vegetation communities, typically Belah-Rosewood Woodland, or form east-west running ridges. Soils are either deep red sandy or loamy deposits or weathered calcareous sands.

A number of mallee eucalypt species occur in various abundances and assemblages. The more prevalent are *Eucalyptus socialis* (Red Mallee), *Eucalyptus dumosa* (White Mallee), *Eucalyptus gracilis* (Yorrell), *Eucalyptus costata* ssp. *murrayana* (Ridge-fruited Mallee) and less commonly *Eucalyptus leptophylla (*Narrow - leaved Red Mallee) and *Eucalyptus oleosa* (Red Mallee).

Two forms of this community have been mapped as distinct map units; Linear Dune Mallee on deeper dune sands with a ground layer dominated by *Triodia scariosa* ssp. *scariosa* (Porcupine Grass), and Sandplain Mallee on sand plains with a ground layer dominated by *Austrostipa nitida* and chenopod shrubs. Each unit can occur as small patches within the other. Sandplain Mallee was often observed as small areas between the dunes in large expanses of Linear Dune Mallee and in areas predominantly covered by (and mapped as) Sandplain Mallee patches of Linear Dune Mallee were often observed on small sandy rises. Wherever possible, full floristic sites, RDP sites and opportunistic records were used to map these two units, but in most parts of the study area small areas of one or the other unit will be included in each.

Linear Dune Mallee

Linear Dune Mallee has a canopy dominated by *Eucalyptus socialis, Eucalyptus gracilis,* with *Eucalyptus leptophylla* and *Eucalyptus costata* ssp. *murrayana* occurring less commonly (Plate 1).

The shrub and ground layer has a mix of species including *Dodonaea viscosa* ssp. *angustissima*, *Triodia scariosa* ssp. *scariosa, Schoenus subaphyllus, Sclerolaena diacantha, Sclerolaena parviflora, Chenopodium desertorum, Halgania cyanea* and *Maireana decalvans.* Linear Dune Mallee has a number of species particularly associated with it including *Lomandra effusum, Lomandra leucocephala, Lomandra collina Eremophila glabra ssp. murrayana, Callitris verrucosa, Scaevola depauperata, Leptospermum coriaceum, Bossiaea walkeri, Acacia wilhelmiana, Acacia rigens, Acacia brachybotrya, Schoenus aphyllus, Dodonaea lobulata* and *Amphipogon caricinus.*

Overall the Linear Dune Mallee is in good condition compared to other communities in the study area. This is possible because the type of vegetation, deep sand and distances from watering tanks reduce the visits to such areas by stock and goats. Weed species were seldom recorded in this vegetation map unit.

Plate 1: Typical Linear Dune Mallee

Occurrences of Linear Dune Mallee association have been described in other vegetation surveys.

In the Lower/Murray Darling region:

- Benson *et al*. (2006): ID 171 Spinifex linear dune mallee mainly of the Murray-Darling Depression Bioregion; and Deep sand Mallee of irregular dunefields of the semi-arid (warm) zone.
- Val (2001): Deep Sand Mallee & East West Dune Mallee.

In the vicinity of the study area:

- Scott (1992): ID 3a Mallee of Irregular Dune fields, 3b Dune Crest Mallee and 3c Swale Mallee.
- Westbrooke and Miller (1995): ID 2b *Eucalyptus* open-shrublands with *Triodia* understorey; and
- Porteners et al. (1997): ID 3a Irregular Dune Mallee and 3b Linear Dune Mallee.

Sandplain Mallee

Sandplain Mallee has a canopy dominated by *Eucalyptus socialis, Eucalyptus dumosa* and *Eucalyptus gracilis* (Plate 2).

The shrub and ground layer has a mix of species including *Austrostipa nitida, Sclerolaena diacantha, Chenopodium desertorum, Olearia pimeleoides, Maireana georgei, Maireana triptera, Maireana radiata, Enchylaena tomentosa* and *Marsdenia australis.* Sandplain Mallee shares many species with other vegetation communities in the study area.

Overall the Sandplain Mallee ranges from good to moderate condition depending on the degree of disturbance from grazing and clearing. Few weed species were recorded in Sandplain Woodland but where weeds did occur the following species were most common *Medicago laciniata, Salvia verbenaca, Sisymbrium erysimoides* and *Sonchus oleraceus.*

Plate 2: Typical Sandplain Mallee

Occurrences of the Sandplain Mallee association have been described in other vegetation surveys.

In the Lower/Murray Darling region:

- Benson *et al*. (2006): ID 170 Chenopod sandplain mallee woodland/shrubland of the arid and semi-arid (warm) zones;
- Val (2001): Chenopod Mallee Community.

In the vicinity of the study area:

- Scott (1992): ID 3d Sandplain Mallee;
- Westbrooke and Miller (1995): ID 2a *Eucalyptus gracilis*/*E. dumosa*/E. *socialis* open-shrubland; and
- Porteners *et al*. (1997): ID 3d Sandplain Mallee.

Mallee Woodland Complex is not listed as a Threatened Ecological Community under either State or Commonwealth legislation.

3.4.2 Belah-Rosewood Woodland

Belah-Rosewood Woodland occurs on level to undulating sand plains on calcareous soils mainly of red-brown loam to loamy sands; solonised brown soils to sandy red earths; reddish brown sands and duplex soils (Porteners *et al*. 1997). Small depression (gilgai) can be found within this community (Plate 3).

Belah-Rosewood Woodland in the study area is generally dominated by *Casuarina pauper* (Belah) and the small tree *Alectryon oleifolius* ssp. *canescens* (Western Rosewood). Within this broad definition, stands of this woodland may contain in varying densities *Geijera parviflora* (Wilga), *Callitris glaucophylla* (White Cypress Pine) and a number of mallee eucalypt species. All of these species, except for mallee eucalypts, may be the dominant canopy species depending on the land use history of the specific location.

The shrub and ground layer has a mix of species including *Enchylaena tomentosa, Dissocarpus paradoxa, Sclerolaena diacantha, Austrostipa nitida, Atriplex stipitata, Chenopodium curvispicatum, Chenopodium desertorum, Maireana decalvans* and *Brachyscome ciliaris.*

Overall the Belah-Rosewood Woodland ranges from good to moderate condition depending on the degree of disturbance from grazing or clearing. A number of weed species were recorded in Belah-Rosewood Woodland including *Medicago laciniata, Salvia verbenaca, Sisymbrium erysimoides, Reichardia tingitana, Malva parviflora, Conyza bonariensis* and *Sonchus oleraceus.*

Plate 3: Typical Belah-Rosewood Woodland

Occurrences of the Belah-Rosewood Woodland assemblage have been described in other vegetation surveys.

In the Lower/Murray Darling region:

- Benson et al. (2006): ID 58 Black Oak – Western Rosewood open woodland on deep sandy loams of the Murray-Darling Depression and Riverina Bioregions and; ID 221 Black Oak-Pearl Bluebush open woodland of the sandplains of the semi-arid warm and arid climate zones.
- Val et al. (2001): 1.Low belah woodlands
- Val (2001): Belah Rosewood Community and components of Cypress Community.

In the vicinity of the study area:

- Scott (1992): Vegetation Community ID 4 Belah-Rosewood;
- Westbrooke and Miller (1995): Vegetation community ID 1b *Casuarina pauper*, Belah woodland/open woodland.
- Porteners *et al*. (1997): Vegetation community ID 4 Belah-Rosewood.

Belah-Rosewood Woodland is not listed as a Threatened Ecological Community under either State or Commonwealth legislation.

3.4.3 Disturbed Area Shrubland Complex

Disturbed Area Shrubland Complex is found in drainage lines, swales between dunes and on sandplains within the study area. Typically these shrublands occur on soils which have a hard crust or exposed subsoil surface as a result of erosion (Plate 4).

Once disturbed, many shrub and tree species are prevented from re-establishing by grazing of stock and rabbits and shrub species which are unpalatable become dominant over time (Beadle 1948; Benson 2006). Within the study area this complex is typically dominated by the shrub species *Eremophila sturtii* (Scrub Turpentine) and *Dodonaea viscosa* ssp. *angustissima* (Narrow-leaved Hopbush) with *Nitraria billardierei* (Dillon Bush) and *Senna* species occurring less commonly. Other species associated with this map unit are *Dissocarpus paradoxa, Maireana coronata, Vittadinia cuneata, Nicotiana goodspeedii, Teucrium racemosum, Eremophila glabrata, Enneapogon avenaceus Sclerolaena obliquicuspis, Chamaesyce drummondii* and *Enchylaena tomentosa*.

Disturbed Area Shrubland Complex is often found in association with disturbed remnants of the vegetation communities Yarran Shrubland, Belah-Rosewood Woodland, Black Box Woodland and Sandplain Mallee and may represent vegetation of this type which is severely disturbed. These areas no longer have characteristics which allow for the determination of past vegetation types. However, survey sites in such areas form a distinct group in the analysis and are closely associated with the Yarran Shrubland group as Yarran Shrubland sites are also highly disturbed. Disturbed shrubland vegetation has been recorded by others as being areas which have been disturbed by grazing, rabbits, clearing and erosion (Beadle, 1948; Porteners *et al*., 1997; Scott, 1992; Westbrooke & Miller, 1995; Benson *et al*., 2006).

Disturbed Area Shrubland Complex represents vegetation considered to be remnant of other map units in poor condition within the study area. However, a number of sites have been scored as being in good condition due to the low number of weeds present and a high shrub cover. Weed species recorded in this map unit include *Medicago minima, Salvia verbenaca, Sisymbrium erysimoides, Conyza bonariensis, Cirsium vulgare, Chondrilla juncea* and *Sonchus oleraceus.*

Plate 4: Typical Disturbed Area Shrubland Complex

Occurrences of communities similar to the Disturbed Area Shrubland Complex assemblage have been described in other vegetation surveys.

In the Lower Murray Darling region:

- Benson et al. 2006: ID 143 Narrow-leaved Hopbush-Scrub Turpentine-Senna shrubland of semi-arid and arid sandplains and dunes.
- Val (2001): Mixed Shrubland.

In the vicinity of the study area:

- Porteners *et al*. (1997): ID 22 Disturbed Shrubland Complex.
- Westbrooke and Miller (1995): ID 4a *Dodonaea viscosa* ssp. *angustissima* shrubland.

Disturbed Area Shrubland Complex is not listed as a Threatened Ecological Community under either State or Commonwealth legislation.

3.4.4 Mulga Woodland

The Mulga Woodland in the study area is dominated by a canopy of *Acacia aneura* (Mulga) with an understorey of chenopod shrubs, herbs and grasses with occasional occurrences of *Hakea tephrosperma* and *Eremophila longifolia* as trees or shrubs (Plate 5). The shrub and ground layers are dominated by *Eremophila sturtii (*Scrub Turpentine)*, Dodonaea viscosa* ssp. *angustissima* (Narrow-leaved Hop Bush), *Austrostipa nitida, Austrostipa eremophila, Einadia nutans, Abutilon otocarpum, Maireana triptera, Eremophila glabra, Sclerolaena diacantha* and *Cheilanthes sieberi*.

Mulga Woodland occurs less commonly and in smaller stands in the SFWP of NSW. It has not been mapped by other vegetation surveys in the vicinity of the study area (Scott, 1992; Porteners *et al*., 1997) and is not included in the mapping of vegetation provided by the Lower Murray Darling CMA. *Acacia aneura* (Mulga) Woodland is recorded as occurring in Mungo National Park (Westbrooke & Miller, 1995).

Mulga Woodland is in poor condition within the study area with most condition assessment sites being scored as moderate to poor. Much of the canopy layer has disappeared and heavy grazing has depleted the shrub and ground layers. Weed species recorded in this map unit include *Medicago minima, Salvia verbenaca, Sisymbrium erysimoides, Conyza bonariensis, Cirsium vulgare, Chondrilla juncea* and *Sonchus oleraceus.*

Plate 5: Mulga Woodland with remnant canopy of *Acacia aneura*

Occurrences of communities similar to the Mulga Woodland assemblage have been described in other vegetation surveys.

In the Lower Murray Darling region:

- Benson *et al*. 2006: ID 199 Hooked Needlewood-Needlewood-Mulga-Turpentine Bush open shrubland of the semi-arid and arid plains.

In the vicinity of the study area by:

- Westbrooke and Miller (1995): ID 3a *Acacia aneura* open-woodland.

Mulga Woodland in this locality is not listed as a Threatened Ecological Community under either State or Commonwealth legislation.

3.4.5 Yarran Shrubland

Yarran Shrubland occurs on level to undulating plains of brown-red calcareous loams. Small depressions (gilgai) are typically found within this community (Plates 6 to 8). Yarran Shrubland has been extensively cleared in the past for cropping and grazing and now occurs as patches of heavily grazed vegetation dominated by shrub species such as *Eremophila sturtii, Sclerolaena obliquicuspis* and *Dissocarpus paradoxus* which are not palatable to stock.

Typically Yarran Shrubland is distinguished by a canopy dominated by *Acacia melvillei* (Yarran) with other species such as *Casuarina pauper* (Belah) and the small tree *Alectryon oleifolius* ssp. *canescens* (Western Rosewood) occasionally present. The understory is composed of chenopod shrubs, herbs and grasses (Scott 1992; Porteners *et al*. 1997; Benson *et al*. 2006).

Within the study area the map unit Yarran Shrubland has very little canopy with *Acacia melvillei* represented by small shrubs or regenerating rootstock. The shrub and ground layers are dominated by *Eremophila sturtii, Austrostipa nitida, Vittadinia cervicularis, Sclerolaena diacantha, Sclerolaena obliquicuspis, Dissocarpus paradoxa, Austrodanthonia setacea, Maireana triptera, Einadia nutans, Oxalis perennans, Sida intricata, Convolvulus remotus* and *Enchylaena tomentosa*.

The species *Acacia melvillei* was also recorded as isolated individuals in other assemblages, including Belah-Rosewood Woodland and Black Box Woodland. Another Acacia species, *Acacia homalophylla*, is often confused with *Acacia melvillei* and was also recorded during the field survey. Identification of both species was made using the characteristics of seed pods, which were present during the survey period. *Acacia melvillei* was the most common species found, with only a few occurrences of *A. homalophylla* being recorded. Although *Acacia melvillei* is able to resprout from root stock this species is highly palatable and grazing prevents the re-establishment of mature plants.

Determination of Yarran Shrubland was undertaken using the results of the data analysis. Within this analysis, *Acacia melvillei* sites formed a distinct assemblage, separate from other vegetation assemblages. One site of relatively intact Yarran Shrubland (CSW1) was surveyed and this site grouped with the highly disturbed Yarran Shrubland sites within the analysis. Closely associated with this assemblage was another assemblage Disturbed Area Shrubland Complex that generally did not have regenerating *Acacia melvillei* present, but was highly disturbed and dominated by unpalatable shrub species found in the Yarran Shrubland assemblage. Sites in the Disturbed Area Shrubland Complex may have supported *Acacia melvillei* shrubland community in the past.

Distinguishing the map unit boundary between Yarran Shrubland and Disturbed Area Shrubland Complex was difficult. Given that Yarran Shrubland is an EEC (*Acacia melvillei* Shrubland; Appendix I) a precautionary approach was taken to delineating these two closely related species assemblages.

Remnants of Yarran Shrubland in the study area are generally in moderate to poor condition lacking structural integrity and having higher numbers of weed species than most other map units in the study area. However, a number of sites have been scored as being in good condition due to the low number of weeds present and a high shrub cover. Given the significant disturbance of Yarran Shrubland due to its location in areas considered to be arable, the fact that the plant is considered to be folder for sheep and cattle, the significant impact of high rabbit numbers on seedlings/regrowth and the high numbers of goats it is rare to find a patch of this shrubland which could be considered to be intact. Most sites had dead large individuals of *Acacia melvillei* often with heavily grazed regeneration occurring nearby.

A number of weed species were recorded in Yarran Shrubland including *Picris angustifolia subsp. angustifolia, Carthamus lanatus, Centaurea calcitrapa, Medicago laciniata, Medicago minima, Asphodelus fistulosus, Salvia verbenaca, Cucumis myriocarpus, Marrubium vulgare, Sisymbrium erysimoides, Reichardia tingitana, Malva parviflora, Conyza bonariensis* and *Sonchus oleraceus.*

Plate 6: Yarran Shrubland showing senescing *Acacia melvillei* tree

Plate 7: Yarran Shrubland showing small regenerating shrubs of *Acacia melvillei*

Plate 8: Yarran Shrubland with regenerating *Acacia melvillei* in foreground

Occurrences of the Yarran Shrubland assemblage have been described in other vegetation surveys.

In the Lower Murray/Darling region:

- Benson *et al*. 2006: ID 23 Yarran shrubland of the sandplains and plains of the semi-arid (warm) and arid climate zones.

In the vicinity of the study area by:

- Scott (1992): ID 17 *Acacia melvillei* woodland.
- Westbrooke and Miller (1995): ID 3b *Acacia melvillei* tall open shrubland; and
- Porteners *et al*. (1997): ID 17 *Acacia melvillei* woodland.

Yarran Shrubland mapped in the study area conforms to the description of '*Acacia melvillei* Shrubland in the Riverina and Murray-Darling Depression bioregions' a listed EEC under the TSC Act (Appendix I). It is not listed under Commonwealth legislation.

3.4.6 Black Box Woodland

Small stands of Black Box Woodland occur within the study area in low lying areas where runoff accumulates after rain. Soils are silty or cracking grey and brown clays. Black Box Woodland has been extensively cleared within the study area remaining only in areas where cultivation or clearing for grazing is not practical due to the potential for such areas to flood during rain periods (Plate 9).

Eucalyptus largiflorens (Black Box) is the dominant tree species within this vegetation assemblage with an understory of grasses, herbs and chenopod shrubs. The shrub and ground layers has a mix of species including *Eremophila maculata, Pseudognaphalium luteoalbum, Marsilea drummondii, Lachnagrostis filiformis, Teucrium albicaule, Wahlenbergia tumidifructa, Polygonum plebeium, Teucrium racemosum, Verbena gaudichaudii, Stemodia florulenta, Persicaria lapathifolia, Myriophyllum verrucosum, Austrostipa nitida, Nicotiana goodspeedii, Rumex tenax, R. crystallinus* and *Bulbine semibarbata.* The shrub *Acacia melvillei* (Yarran) may also occur, particularly where Black Box Woodland and Yarran Shrubland intergrade.

Overall Black Box Woodland is in good to poor condition depending on the degree of disturbance from grazing or clearing. A number of weed species were recorded in Black Box Woodland *including Picris hieracioides, Spergularia rubra, Verbena supina, Lactuca serriola, Medicago laciniata, Medicago minima, Salvia verbenaca, Sisymbrium erysimoides, Onopordum acaulon, Reichardia tingitana, Malva parviflora, Conyza bonariensis* and *Sonchus oleraceus.*

Plate 9: Typical Black Box Woodland

Occurrences of the Black Box Woodland assemblage have been described in other vegetation surveys.

In the Lower Murray/Darling region:

- Benson et al. (2006): ID 15 Black Box open woodland with chenopod understorey mainly on the outer floodplains in south-western NSW.
- Val et al. (2001): 3. Low black box woodland.
- Val (2001): Black Box Community.

In the vicinity of the study area:

- Scott (1992): ID 2 Black Box;
- Westbrooke and Miller (1995): ID 1a *Eucalyptus largiflorens*, Black Box open-woodland; and
- Porteners *et al*. (1997): ID 2: Black Box Woodland.

One threatened flora species, the Winged Peppercress (*Lepidium monoplocoides*), has been located within this vegetation community in the study area.

Black Box Woodland is not listed as an Endangered Ecological Community under either State or Commonwealth legislation.

3.4.7 Grass/Herblands of Drainage Depressions

Areas of Grass/Herblands of Drainage Depressions are found in drainage depressions or gilgai and are often associated with Black Box Woodland, Yarran Shrubland and Belah-Rosewood Woodland communities (Plates 10 and 11). In some locations of the study area, the assemblage occurs in relatively large drainage depressions which often support Black Box Woodland (Plates 10 and 11). In other locations it occurs in depressions known as gilgai, which form in clay-rich soils exposed to periodic wetting and drying.

These depressions have a unique association of herb and grass species including *Marsilea drummondii, Centipeda cunninghamii, Centipeda thespidioides, Goodenia fascicularis, Stemodia florulenta, Teucrium racemosum, Teucrium albicaule, Eragrostis falcata, Wahlenbergia gracilenta, Isolepis australiensis* and *Schenkia spicata.*

Grass/Herblands of Drainage Depressions in the study area are in moderate to poor condition with most sites being severely disturbed. Damage to this assemblage is high as they retain water for longer periods that surrounding areas and consequently are heavily visited by stock and goats. Weed species associated with this map unit include *Spergularia marina, Medicago minima, Salvia verbenaca, Sisymbrium erysimoides, Conyza bonariensis, Cirsium vulgare, Chondrilla juncea* and *Sonchus oleraceus.* These depressions are likely to have very little vegetation present during drought periods.

Grass/Herblands of Drainage Depressions occur throughout the study area generally in very small patches and consequently many have not been mapped.

Plate 10: Grass/Herblands of Drainage Depressions showing small drying depression and disturbance from stock visits

Plate 11: Grass/Herblands of Drainage Depressions showing larger area with disturbance by goats

Occurrences of communities similar to Grass/Herblands of Drainage Depressions assemblage have not previously been described in the vegetation surveys of Benson *et al*. (2006), Scott (1992), Westbrooke and Miller (1995) or Porteners *et al*. (1997).

One threatened flora species, *Lepidium monoplocoides*, has been located within this map unit in the study area.

Grass/Herblands of Drainage Depressions is not listed as an Endangered Ecological Community under either State or Commonwealth legislation.

3.4.8 Cleared land

A portion of the riverine plain located in the study area has been cleared of native vegetation and periodically cultivated (Plate 12). There are occasional occurrences of remnant native species within this area, sometimes occurring as small isolated clumps of trees. This vegetation community represents land that is considered too disturbed to be able to make reliable conclusions about the vegetation that occurred here in the past. It is most likely that this area was covered by stands of Yarran Shrubland, Black Box and Belah-Rosewood Woodland. Regenerating *Acacia melvillei* suggests that a significant portion may have once included Yarran Shrubland. The Cleared Land vegetation map unit is in poor condition.

Plate 12: Cleared land showing regenerating *Acacia melvillei*

3.5 Vegetation Condition

The condition of the vegetation of the study area was assessed using the method described in Section 2.3.6 of this report. Grazing, clearing and timber harvesting have altered the structural and species composition of the vegetation in the study area. Table 10 provides an overall condition score for each vegetation type.

Overall the collated condition scores indicated that sites located on soils with higher clay content (Black Box Woodland, Grass/Herbland of Drainage Depressions, Yarran Shrubland and Disturbed Area Shrubland Complex) were more inclined to be in moderate/poor or poor condition than the Belah-Rosewood Woodland, Linear Dune Mallee and Sandplain Mallee vegetation. The closer that survey sites were located to tanks, the higher the level of disturbance observed e.g. more intense grazing pressure, tracking, erosion and/or weed species.

The Yarran Shrublands of the study area have lost the canopy layer in most locations as the Acacias were likely used to provide fodder in drought years and later cleared for cropping. Subsequent development of a mature canopy in this community is limited by grazing.

Areas of Disturbed Shrubland Complex are thought to represent locations where severe long term disturbance has resulted in the restriction of the regeneration of species palatable to grazing animals, including some canopy species. Only isolated Mallee Eucalypt, Belah, Cypress Pine trees or stunted regenerating Acacia shrubs are present to indicate the vegetation that may have once occurred there. Typically, the Black Box Woodland remnants, although retaining the canopy layer, have a shrub and ground layer with a greater numbers and percentage cover of weed species. Although weed species numbers are higher than other vegetation communities (Table 8), native species still provide the greater percentage of vegetation cover in the Black Box Woodlands.

The Mallee Woodland complex has been less affected by timber harvesting or clearing than the communities discussed above; however, the impact of grazing can be seen in both Linear Dune and Sandplain Mallee as erosion resulting from tracking in the deeper dunes and removal of surface soil on the sandplains.

The surveys of the study area were undertaken following a period of high rainfall and it is probable that during drought periods the overall cover of vegetation will be reduced.

4 Listed Plant Species and Ecological Communities

4.1 *Lepidium monoplocoides* (Winged Peppercress)

4.1.1 Profile of the Threatened Species

Lepidium monoplocoides (Winged Peppercress) is listed as Endangered under the TSC Act and the EPBC Act.

Winged Peppercress is an erect annual herb which grows to 15-20 centimetres (cm) high. Leaves are narrow-linear, mostly 2-7 cm long, pinnatisect to entire and arranged along and at the base of the stems. The inflorescence is an elongating raceme with tiny green-pale yellow flowers to 2 mm wide, with sepals 1 mm long and petals inconspicuous or absent. The flowers have only 4 stamens unlike similar species which have 6. Fruits are broadly ovate to circular, 5 mm long and 4 mm wide, and borne on flattened pedicels to 3 mm long. The apex of the fruit is pointed, with a small notch and two smooth wings that are divided into halves that surround the entire fruiting body. Flowering occurs in the spring and summer (Mavromihalis 2010).

Winged Peppercress is widely distributed on the inland plains of south-eastern Australia, occurring from northern NSW to western Victoria, with an old record from south-eastern South Australia (Mavromihalis 2010). In NSW, the species is known from several locations on the Hay Plain, including the Booberoi regeneration area/railway siding, Urana Nature Reserve, along the Cobb Highway south of Ivanhoe, Lake Cargelligo, Micabil and the Morundah property owned by the Department of Defence. Winged Peppercress occurs in open, sparsely vegetated sites in a range of habitats on heavy clay or clay-loam soils, usually on sites that are seasonally flooded or prone to waterlogging, in arid to semi-arid areas with an average rainfall range of 200–450 mm per year (Mavromihalis 2010).

Vegetation communities in which the species occurs include grasslands, wetlands and floodplain woodlands dominated by *Eucalyptus coolabah* and *Eucalyptus largiflorens*, and chenopod shrublands dominated by *Atriplex*, *Maireana* and/or *Nitraria* species. Little is known of the biology and ecology of Winged Peppercress. The species is more readily observable following significant rainfall, and virtually disappears in dry years, when only a small proportion of the total population may be visible above ground at any one time (Mavromihalis 2010). Like many annual species occurring in dry environments, some seed probably remains dormant in the soil for several years; the magnitude of the soil seed store is also unknown, but is likely to be large. During extended wet periods, the species can behave like a short-lived perennial plant (Scarlet 2000). Winged Peppercress is currently known from 13 locations, six in Victoria and seven in NSW (Mavromihalis 2010), and there are a total of 78 records on the Atlas of NSW Wildlife (OEH, 2011a). The inconspicuous nature of the plant (except when seeding) may have also lead to an under-estimation of population sizes (Mavromihalis 2010).

4.1.2 Description of the Threatened Species within the Study Area

Within the study area, Winged Peppercress was collected from four locations. Two were in Black Box Woodland, one in Belah-Rosewood Woodland with associated gilgai and one in Grass/Herblands of Drainage Depressions (Plates 13 to 15).

All locations show signs of recent inundation and soils had high clay content. Most specimens were fruiting but a number still had flowers present. Each location was disturbed by grazing in particular and there was evidence that the sites had recently been visited by goats. A condition score of poor was recorded for three populations (populations 3, 5, 6) and moderate for one (population 4). Records were made in November and December 2012.

Winged Peppercress was recorded in a number of locations with a similar species *Lepidium phlebopetalum* (Veined Peppercress). Unlike Winged Peppercress, Veined Peppercress is often a perennial and has six stamens in each of its flowers.

Plate 13: *Lepidium monoplocoides* (Winged Peppercress)

Plate 14: *Lepidium monoplocoides* (Winged Peppercress) habitat (population 6)

Plate 15: *Lepidium monoplocoides* (Winged Peppercress) habitat (population 3)

4.2 *Acacia melvillei* Shrubland in the Riverina and Murray Darling Depression Bioregions

4.2.1 Profile of the Endangered Ecological Community

Acacia melvillei Shrubland is listed as an Endangered Ecological Community under the TSC Act.

The community typically has an open canopy of shrubs or small trees, sometimes with scattered mid-stratum shrubs (which may be reduced to isolated individuals or may be absent as a result of past clearing) and a sometimes sparse, but highly variable ground layer dominated by grasses, chenopods and herbs. The shrub/tree layer is dominated by *Acacia melvillei* (Yarran), either in pure stands or with a range of other less abundant trees or tall shrubs (NSW Scientific Committee 2008). These may include *Acacia loderi* (Nelia), *Alectryon oleifolius* subsp. *canescens* (Rosewood), *Casuarina pauper* (Belah) and/or *Myoporum platycarpum* (Sugarwood). A scattered small shrub layer is sometimes present and may include *Enchylaena tomentosa* (Ruby Saltbush), *Eremophila sturtii*, *Nitraria billardierei* (Dillon bush), *Rhagodia spinescens* (Thorny Saltbush) and/or *Maireana pyramidata* (Black bluebush). The groundcover is highly variable in structure and composition. It may be sparse or more continuous, depending on the history of disturbance, grazing and rainfall events.

It comprises chenopod subshrubs such as *Atriplex stipitata*, *Dissocarpus paradoxus* (Cannonball Burr), *Maireana* spp., *Sclerolaena* spp. (Copperburrs), *Einadia nutans* subsp. *nutans* (Climbing Saltbush) and grasses and forbs including *Austrostipa nitida*, *Crassula colorata*, *Erodium crinitum* (Blue Storksbill), *Tetragonia tetragonioides*. *Triraphis mollis* and *Zygophyllum ammophilum* (Sand Twinleaf). The structure of the community varies depending on past and current disturbances, particularly clearing, logging, grazing and soil erosion and on the timing and magnitude of recent rainfall (NSW Scientific Committee 2008).

Acacia melvillei Shrubland is scattered over a relatively large distribution, with an estimated extent of occurrence in the order of 50 000 square kilometres (km^2). The community is currently recorded from south-western portion of NSW in the Riverina and Murray-Darling Depression bioregions in the LGAs of Balranald, Carrathool, Central Darling, Conargo, Wakool and Wentworth. The community may occur elsewhere in the Riverina and Murray-Darling Depression bioregions. Throughout this distribution, *Acacia melvillei* Shrubland occurs in relatively small patches. Based on available mapping and site records, *Acacia melvillei* Shrubland is estimated to occupy an area of about 800 km^2 (NSW Scientific Committee 2008).

Most remaining stands of *Acacia melvillei* Shrubland have been moderately to heavily disturbed and degraded by overgrazing and fragmentation, and subsequent weed invasion (NSW Scientific Committee 2008). Excessive grazing has resulted in simplification of community structure, changes in species composition, invasion of weeds and soil erosion (Eldridge and Greene 1994; Eldridge 1998; Benson *et al*. 2006). Overgrazing by domestic livestock and feral herbivores (e.g. rabbits and goats) has resulted in a scarcity of woody understorey plants and a lack of regeneration of palatable trees and shrubs in the community (Batty and Parsons 1992; Porteners 2001; Benson *et al*. 2006; Enke 2007). Consequently senescent trees are not replaced with new individuals and there is a prolonged trend of stand degeneration, which is difficult to reverse, even under active conservation management (Dayman 2007; Enke 2007). Overgrazing also reduces structural complexity, plant species diversity and habitat suitability for vertebrate fauna of the community. The processes associated with overgrazing have resulted in a large reduction in the ecological function of the community. Fragmentation, grazing and small-scale physical disturbance have resulted in weed invasion throughout the distribution of *Acacia melvillei Shrubland*, which continues to threaten the ecological function of the community (NSW Scientific Committee 2008).

Areas of *Acacia melvillei* Shrubland are conserved in Mungo and Willandra National Parks, and Kajuligah and Yanga Nature Reserves (Westbrooke and Miller 1995; Porteners 2001; Benson *et al*. 2006). However, some of these reserves contain only a few hectares of the community, and all exhibit signs of degradation associated with past land uses and the continuing impacts of feral herbivores (NSW Scientific Committee 2008).

Ongoing threats to *Acacia melvillei* Shrubland collectively include clearing (particularly in the east of its range), overgrazing and weed invasion (OEH 2011b). Clearing fragments stands of the community; overgrazing by domestic livestock and feral herbivores, including rabbits and goats continues to limit the regeneration of palatable trees and shrubs as senescent trees are not replaced with new individuals and stands continue to degenerate even under active conservation management. Weeds which invade following disturbance compete with regenerating native seedlings for resources, further limiting the potential for natural regeneration (OEH 2011b).

4.2.2 Description of the Endangered Ecological Community within the Study Area

Within the study area the map unit Yarran Shrubland represents the EEC *Acacia melvillei* Shrubland. To ascertain the relationship between the map unit Yarran Shrubland and the EEC *Acacia melvillei* shrubland each descriptive criteria in the final determination for this EEC has been addressed in Appendix I of this report.

Within the study area *Acacia melvillei* Shrubland occurs in large patches on soil with high clay content. In many of these locations gilgai also occur. Generally the shrubland occurs adjacent to Black Box Woodland, Belah-Rosewood Woodland and in some locations Sandplain Mallee (Plates 16 and 17).

Acacia melvillei Shrubland is represented by degraded stands with little or no canopy layer. Large individual trees of *Acacia melvillei* occur rarely and are in the late stages of senescence. In a few locations small shrubs of *Acacia melvillei* occur but in most locations the species exists as heavily grazed resprouting root stock. Seedlings of *Acacia melvillei* were observed at only one site. Dispersed across the patches of *Acacia melvillei* Shrubland are occasional occurrences of *Casuarina pauper* (Belah), *Callitris glaucophylla* (White Cypress Pine) and Mallee species.

The shrub and ground layer can be dominated by grasses or chenopod shrubs. Although the remnant patches are highly disturbed they are still dominated by native species. Large areas of cropping land, map unit Cleared Area (Cropping) have isolated regenerating *Acacia melvillei* rootstock. It is likely that these areas once supported *Acacia melvillei* shrubland however clearing and ploughing for crop planting has removed most of the understorey species.

Plate 16: Fruit of *Acacia melvillei*

Plate 17: Heavily grazed re-sprouting root stock of *Acacia melvillei*

4.3 Potential Habitat for Threatened Species

Potential habitat may exist within the study area for the following species *Acacia acanthoclada, Acacia carneorum, Lasiopetalum behrii, Santalum murrayanum, Swainsona murrayana* and *Swainsona pyrophila.* Table 11 describes the potential habitat within the study area for species not located during the survey.

Table 11: Potential habitat within the study area for threatened species not located during the survey.

Scientific Name	Common Name	Habitat	Comments
Acacia acanthoclada	Harrow Wattle	Mallee communities on ridges and dunes; generally grows in deep, loose, sandy soil (OEH 2011c, 2012a).	Most records in NSW are either in the Scotia mallee or from between Mallee Cliffs and Mungo National Parks (OEH 2011c, 2012a). Potential habitat is provided in the study area by Linear Dune Mallee vegetation.
Acacia carneorum	Needle Wattle	Needle Wattle occurs on sand ridges or sandy flats or in alluvium along watercourses (SEWPaC 2012). Occurs in Mulga communities, White Cypress Pine woodland, Red Mallee woodland, grassland and chenopod low shrubland (SEWPaC 2012).	There is an unconfirmed report of one individual of this species in an environmental assessment for Boree Plains in 2002 (Anon 2002). Potential habitat is provided in the study area by Sandplain Mallee and Mulga Woodland vegetation.
Brachyscome papillose	Mossgiel Daisy	Recorded primarily in clay soils on Bladder Saltbush (*Atriplex vesicaria*) and *Maireana aphylla* plains, but also in grassland and in Grey Box (*Eucalyptus microcarpa*) - Cypress Pine (*Callitris spp.*) woodland (SEWPaC 2012).	Occurs chiefly from Mossgiel to Urana, with sites in the Jerilderie area, the Hay Plain, Willandra Lakes district and north to Ivanhoe (SEWPaC 2012). A north-western outlier is a Byrnedale Station, north of Menindee. The only known slopes on South Western Slopes is Ganmain Reserve (SEWPaC 2012).
Lasiopetalum behrii	Pink Velvet Bush	Grows in mallee and red dune and swale country (OEH 2011c, 2012a).	Potential habitat provided in the study area by Sandplain Mallee and by Linear Dune Mallee. However this species is known in NSW from only a single record made in 1997 on leasehold land to the south east of Pooncarie (OEH 2011c, 2012a).
Solanum karsense	Menindee Nightshade	Grows in occasionally flooded depressions with heavy soil, including level river floodplains of grey clay with Black Box and Old Man Saltbush, and open treeless plains with solonized brown soils (OEH 2012a).	Menindee Nightshade is the only species of Solanum endemic to NSW and is restricted to the far south-western plains, extending up the Darling River to the Menindee and Wilcannia districts (OEH 2012a). Mainly restricted to the area between the Darling and Lachlan Rivers. Localities include Kars Station, Lake Tandou, Lake Cawndilla, Oxley area, between Broken Hill and Menindee, and the Darling River. It has been recorded from Kinchega National Park and Nearie Lake Nature Reserve (OEH 2012a). Potential habitat includes Black Box Woodland.
Santalum murrayanum	Bitter Quandong	NSW populations found in mallee habitats on soft linear dune-crests, with deep and well-drained calcareous earths or red and brown sands, loamy sands or clay-loams (OEH 2011c, 2012a). Associated species include *Eucalyptus socialis and Pimelea microcephala, Eucalyptus costata, E. leptophylla, E. dumosa, Callitris verrucosa* and *Triodia scariosa* (OEH 2011c, 2012a).	One plant is known from Mallee Cliffs National Park and another from the Travelling Stock Route within northern Mungo National Park (OEH 2011c, 2012a). Potential habitat is provided in the study area by Linear Dune Mallee vegetation. Species composition of habitat matches with species in this vegetation.

Scientific Name	Common Name	Habitat	Comments
Swainsona murrayana	Murray Swainson-pea	The species has been collected from clay-based soils, ranging from grey, red and brown cracking clays to red-brown earths and loams (OEH 2011c, 2012a). Grows in a variety of vegetation types including bladder saltbush, black box and grassland communities on level plains, floodplains and depressions and is often found with Maireana species (OEH 2011c, 2012a).	Found throughout NSW (OEH 2011c, 2012a). Potential habitat is provided in the study area by Black Box Woodland vegetation.
Swainsona pyrophila	Yellow Swainson-pea	Grows in mallee scrub on sandy or loamy soil, usually found only after fire (OEH 2011c, 2012a). Sites include cleared and burnt mallee scrub on red loam to sand, previously burnt *Eucalyptus dumosa* mallee (OEH 2011c, 2012a).	Occurs in the south-western plains regions of NSW (OEH 2011c, 2012a). Potential habitat is provided in the study area by Linear Dune Mallee and Sandplain Mallee vegetation.

5 Glossary

CMA – Catchment Management Authority.
EEC – Endangered Ecological Community.
EPBC Act – Commonwealth Environment Protection and Biodiversity Act, 1999.
SFWP – Far South Western Plains Botanical Region.
LGA – Local Government Area.
RDP – Rapid Data Point.
TSC Act – NSW Threated Species Conservation Act, 1995.

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Appendix A: Location Points for Full Floristic Survey Sites

Site Number	EastingGDA94	NorthingGDA94
CAL1_OFF	706821	6266728
CS41	712345	6255379
CS42	711950	6255098
CS43	712170	6255020
CS44	712636	6254704
CS45	712383	6254795
CS46	712748	6254535
CSA01	716965	6256057
CSB14	712105	6254560
CSB23	712078	6254417
CSB24	711741	6254794
CSB59	716707	6256722
CSO1-2	717001	6253111
CSO1-21	717947	6254974
CSO1-27	717137	6255414
CSO1-35	715921	6256164
CSO1-6	717598	6253459
CSO2-1	716054	6251897
CSO2-13	718666	6252736
CSO3-12	713457	6255853
CSO3-3	714749	6256064
CSO4-1	715834	6256488
CSO4-16	714502	6256170
CSO4-24	714693	6258859
CSO6-50	708486	6264366
CSO8-12	708323	6273270
CSO8-18	707012	6271702
CSO8-6	709468	6273063
CSO9-5	708606	6255532
CSO9-T	708630	6255122
CSP01	714573	6248285
CSP02	714592	6248558
CSP03	714911	6248590
CSP04	716388	6251694
CSP05	717094	6252986
CSP06	716948	6253899
CSP07	717207	6253448
CSP08	717866	6253259
CSP09	718202	6254081
CSP10	718334	6252849
CSP11	717619	6252981

Site Number	EastingGDA94	NorthingGDA94
CSP12	715529	6253231
CSP14	713353	6255787
CSP15	714569	6256222
CSP16	714569	6256222
CSP17	712593	6252690
CSP18	712350	6251644
CSP19	712007	6250110
CSP20	711902	6249229
CSP21	712365	6248864
CSP22	716338	6246561
CSP23	716714	6246393
CSP24	717109	6246231
CSP27	719381	6251460
CSP28	717481	6252827
CSP29	716225	6254082
CSP30	716107	6254909
CSP31	712342	6259845
CSP32	705284	6260355
CSP33	704946	6257897
CSP34	707281	6256008
CSP35	708960	6254960
CSP36	709513	6255014
CSP37	711535	6254866
CSP38	708559	6254248
CSO35	713126	6247229

Appendix B: Survey Sheet Proforma

Full Floristic Survey Sheet

Survey Name		Date	
Site Number		Recorders	
Quadrat Dimensions	20 x 20 / other (specify)	Quadrat Orientation	Along Slope / Other (specify)
Film No		Photo No(s)	
Location (mark site location on topo. map and label with site no.)			
Topographic Map (E & N):	Eastings:	Northings:	
GPS (E & N):	Eastings:	Northings	

GPS Datum	**MGA**	Map Zone No:	Map Sheet Name and Number		Scale	

Current Land Tenure		Property Name	
Current Land Use		Botanical Subdivision	

Physiography:

Elevation		Slope (degrees)		Aspect	
Landform Morphology *		Landform Element*		Landform Pattern *	
Micro-relief (describe fine-scale features eg: sinkhole)					
Mapped Geology		Lithology (field observ.) *		Soil Landscape	
Horizontal Elevation to the horizon(degrees)			Horizon Visibility	Good / Fair / Poor	

N	NE	E	SE	S	SW	W	NW

Soils

Colour (Choose From/Combine)	Brown / Yellow / Red / Black / Grey / White / Other (specify)
Drainage:	Waterlogged / Damp / Well Drained (moist) / Well Drained (dry)
Runoff:	Very Rapid / Rapid / Moderately Rapid / Slow / Very Slow / No Run Off
Texture	Sand / Sandy Loam / Loam / Clay Loam / Clay / Other (specify)
Depth	Deep / Shallow / Skeletal
Erosion	None / Eroded / Aggraded / Both

Disturbance

Type (tick if applicable)	Time since Disturbance (yrs ± accuracy)	Intensity of Disturbance	Basis for Assessment (observation/records)
Fire		Low Intensity / High Intensity	
Grazing		Slight / Moderate / Severe	
Total % cover weeds	N/A		
Total % cover natives	N/A		
Number of hollow trees	N/A		
Total length of logs (m)	N/A		
Regenerating mature overstorey species	N/A	Present / Absent	

Vegetation Structure (incl. Floristic Association [Common or Botanic Name]):	

Stratum	**Growth Form ***	**Height Range(m)**	**Crown Cover%**	**Distrib.**	**Dominant Species (Top 3 Species)**
Emergents					
Upper					
Middle					
Lower					

Non-vascular Groundcover:

%surface rock	%out-cropping rock	%litter	%fungi	%lichens/ bryophytes	%bare ground

Cover Abundance Classes: 1: uncommon & <5% cover
2: common & <5% cover
3: 6 – 20 % cover
4: 21 – 50% cover
5: 51 – 75% cover
6: 75 – 100% cover

Species Name	c/a	Spec. No.	Herb	✓	Species Name	c/a	Spec. No.	Herb	✓

Rapid Data Point Survey Sheet

Site Information

Recorder:		Date:	
Site Number:		GPS coordinates: (In GDA 94 Datum)	
		GPS coordinates: (In GDA 94 Datum)	

Dominant Species

Stratum	**3 dominant Species Name (in order of dominance)**
Upper	
Upper	
Upper	
Mid	
Mid	
Mid	
Ground	
Ground	
Ground	

Condition

Circle	**Good**	**Moderate**	**Poor**

Appendix C: Electronic Data Set - Full Floristic and Rapid Data Point Surveys

(Data only for sites located within the study area).

Data Matrix from Analysis

Scientific Name	CS41	CS42	CS43	CS44	CS45	CS46	CSA1	CSB14	CSB23	CSB24	CSB59	CSO1-2	CSO1-21	CSO1-27	CSO1-35	CSO2-1	CSO2-13	CSO3-12	CSO3-3	CSO4-1	CSO4-16	CSO4-24	CSO6-50	CSO8-12	CSO8-18	CSO8-6	CSO9-T	CSO9-5	CSO1-6	CSP1	CSP10	CSP11	CSP12
Abutilon otocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0
Acacia aneura	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0
Acacia colletioides	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Acacia ligulata	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia melvillei	0	0	0	0	0	0	2	0	1	1	1	3	2	5	0	2	0	0	0	1	0	0	0	0	0	0	0	1	3	0	0	0	0
Acacia sclerophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alectryon oleifolius	0	3	0	3	0	1	0	0	3	0	0	0	0	0	0	0	3	3	4	1	0	0	0	0	0	3	1	0	0	0	0	0	0
Alternanthera sp. A	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amphipogon caricinus var. caricinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema miraculosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Angianthus brachypappus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apophyllum anomalum	0	3	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arabidella nasturtium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex acutibractea	0	0	0	2	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex angulata	0	1	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex eardleyae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex holocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Atriplex leptocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
Atriplex lindleyi	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex stipitata	0	0	0	0	0	0	2	0	2	0	0	0	0	0	1	0	0	2	2	2	2	0	0	0	0	1	1	1	0	0	1	0	0
Austrodanthonia setacea	0	0	0	0	0	0	3	0	0	0	0	2	1	2	2	1	1	1	0	2	0	0	0	2	0	1	1	0	3	0	2	3	0
Austrostipa drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Austrostipa elegantissima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0
Austrostipa eremophila	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0
Austrostipa nitida	1	2	3	3	0	2	4	3	0	4	0	2	2	4	4	2	5	3	4	3	2	4	3	4	2	4	4	4	3	0	5	2	3
Austrostipa platychaeta	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Austrostipa scabra	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Austrostipa tuckeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
Boerhavia dominii	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyscome ciliaris	0	1	0	0	0	0	0	0	1	0	0	0	1	0	3	1	2	2	2	1	2	0	0	0	0	3	0	0	0	0	0	0	0
Brachyscome trachycarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Bulbine semibarbata	0	0	0	0	0	0	0	0	2	0	0	2	0	1	2	0	0	0	1	2	0	0	0	0	0	0	0	2	2	0	2	0	0
Calandrinia eremaea	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callitris glaucophylla	0	0	0	0	2	0	0	0	0	0	0	0	0	0	3	0	0	0	0	4	0	0	0	4	0	0	0	0	0	0	0	0	0
Calotis erinacea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Calotis scapigera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassytha melantha	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Casuarina pauper	0	4	0	0	0	4	0	0	3	3	0	0	0	0	0	0	0	2	4	2	5	0	0	0	0	4	4	0	0	0	0	0	3
Centipeda crateriformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centipeda cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0
Centipeda thespidioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Chamaesyce drummondii	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0	1	1	0	1	0	0	1	0	0	0	0
Cheilanthes sieberi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Chenopodium curvispicatum	0	1	0	0	0	1	1	0	0	0	0	0	2	0	0	3	2	2	2	0	2	0	0	0	0	2	2	2	0	0	0	0	0
Chenopodium desertorum	1	1	1	0	0	1	0	2	2	0	0	0	0	1	0	0	0	0	0	0	0	1	2	1	2	3	0	0	0	0	2	0	0
Chenopodium melanocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chloris truncata	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chrysocephalum apiculatum	0	0	0	0	0	0	0	0	0	0	0	1	1	1	3	0	1	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Chthonocephalus pseudevax	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus clementii	0	0	0	0	1	0	3	0	0	0	0	2	2	2	2	0	1	0	0	1	0	0	0	0	0	0	0	2	2	0	1	0	0
Convolvulus graminetinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus remotus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Crassula colorata	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
Crassula sieberiana	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cryptandra propinqua	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diplachne fusca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dissocarpus paradoxus	0	2	0	2	0	1	2	0	3	2	0	3	3	3	0	0	3	3	2	1	3	0	0	2	0	1	0	2	2	3	0	4	3
Dodonaea bursariifolia	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea viscosa	1	1	0	1	0	0	0	0	0	1	0	0	0	0	2	1	2	1	0	3	0	2	2	0	0	0	1	0	0	0	1	0	0
Dysphania littoralis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Einadia nutans subsp. nutans	0	0	0	0	0	0	1	0	0	0	0	0	1	2	2	0	0	0	0	2	2	3	0	1	0	0	0	1	0	1	0	0	0
Einadia polygonoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Einadia trigonos	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis acuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis pusilla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enchylaena tomentosa	0	2	2	1	0	0	2	0	0	2	0	0	1	2	0	0	2	3	2	2	4	3	1	3	1	2	1	2	0	0	2	0	2

Data Matrix from Analysis

Scientific Name	CS41	CS42	CS43	CS44	CS45	CS46	CSA1	CSB14	CSB23	CSB24	CSB59	CSO1-2	CSO1-21	CSO1-27	CSO1-35	CSO2-1	CSO2-13	CSO3-12	CSO3-3	CSO4-1	CSO4-16	CSO4-24	CSO6-50	CSO8-12	CSO8-18	CSO8-6	CSO9-T	CSO9-5	CSO1-6	CSP1	CSP10	CSP11	CSP12
Enneapogon avenaceus	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	3	0	0	1	0	1	0	2	1	2	0	0	0	0	0	0	0
Enteropogon acicularis	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enteropogon ramosus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epaltes australis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Eragrostis elongata	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis falcata	0	0	0	0	0	0	0	0	0	0	0	4	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis lacunaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Eremophila deserti	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Eremophila glabra	2	0	0	0	0	0	0	0	0	3	0	0	0	0	1	1	0	1	0	0	0	2	0	0	0	0	1	1	0	0	0	1	0
Eremophila longifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Eremophila oppositifolia subsp. rubra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0
Eremophila sturtii	0	0	0	0	0	0	0	0	0	1	0	2	4	1	4	1	4	0	3	3	0	0	0	0	0	0	0	4	1	0	4	0	0
Erodium crinitum	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus costata	1	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus dumosa	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	0	4	0	0	0	0	0	0	0	0
Eucalyptus gracilis	3	0	3	0	0	1	3	0	0	3	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	3	0	0	0	0	0	0
Eucalyptus largiflorens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
Eucalyptus leptophylla	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Eucalyptus socialis	1	0	3	0	1	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	5	0	0	0	0	0	0	0	0
Euchiton sphaericus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eutaxia microphylla	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exocarpos aphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geijera parviflora	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	1	3	0	1	0	0	0	0	0	0	0	0	0	0
Goodenia fascicularis	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Goodenia glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia havilandii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0
Goodenia pinnatifida	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Goodenia willisiana	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea huegelii	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hakea leucoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Halgania cyanea	1	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0
Haloragis odontocarpa	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harmsiodoxa brevipes var. brevipes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heliotropium europaeum	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isoetes muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isolepis australiensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus aridicola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lachnagrostis filiformis	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa leptolepis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Lemooria burkittii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium fasciculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
Lepidium leptopetalum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium monoplocoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Lepidium phlebopetalum	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	1	0	2	1	0
Lepidium pseudohyssopifolium	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptorhynchos baileyi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lysiana exocarpi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Lythrum wilsonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana appressa	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana brevifolia	1	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	3	0
Maireana coronata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0
Maireana decalvans	1	2	2	2	0	3	1	1	2	3	0	0	0	0	0	0	0	0	0	0	1	0	2	0	2	0	2	0	0	0	2	2	3
Maireana georgei	0	0	0	0	0	0	1	0	0	0	0	0	0	2	1	3	0	2	1	1	1	0	2	0	3	1	2	2	0	0	0	1	0
Maireana pentatropis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana pyramidata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Maireana radiata	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3	3	1	3	0	1	0	2	0	4	0	0	0	0	1	2
Maireana sclerolaenoides	0	0	0	0	0	0	2	0	0	0	0	2	0	2	0	0	0	2	3	0	3	0	0	0	0	0	3	0	0	0	0	0	1
Maireana sedifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0
Maireana trichoptera	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana triptera	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	3	2	2	2	2	2	1	0	0	1	3	2	2	0	0	0	0
Maireana turbinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marsdenia australis	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	0	0	0	0	0	1	0
Marsilea drummondii	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marsilea hirsuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria cunninghamii	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Minuria integerrima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CS41	CS42	CS43	CS44	CS45	CS46	CSA1	CSB14	CSB23	CSB24	CSB59	CSO1-2	CSO1-21	CSO1-27	CSO1-35	CSO2-1	CSO2-13	CSO3-12	CSO3-3	CSO4-1	CSO4-16	CSO4-24	CSO6-50	CSO8-12	CSO8-18	CSO8-6	CSO9-T	CSO9-5	CSO1-6	CSP1	CSP10	CSP11	CSP12
Muehlenbeckia florulenta	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Myoporum platycarpum subsp. platyca	2	0	0	0	3	0	3	1	0	3	0	0	0	0	0	0	0	0	1	0	3	0	0	0	0	0	3	1	0	0	1	0	0
Myriophyllum verrucosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nicotiana goodspeedii	0	0	0	0	0	0	2	0	2	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	1	0	0	1	0
Nitraria billardierei	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	1	1	0	0	0
Olearia calcerea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	3	0	0	0	0	0	0
Olearia pimeleoides	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	2	1	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0
Olearia rudis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Omphalolappula concava	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxalis chnoodes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Oxalis perennans	0	0	0	0	0	0	1	0	2	0	0	2	2	1	2	0	1	2	0	2	0	0	0	0	0	0	0	2	2	0	0	1	0
Panicum effusum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Parsonsia eucalyptophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paspalidium constrictum	0	1	2	0	0	0	0	0	0	0	0	0	2	0	2	3	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Pelargonium australe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Persicaria lapathifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pimelea microcephala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0
Pimelea trichostachya	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago debilis	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago turrifera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis canescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Podolepis capillaris	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Polygonum plebeium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portulaca oleracea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudognaphalium luteoalbum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0
Ptilotus exaltatus	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0
Ptilotus obovatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus sessilifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Pycnosorus thompsonianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Radyera farragei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia spinescens	0	0	0	0	0	0	3	0	0	0	0	2	0	2	0	0	0	1	1	1	1	0	0	2	0	1	0	0	1	0	0	0	0
Rhagodia ulicina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Rhodanthe corymbiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe floribunda	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Rumex crystallinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex tenax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rutidosis helichrysoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Scaevola spinescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0
Schenkia spicata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schoenus subaphyllus	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena diacantha	2	3	2	3	2	3	0	2	3	0	0	3	3	3	2	0	2	1	2	2	2	2	2	5	2	3	0	3	3	0	3	1	3
Sclerolaena obliquicuspis	0	0	0	0	0	0	4	0	0	0	0	0	0	3	2	2	3	3	3	0	3	0	0	4	0	5	2	3	2	0	2	0	2
Sclerolaena parviflora	2	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0
Sclerolaena patenticuspis	0	0	1	3	0	1	0	0	0	3	0	0	2	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	1	0	3	0	2
Sclerolaena tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
Senecio glossanthus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio productus subsp. productus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Senecio runcinifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna form taxon 'coriacea'	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0
Senna form taxon 'filifolia'	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Senna form taxon 'petiolaris'	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0
Sida corrugata	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
Sida intricata	0	0	0	0	0	0	1	0	0	0	1	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	1	0
Solanum coactiliferum	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum esuriale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum simile	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Spergularia marina	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0
Sporobolus caroli	0	0	0	0	0	0	1	0	0	0	2	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0
Stemodia florulenta	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Stenopetalum sphaerocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Teucrium albicaule	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teucrium racemosum	0	0	0	0	0	0	0	0	0	0	0	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
Thysanotus baueri	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	2	0	2	0	0	0	0	0	0	0	0
Triodia scariosa subsp. scariosa	4	0	0	0	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0
Triptilodiscus pygmaeus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Velleia arguta	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CS41	CS42	CS43	CS44	CS45	CS46	CSA1	CSB14	CSB23	CSB24	CSB59	CSO1-2	CSO1-21	CSO1-27	CSO1-35	CSO2-1	CSO2-13	CSO3-12	CSO3-3	CSO4-1	CSO4-16	CSO4-24	CSO6-50	CSO8-12	CSO8-18	CSO8-6	CSO9-T	CSO9-5	CSO1-6	CSP1	CSP10	CSP11	CSP12
Verbena gaudichaudii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia blackii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia cervicularis	0	0	0	0	0	0	2	1	0	0	0	1	2	2	3	2	3	2	2	2	2	0	1	0	2	0	1	0	2	0	1	0	1
Vittadinia condyloides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia cuneata	0	0	1	0	2	0	0	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Vittadinia dissecta	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	2	0	0	2	0	0	0	0	0	0	0
Vittadinia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	0	1	0	0	0	0	0
Vittadinia muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia pterochaeta	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Vittadinia sulcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia communis	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0
Wahlenbergia gracilenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia tumidifructa	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Westringia rigida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Xerochrysum bracteatum	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0
Xerochrysum viscosum	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum ammophilum	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum eremaeum	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	2	2	0	3	0	0	0	0	0	2	0	0	0	0	0	0
Zygophyllum glaucum	0	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0
Zygophyllum iodocarpum	0	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	1	0	1	0	2	0	0	0	0	0	0	1	1	0	0	0	1

Data Matrix from Analysis

Scientific Name	CSP14	CSP15	CSP16	CSP17	CSP18	CSP19	CSP2	CSP20	CSP21	CSP22	CSP23	CSP24	CSP27	CSP28	CSP29	CSP3	CSP30	CSP31	CSP32	CSP33	CSP34	CSP35	CSP36	CSP37	CSP38	CSP4	CSP5	CSP6	CSP7	CSP8	CSP9	CAL1_OFF	CSO35
Abutilon otocarpum	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Acacia aneura	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia colletioides	0	0	0	0	1	1	0	1	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia ligulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia melvillei	0	0	1	0	0	0	1	0	0	0	0	0	0	1	2	0	0	0	0	0	0	1	0	3	0	0	0	1	0	1	2	0	3
Acacia sclerophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alectryon oleifolius	3	0	3	3	3	0	0	1	1	1	3	3	3	0	0	0	0	1	0	0	0	0	0	3	0	0	0	0	0	0	1	3	1
Alternanthera sp. A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amphipogon caricinus var. caricinus	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema miraculosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Angianthus brachypappus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
Apophyllum anomalum	0	0	1	0	1	1	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0
Arabidella nasturtium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex acutibractea	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex angulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Atriplex eardleyae	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex holocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex leptocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex lindleyi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex stipitata	2	2	1	2	2	2	0	2	2	2	2	2	2	0	0	0	2	0	1	0	0	2	2	0	2	0	0	0	0	2	0	0	1
Austrodanthonia setacea	1	0	1	1	1	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	1
Austrostipa drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa elegantissima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa eremophila	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa nitida	4	4	3	0	1	1	1	3	2	3	2	0	3	3	4	0	4	3	4	1	0	2	3	1	0	0	0	0	0	3	3	5	1
Austrostipa platychaeta	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Austrostipa scabra	1	0	0	3	2	3	0	2	0	2	0	0	2	1	2	0	2	2	1	2	0	0	0	2	0	0	0	0	0	0	0	0	0
Austrostipa tuckeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boerhavia dominii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyscome ciliaris	2	0	2	2	0	0	0	0	0	1	0	0	0	0	1	0	0	2	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0
Brachyscome trachycarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulbine semibarbata	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	2	2	0	2	2	0	0	0	0	1	2	0	0
Calandrinia eremaea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callitris glaucophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0
Calotis erinacea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis scapigera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Cassytha melantha	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Casuarina pauper	0	4	4	3	3	3	0	3	4	3	3	4	4	1	0	0	3	3	0	1	0	3	3	3	1	0	0	0	0	1	4	0	0
Centipeda crateriformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	2	0	1	0	0	0	0
Centipeda cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	2	0	2	0	0	3	2	0	1	3	1	0	0	0	0
Centipeda thespidioides	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0
Chamaesyce drummondii	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0
Cheilanthes sieberi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium curvispicatum	0	0	0	1	0	3	0	2	1	2	0	3	0	0	0	0	0	1	1	1	0	0	3	1	2	0	0	1	0	1	0	1	0
Chenopodium desertorum	1	1	1	2	0	1	1	1	2	2	3	3	1	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0
Chenopodium melanocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Chloris truncata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chrysocephalum apiculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chthonocephalus pseudevax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus clementii	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus graminetinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus remotus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crassula colorata	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
Crassula sieberiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Cryptandra propinqua	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diplachne fusca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Dissocarpus paradoxus	2	2	3	0	0	2	3	3	0	3	0	2	2	2	0	0	3	3	3	0	0	3	2	0	0	0	0	1	0	3	2	0	1
Dodonaea bursariifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea viscosa	3	0	0	1	1	0	0	1	1	1	0	0	0	0	2	0	0	0	4	4	0	0	3	0	0	0	0	0	0	0	0	1	0
Dysphania littoralis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
Einadia nutans subsp. nutans	1	0	1	0	0	1	1	0	0	0	0	0	1	0	2	1	2	0	0	2	0	1	0	1	0	0	0	0	0	0	0	0	0
Einadia polygonoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Einadia trigonos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis acuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Eleocharis pusilla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Enchylaena tomentosa	2	2	2	2	2	2	1	3	3	2	0	3	1	0	0	0	0	2	0	2	0	2	2	0	0	0	0	0	0	0	2	3	2

Data Matrix from Analysis

Scientific Name	CSP14	CSP15	CSP16	CSP17	CSP18	CSP19	CSP2	CSP20	CSP21	CSP22	CSP23	CSP24	CSP27	CSP28	CSP29	CSP3	CSP30	CSP31	CSP32	CSP33	CSP34	CSP35	CSP36	CSP37	CSP38	CSP4	CSP5	CSP6	CSP7	CSP8	CSP9	CAL1_OFF	CSO35
Enneapogon avenaceus	0	1	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Enteropogon acicularis	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enteropogon ramosus	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	1	0	1	0	0
Epaltes australis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis elongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis falcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis lacunaria	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila deserti	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila glabra	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	1	1	0	1	0	0	0	1	0	0	0	0	0	0	0	1	1
Eremophila longifolia	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila oppositifolia subsp. rubra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila sturtii	0	0	1	0	0	0	0	1	1	1	2	0	1	1	4	0	0	0	0	0	0	4	0	3	4	0	0	0	0	1	0	0	4
Erodium crinitum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus costata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus dumosa	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Eucalyptus gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus largiflorens	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3	0	0	0	0	3	0	0	0	0	3	3	3	3	0	0	0	0
Eucalyptus leptophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus socialis	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0
Euchiton sphaericus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Eutaxia microphylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exocarpos aphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Geijera parviflora	0	0	1	0	0	1	0	3	0	0	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia fascicularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Goodenia glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Goodenia havilandii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia pinnatifida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia willisiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea huegelii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hakea leucoptera	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Halgania cyanea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haloragis odontocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harmsiodoxa brevipes var. brevipes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Heliotropium europaeum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isoetes muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Isolepis australiensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus aridicola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	1	0	0	0	0
Lachnagrostis filiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	1	0	0	0	0	0	3	1	0	0	0	0	0
Leiocarpa leptolepis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lemooria burkittii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium fasciculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium leptopetalum	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium monoplocoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium phlebopetalum	1	1	1	0	0	0	0	0	0	0	0	1	0	0	2	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0
Lepidium pseudohyssopifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptorhynchos baileyi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Lysiana exocarpi	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lythrum wilsonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0
Maireana appressa	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Maireana brevifolia	2	0	0	3	3	0	1	0	3	3	3	3	0	0	0	0	2	0	0	1	0	0	1	0	2	0	0	0	0	0	0	0	1
Maireana coronata	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Maireana decalvans	0	2	2	2	0	2	2	3	3	2	2	2	2	2	3	0	2	2	2	0	0	0	0	2	3	0	0	0	0	1	2	2	0
Maireana georgei	0	1	0	1	0	0	0	0	2	1	0	0	0	0	0	0	2	0	1	0	0	0	1	0	0	0	0	0	0	0	0	2	0
Maireana pentatropis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana pyramidata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana radiata	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana sclerolaenoides	2	0	0	2	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Maireana sedifolia	0	1	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Maireana trichoptera	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Maireana triptera	2	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	1	2	1	2
Maireana turbinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marsdenia australis	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Marsilea drummondii	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	4	0	0	0	0	3	0	0	2	0	0	3	0	0	0	0	0	0
Marsilea hirsuta	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Minuria cunninghamii	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	1	3	0	0
Minuria integerrima	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSP14	CSP15	CSP16	CSP17	CSP18	CSP19	CSP2	CSP20	CSP21	CSP22	CSP23	CSP24	CSP27	CSP28	CSP29	CSP3	CSP30	CSP31	CSP32	CSP33	CSP34	CSP35	CSP36	CSP37	CSP38	CSP4	CSP5	CSP6	CSP7	CSP8	CSP9	CAL1_OFF	CSO35
Muehlenbeckia florulenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myoporum platycarpum subsp. platyca	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0
Myriophyllum verrucosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	4	2	2	0	0	0	0
Nicotiana goodspeedii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	2	0	0	2	0	0	0	0	0
Nitraria billardierei	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0
Olearia calcerea	0	0	0	0	0	0	0	0	0	0	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olearia pimeleoides	1	0	0	2	2	0	0	1	1	1	2	0	0	0	2	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0
Olearia rudis	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Omphalolappula concava	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Oxalis chnoodes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxalis perennans	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	1	1	2
Panicum effusum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0
Parsonsia eucalyptophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Paspalidium constrictum	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Pelargonium australe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Persicaria lapathifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	2	0	0	0	0
Pimelea microcephala	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Pimelea trichostachya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago debilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago turrifera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Podolepis canescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis capillaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polygonum plebeium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	3	2	2	2	0	0	0	0
Portulaca oleracea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudognaphalium luteoalbum	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	1	0	2	3	4	3	0	0	0	0
Ptilotus exaltatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus obovatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus sessilifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pycnosorus thompsonianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Radyera farragei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Rhagodia spinescens	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	2
Rhagodia ulicina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe corymbiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0
Rhodanthe floribunda	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex crystallinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	1	0	0	0	0
Rumex tenax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	2	1	2	0	0	0	0	0
Rutidosis helichrysoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scaevola spinescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schenkia spicata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Schoenus subaphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena diacantha	3	3	3	2	3	3	0	3	3	3	3	3	3	0	0	0	3	2	2	2	0	2	3	2	3	0	0	0	0	2	3	2	2
Sclerolaena obliquicuspis	1	0	2	0	0	2	0	0	0	2	2	2	0	3	0	0	2	0	0	0	0	2	2	1	1	0	0	0	0	0	0	0	1
Sclerolaena parviflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena patenticuspis	0	0	0	2	3	0	3	0	0	0	3	0	0	4	1	0	0	0	0	0	0	2	3	0	0	0	0	0	0	2	0	0	0
Sclerolaena tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Senecio glossanthus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio productus subsp. productus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0
Senecio runcinifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	2	0	0	0	0
Senna form taxon 'coriacea'	1	0	0	0	1	2	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
Senna form taxon 'filifolia'	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna form taxon 'petiolaris'	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Sida corrugata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida intricata	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0
Solanum coactiliferum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum esuriale	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum simile	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spergularia marina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0
Sporobolus caroli	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Stemodia florulenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	1	0	0	0	1	0	0	1	2	0	0	0	0
Stenopetalum sphaerocarpum	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Teucrium albicaule	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0
Teucrium racemosum	0	0	0	0	0	0	3	0	0	0	0	0	0	0	2	0	0	0	2	3	0	0	0	2	2	0	0	0	0	0	0	0	2
Thysanotus baueri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triodia scariosa subsp. scariosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triptilodiscus pygmaeus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Velleia arguta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSP14	CSP15	CSP16	CSP17	CSP18	CSP19	CSP2	CSP20	CSP21	CSP22	CSP23	CSP24	CSP27	CSP28	CSP29	CSP3	CSP30	CSP31	CSP32	CSP33	CSP34	CSP35	CSP36	CSP37	CSP38	CSP4	CSP5	CSP6	CSP7	CSP8	CSP9	CAL1_OFF	CSO35
Verbena gaudichaudii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	0	0	0	0
Vittadinia blackii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia cervicularis	0	0	0	1	0	2	0	0	1	0	0	0	1	1	2	0	0	2	0	1	0	1	0	0	2	0	0	0	0	0	0	0	1
Vittadinia condyloides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia cuneata	2	2	2	2	0	2	0	2	2	0	0	0	0	0	0	0	0	0	0	3	0	1	2	0	0	0	0	0	0	0	1	1	0
Vittadinia dissecta	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	2	1
Vittadinia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Vittadinia muelleri	0	0	0	0	0	0	0	0	0	2	1	1	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Vittadinia pterochaeta	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Vittadinia sulcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia communis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia gracilenta	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia tumidifructa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	2	2	0	0	1	0	1	0	0	0
Westringia rigida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Xerochrysum bracteatum	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Xerochrysum viscosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum ammophilum	0	2	0	1	1	0	0	3	0	1	0	0	0	2	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
Zygophyllum eremaeum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum glaucum	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0
Zygophyllum iodocarpum	1	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Species from Rapid Data Point Sites

Site No.	Stratum	Dominant Species	Site No.	Stratum	Dominant Species
1	Upper	Alectryon oleifolius	9	Ground	Austrostipa scabra
1	Mid	Atriplex stipitata	9	Mid	Eucalyptus gracilis
1	Ground	Austrostipa scabra	9	Mid	Eucalyptus socialis
1	Upper	Casuarina pauper	9	Mid	Maireana decalvans
1	Mid	Dodonaea viscosa subsp.angustissima	9	Mid	Myoporum platycarpum subsp. platycarpum
1	Mid	Eucalyptus gracilis	9	Mid	Olearia calcerea
1	Mid	Maireana decalvans	10	Upper	Alectryon oleifolius
2	Upper	Alectryon oleifolius	10	Mid	Atriplex stipitata
2	Ground	Austrostipa nitida	10	Ground	Austrostipa scabra
2	Ground	Austrostipa scabra	10	Upper	Casuarina pauper
2	Upper	Casuarina pauper	10	Mid	Dodonaea viscosa subsp.angustissima
2	Mid	Eucalyptus gracilis	10	Mid	Eremophila glabra
2	Mid	Myoporum platycarpum subsp. platycarpum	10	Mid	Eucalyptus dumosa
2	Mid	Sclerolaena patenticuspis	10	Mid	Eucalyptus dumosa
3	Upper	Alectryon oleifolius	10	Mid	Eucalyptus gracilis
3	Mid	Apophyllum anomalum	10	Mid	Maireana decalvans
3	Ground	Austrostipa scabra	10	Mid	Myoporum platycarpum subsp. platycarpum
3	Upper	Casuarina pauper	11	Ground	Austrostipa scabra
3	Mid	Dissocarpus paradoxus	11	Mid	Eucalyptus leptophylla
3	Mid	Enchylaena tomentosa	11	Upper	Geijera parviflora
3	Mid	Myoporum platycarpum subsp. platycarpum	11	Mid	Maireana decalvans
4	Mid	Acacia colletioides	11	Ground	Maireana radiata
4	Upper	Alectryon oleifolius	12	Mid	Dodonaea viscosa subsp.angustissima
4	Mid	Apophyllum anomalum	12	Mid	Eucalyptus gracilis
4	Ground	Austrostipa scabra	12	Mid	Eucalyptus socialis
4	Mid	Bossiaea walkeri	12	Mid	Maireana decalvans
4	Mid	Eucalyptus dumosa	12	Mid	Olearia pimeloides
4	Mid	Eucalyptus socialis	12	Mid	Senna form taxon 'petiolaris'
4	Mid	Maireana decalvans	12	Ground	Triodia scariosa subsp. scariosa
4	Mid	Senna form taxon 'petiolaris'	13	Ground	Austrostipa scabra
4	Ground	Zygophyllum glaucum	13	Upper	Callitris glaucophylla
5	Mid	Eucalyptus costata	13	Mid	Dodonaea viscosa subsp.angustissima
5	Mid	Eucalyptus dumosa	13	Mid	Maireana decalvans
5	Mid	Eucalyptus socialis	13	Ground	Vittadinia cervicularis
5	Upper	Geijera parviflora	14	Ground	Austrostipa nitida
5	Ground	Halgania cyanea	14	Ground	Austrostipa scabra
5	Mid	Maireana decalvans	14	Mid	Dodonaea viscosa subsp.angustissima
5	Mid	Senna form taxon 'coriacea'	14	Mid	Eucalyptus gracilis
5	Ground	Triodia scariosa subsp. scariosa	14	Mid	Eucalyptus socialis
6	Upper	Alectryon oleifolius	14	Mid	Maireana decalvans
6	Ground	Austrostipa scabra	14	Ground	Vittadinia cervicularis
6	Mid	Enchylaena tomentosa	15	Ground	Austrostipa scabra
6	Mid	Eremophila glabra	15	Mid	Eucalyptus gracilis
6	Mid	Eucalyptus dumosa	15	Mid	Eucalyptus socialis
6	Mid	Eucalyptus gracilis	15	Mid	Maireana decalvans
6	Mid	Maireana decalvans	15	Ground	Triodia scariosa subsp. scariosa
6	Mid	Senna form taxon 'petiolaris'	16	Ground	Austrostipa scabra
7	Mid	Acacia colletioides	16	Mid	Bossiaea walkeri
7	Mid	Apophyllum anomalum	16	Mid	Eucalyptus costata
7	Ground	Austrostipa scabra	16	Mid	Eucalyptus gracilis
7	Mid	Dissocarpus paradoxus	16	Ground	Halgania cyanea
7	Mid	Dodonaea viscosa subsp.angustissima	16	Ground	Triodia scariosa subsp. scariosa
7	Mid	Eucalyptus dumosa	17	Ground	Austrodanthonia setacea
7	Mid	Eucalyptus gracilis	17	Mid	Eucalyptus costata
7	Mid	Maireana decalvans	17	Mid	Eucalyptus dumosa
8	Mid	Acacia colletioides	17	Mid	Eucalyptus dumosa
8	Upper	Alectryon oleifolius	17	Mid	Eucalyptus socialis
8	Ground	Austrostipa scabra	17	Mid	Maireana decalvans
8	Mid	Eucalyptus gracilis	17	Ground	Triodia scariosa subsp. scariosa
8	Mid	Grevillea huegelii	17	Ground	Vittadinia cervicularis
8	Ground	Maireana brevifolia	18	Upper	Alectryon oleifolius
8	Mid	Maireana decalvans	18	Ground	Austrostipa nitida
8	Mid	Myoporum platycarpum subsp. platycarpum	18	Ground	Austrostipa scabra
9	Mid	Acacia colletioides	18	Mid	Eucalyptus gracilis
9	Upper	Alectryon oleifolius	18	Mid	Maireana decalvans

Species from Rapid Data Point Sites

Site No.	Stratum	Dominant Species	Site No.	Stratum	Dominant Species
18	Mid	Myoporum platycarpum subsp. platycarpum	29	Mid	Eucalyptus dumosa
19	Upper	Alectryon oleifolius	29	Mid	Eucalyptus gracilis
19	Mid	Apophyllum anomalum	29	Mid	Eucalyptus socialis
19	Ground	Austrostipa nitida	29	Mid	Maireana decalvans
19	Upper	Casuarina pauper	29	Ground	Triodia scariosa subsp. scariosa
19	Mid	Eremophila sturtii	30	Mid	Acacia melvillei
19	Mid	Eucalyptus gracilis	30	Upper	Alectryon oleifolius
19	Mid	Myoporum platycarpum subsp. platycarpum	30	Ground	Austrostipa nitida
19	Mid	Sclerolaena patenticuspis	30	Ground	Austrostipa scabra
20	Ground	Austrostipa nitida	30	Upper	Casuarina pauper
20	Ground	Austrostipa scabra	30	Ground	Maireana brevifolia
20	Mid	Dodonaea viscosa subsp.angustissima	30	Mid	Myoporum platycarpum subsp. platycarpum
20	Mid	Eremophila sturtii	31	Mid	Acacia ligulata
20	Mid	Eucalyptus dumosa	31	Ground	Austrostipa nitida
20	Mid	Eucalyptus gracilis	31	Mid	Eremophila sturtii
20	Mid	Eucalyptus socialis	31	Mid	Eucalyptus dumosa
20	Ground	Maireana brevifolia	31	Mid	Eucalyptus gracilis
21	Upper	Alectryon oleifolius	31	Mid	Maireana decalvans
21	Ground	Austrostipa nitida	31	Mid	Nitraria billardierei
21	Mid	Eucalyptus gracilis	31	Mid	Senna form taxon 'coriacea'
21	Mid	Maireana decalvans	32	Upper	Alectryon oleifolius
21	Ground	Vittadinia cervicularis	32	Mid	Apophyllum anomalum
22	Ground	Austrostipa nitida	32	Ground	Austrostipa nitida
22	Ground	Austrostipa scabra	32	Upper	Casuarina pauper
22	Mid	Dodonaea viscosa subsp.angustissima	32	Mid	Enchylaena tomentosa
22	Mid	Eremophila sturtii	32	Mid	Eremophila sturtii
22	Ground	Vittadinia cervicularis	32	Ground	Maireana brevifolia
23	Ground	Austrostipa scabra	33	Ground	Austrostipa nitida
23	Upper	Callitris glaucophylla	33	Mid	Eremophila glabra
23	Mid	Dissocarpus paradoxus	33	Mid	Eucalyptus gracilis
23	Mid	Dodonaea viscosa subsp.angustissima	33	Mid	Eucalyptus socialis
23	Mid	Eremophila sturtii	33	Mid	Maireana decalvans
23	Ground	Vittadinia cervicularis	33	Mid	Sclerolaena patenticuspis
24	Ground	Austrostipa scabra	34	Ground	Austrostipa nitida
24	Mid	Dodonaea viscosa subsp.angustissima	34	Mid	Eremophila glabra
24	Mid	Sclerolaena patenticuspis	34	Mid	Eremophila sturtii
24	Ground	Triodia scariosa subsp. scariosa	34	Mid	Eucalyptus dumosa
25	Ground	Atriplex angulata	34	Mid	Eucalyptus gracilis
25	Ground	Austrostipa scabra	34	Mid	Maireana decalvans
25	Upper	Casuarina pauper	34	Mid	Sclerolaena diacantha
25	Mid	Eremophila sturtii	35	Ground	Austrostipa nitida
25	Mid	Eucalyptus gracilis	35	Mid	Eremophila sturtii
25	Mid	Maireana decalvans	35	Mid	Eucalyptus dumosa
25	Mid	Sclerolaena diacantha	35	Mid	Eucalyptus gracilis
26	Ground	Austrostipa scabra	35	Mid	Maireana decalvans
26	Mid	Eremophila glabra	35	Mid	Senna form taxon 'coriacea'
26	Mid	Eucalyptus dumosa	36	Mid	Dodonaea viscosa subsp.angustissima
26	Mid	Eucalyptus gracilis	36	Mid	Eremophila glabra
26	Mid	Maireana decalvans	36	Mid	Eucalyptus dumosa
26	Ground	Triodia scariosa subsp. scariosa	36	Mid	Maireana decalvans
27	Mid	Acacia colletioides	36	Mid	Sclerolaena diacantha
27	Upper	Alectryon oleifolius	36	Ground	Triodia scariosa subsp. scariosa
27	Ground	Austrostipa scabra	37	Ground	Austrostipa nitida
27	Mid	Dissocarpus paradoxus	37	Ground	Austrostipa scabra
27	Mid	Dodonaea viscosa subsp.angustissima	37	Upper	Casuarina pauper
27	Mid	Eucalyptus gracilis	37	Mid	Dodonaea viscosa subsp.angustissima
27	Mid	Eucalyptus socialis	37	Mid	Eremophila sturtii
27	Mid	Maireana decalvans	37	Mid	Maireana decalvans
28	Mid	Eucalyptus dumosa	38	Ground	Austrostipa scabra
28	Mid	Eucalyptus leptophylla	38	Mid	Dodonaea viscosa subsp.angustissima
28	Mid	Eucalyptus socialis	38	Mid	Eremophila glabra
28	Ground	Halgania cyanea	38	Mid	Eucalyptus dumosa
28	Ground	Triodia scariosa subsp. scariosa	38	Mid	Eucalyptus gracilis
29	Ground	Austrostipa scabra	38	Mid	Maireana decalvans
29	Ground	Austrostipa scabra	38	Ground	Triodia scariosa subsp. scariosa

Species from Rapid Data Point Sites

Site No.	Stratum	Dominant Species	Site No.	Stratum	Dominant Species
39	Ground	Austrostipa nitida	48	Mid	Westringia rigida
39	Ground	Austrostipa scabra	49	Ground	Austrostipa scabra
39	Upper	Casuarina pauper	49	Mid	Eremophila glabra
39	Mid	Eremophila sturtii	49	Mid	Eucalyptus costata
39	Ground	Salvia verbenaca	49	Mid	Eucalyptus gracilis
40	Upper	Alectryon oleifolius	49	Mid	Eucalyptus socialis
40	Ground	Austrostipa nitida	49	Mid	Maireana decalvans
40	Upper	Casuarina pauper	49	Mid	Senna form taxon 'coriacea'
40	Mid	Eremophila sturtii	49	Mid	Senna form taxon 'petiolaris'
40	Mid	Eucalyptus socialis	49	Ground	Triodia scariosa subsp. scariosa
40	Mid	Myoporum platycarpum subsp. platycarpum	50	Mid	Maireana decalvans
40	Mid	Myoporum platycarpum subsp. platycarpum	50	Upper	Alectryon oleifolius
40	Mid	Sclerolaena diacantha	50	Ground	Austrostipa nitida
40	Ground	Vittadinia cervicularis	50	Mid	Eucalyptus socialis
41	Mid	Chenopodium curvispicatum	50	Mid	Senna form taxon 'coriacea'
41	Mid	Dodonaea viscosa subsp.angustissima	50	Mid	Senna form taxon 'petiolaris'
41	Mid	Eucalyptus dumosa	50	Ground	Zygophyllum glaucum
41	Mid	Eucalyptus gracilis	51	Mid	Acacia colletioides
41	Mid	Maireana decalvans	51	Upper	Alectryon oleifolius
41	Mid	Sclerolaena patenticuspis	51	Mid	Apophyllum anomalum
42	Upper	Alectryon oleifolius	51	Ground	Austrostipa nitida
42	Ground	Austrostipa nitida	51	Upper	Casuarina pauper
42	Upper	Casuarina pauper	51	Mid	Eucalyptus gracilis
42	Mid	Chenopodium curvispicatum	51	Mid	Grevillea huegelii
42	Mid	Dissocarpus paradoxus	51	Ground	Maireana brevifolia
42	Mid	Dodonaea viscosa subsp.angustissima	51	Mid	Myoporum platycarpum subsp. platycarpum
42	Mid	Enchylaena tomentosa	51	Mid	Scaevola spinescens
42	Mid	Eremophila sturtii	51	Mid	Senna form taxon 'coriacea'
42	Mid	Eucalyptus dumosa	52	Mid	Eucalyptus costata
43	Ground	Austrostipa scabra	52	Mid	Eucalyptus dumosa
43	Mid	Dodonaea viscosa subsp.angustissima	52	Mid	Eucalyptus socialis
43	Mid	Eucalyptus dumosa	52	Ground	Halgania cyanea
43	Mid	Eucalyptus gracilis	52	Mid	Maireana decalvans
43	Ground	Vittadinia dissecta	52	Mid	Myoporum platycarpum subsp. platycarpum
45	Ground	Austrostipa nitida	52	Ground	Triodia scariosa subsp. scariosa
45	Mid	Bossiaea walkeri	53	Ground	Atriplex acutibractea subs. acutibractea
45	Mid	Dodonaea viscosa subsp.angustissima	53	Mid	Eremophila glabra
45	Mid	Eucalyptus dumosa	53	Mid	Eucalyptus costata
45	Mid	Eucalyptus gracilis	53	Mid	Eucalyptus dumosa
45	Mid	Grevillea huegelii	53	Mid	Eucalyptus gracilis
45	Mid	Maireana decalvans	53	Mid	Eucalyptus socialis
45	Ground	Triodia scariosa subsp. scariosa	53	Mid	Maireana decalvans
45	Ground	Vittadinia dissecta	53	Mid	Maireana decalvans
46	Upper	Casuarina pauper	53	Mid	Sclerolaena diacantha
46	Mid	Eucalyptus costata	53	Mid	Senna form taxon 'coriacea'
46	Mid	Eucalyptus socialis	53	Mid	Senna form taxon 'petiolaris'
46	Ground	Maireana brevifolia	54	Ground	Austrostipa nitida
46	Mid	Maireana decalvans	54	Mid	Dodonaea viscosa subsp.angustissima
46	Mid	Myoporum platycarpum subsp. platycarpum	54	Mid	Eremophila glabra
46	Mid	Sclerolaena patenticuspis	54	Mid	Eucalyptus costata
46	Mid	Senna form taxon 'coriacea'	54	Mid	Eucalyptus dumosa
46	Mid	Senna form taxon 'petiolaris'	54	Mid	Eucalyptus dumosa
47	Mid	Eucalyptus dumosa	54	Ground	Panicum effusum
47	Mid	Eucalyptus socialis	54	Mid	Senna form taxon 'coriacea'
47	Ground	Maireana brevifolia	54	Ground	Triodia scariosa subsp. scariosa
47	Mid	Maireana decalvans	55	Mid	Dodonaea viscosa subsp.angustissima
47	Mid	Myoporum platycarpum subsp. platycarpum	55	Mid	Eucalyptus costata
47	Mid	Westringia rigida	55	Mid	Eucalyptus dumosa
48	Mid	Eucalyptus dumosa	55	Mid	Eucalyptus socialis
48	Mid	Eucalyptus socialis	55	Mid	Maireana decalvans
48	Ground	Maireana brevifolia	55	Mid	Myoporum platycarpum subsp. platycarpum
48	Mid	Maireana decalvans	55	Ground	Triodia scariosa subsp. scariosa
48	Mid	Sclerolaena diacantha	55	Ground	Vittadinia dissecta
48	Mid	Senna form taxon 'coriacea'	56	Ground	Austrostipa nitida
48	Mid	Senna form taxon 'petiolaris'	56	Mid	Eucalyptus costata

Species from Rapid Data Point Sites

Site No.	Stratum	Dominant Species	Site No.	Stratum	Dominant Species
56	Mid	Eucalyptus dumosa	64	Mid	Myoporum platycarpum subsp. platycarpum
56	Ground	Halgania cyanea	64	Mid	Sclerolaena diacantha
56	Mid	Sclerolaena diacantha	64	Mid	Senna form taxon 'petiolaris'
56	Mid	Senna form taxon 'petiolaris'	65	Mid	Acacia colletioides
56	Ground	Triodia scariosa subsp. scariosa	65	Ground	Austrostipa scabra
57	Upper	Alectryon oleifolius	65	Mid	Dodonaea viscosa subsp.angustissima
57	Ground	Atriplex angulata	65	Mid	Eucalyptus costata
57	Upper	Casuarina pauper	65	Mid	Eucalyptus dumosa
57	Mid	Chenopodium curvispicatum	65	Ground	Halgania cyanea
57	Mid	Eucalyptus socialis	65	Mid	Senna form taxon 'petiolaris'
57	Mid	Sclerolaena patenticuspis	65	Ground	Triodia scariosa subsp. scariosa
58	Ground	Austrostipa scabra	66	Ground	Austrostipa scabra
58	Mid	Dodonaea viscosa subsp.angustissima	66	Mid	Eremophila glabra
58	Mid	Eremophila glabra	66	Mid	Eucalyptus gracilis
58	Mid	Eucalyptus dumosa	66	Mid	Eucalyptus socialis
58	Mid	Eucalyptus socialis	66	Mid	Maireana decalvans
58	Mid	Maireana decalvans	66	Mid	Senna form taxon 'petiolaris'
58	Mid	Senna form taxon 'petiolaris'	66	Ground	Vittadinia cervicularis
58	Ground	Triodia scariosa subsp. scariosa	67	Mid	Bossiaea walkeri
59	Mid	Acacia colletioides	67	Mid	Eucalyptus costata
59	Upper	Alectryon oleifolius	67	Mid	Eucalyptus dumosa
59	Ground	Atriplex acutibractea subs. acutibractea	67	Mid	Eucalyptus gracilis
59	Ground	Austrostipa nitida	67	Ground	Lomandra leucocephala
59	Upper	Casuarina pauper	67	Mid	Maireana decalvans
59	Mid	Dodonaea viscosa subsp.angustissima	67	Mid	Myoporum platycarpum subsp. platycarpum
59	Mid	Maireana decalvans	67	Mid	Olearia pimeloides
59	Mid	Myoporum platycarpum subsp. platycarpum	67	Mid	Senna form taxon 'petiolaris'
59	Mid	Senna form taxon 'coriacea'	67	Ground	Triodia scariosa subsp. scariosa
60	Upper	Alectryon oleifolius	68	Ground	Austrostipa scabra
60	Mid	Apophyllum anomalum	68	Mid	Bossiaea walkeri
60	Ground	Austrostipa nitida	68	Mid	Dodonaea viscosa subsp.angustissima
60	Ground	Austrostipa scabra	68	Mid	Eremophila glabra
60	Upper	Callitris glaucophylla	68	Mid	Eucalyptus costata
60	Mid	Dodonaea viscosa subsp.angustissima	68	Mid	Eucalyptus gracilis
60	Mid	Maireana decalvans	68	Mid	Eucalyptus socialis
60	Mid	Senna form taxon 'coriacea'	68	Mid	Maireana decalvans
61	Ground	Austrostipa scabra	68	Ground	Triodia scariosa subsp. scariosa
61	Mid	Dodonaea bursariifolia	69	Ground	Austrostipa scabra
61	Mid	Eucalyptus dumosa	69	Mid	Eremophila glabra
61	Mid	Eucalyptus dumosa	69	Mid	Eremophila sturtii
61	Mid	Senna form taxon 'coriacea'	69	Mid	Eucalyptus dumosa
61	Mid	Senna form taxon 'petiolaris'	69	Mid	Eucalyptus socialis
61	Ground	Triodia scariosa subsp. scariosa	69	Mid	Maireana decalvans
61	Ground	Vittadinia cervicularis	69	Mid	Sclerolaena patenticuspis
62	Upper	Alectryon oleifolius	69	Mid	Senna form taxon 'coriacea'
62	Upper	Casuarina pauper	70	Mid	Acacia colletioides
62	Mid	Chenopodium curvispicatum	70	Ground	Austrostipa scabra
62	Mid	Enchylaena tomentosa	70	Mid	Eucalyptus dumosa
62	Mid	Eucalyptus dumosa	70	Mid	Eucalyptus gracilis
62	Ground	Maireana brevifolia	70	Mid	Eucalyptus socialis
62	Mid	Senna form taxon 'coriacea'	70	Mid	Maireana decalvans
62	Mid	Senna form taxon 'petiolaris'	70	Ground	Triodia scariosa subsp. scariosa
63	Ground	Austrostipa scabra	71	Mid	Apophyllum anomalum
63	Mid	Eremophila glabra	71	Ground	Austrostipa nitida
63	Mid	Eucalyptus gracilis	71	Ground	Austrostipa scabra
63	Mid	Eucalyptus socialis	71	Upper	Casuarina pauper
63	Mid	Maireana decalvans	71	Mid	Dodonaea viscosa subsp.angustissima
63	Mid	Sclerolaena patenticuspis	71	Mid	Eremophila sturtii
63	Mid	Senna form taxon 'coriacea'	71	Mid	Eucalyptus dumosa
63	Mid	Senna form taxon 'petiolaris'	71	Mid	Eucalyptus socialis
64	Mid	Acacia colletioides	71	Mid	Sclerolaena patenticuspis
64	Mid	Apophyllum anomalum	72	Ground	Austrostipa nitida
64	Upper	Casuarina pauper	72	Ground	Austrostipa scabra
64	Mid	Chenopodium curvispicatum	72	Mid	Dodonaea viscosa subsp.angustissima
64	Mid	Dodonaea viscosa subsp.angustissima	72	Mid	Eremophila sturtii

Species from Rapid Data Point Sites

Site No.	Stratum	Dominant Species	Site No.	Stratum	Dominant Species
72	Ground	Leiocarpa leptolepis	82	Mid	Sclerolaena diacantha
73	Ground	Austrostipa scabra	82	Mid	Sclerolaena patenticuspis
73	Mid	Eucalyptus gracilis	83	Ground	Austrostipa scabra
73	Mid	Eucalyptus socialis	83	Mid	Bossiaea walkeri
73	Mid	Maireana decalvans	83	Mid	Dodonaea viscosa subsp.angustissima
73	Ground	Triodia scariosa subsp. scariosa	83	Mid	Eucalyptus costata
74	Mid	Eucalyptus costata	83	Mid	Eucalyptus socialis
74	Mid	Eucalyptus socialis	83	Mid	Maireana decalvans
74	Mid	Maireana decalvans	83	Mid	Myoporum platycarpum subsp. platycarpum
74	Mid	Senna form taxon 'petiolaris'	83	Ground	Triodia scariosa subsp. scariosa
74	Ground	Triodia scariosa subsp. scariosa	84	Mid	Dodonaea viscosa subsp.angustissima
74	Ground	Vittadinia dissecta	84	Mid	Eremophila glabra
75	Ground	Austrostipa scabra	84	Mid	Eucalyptus costata
75	Mid	Eremophila glabra	84	Mid	Eucalyptus socialis
75	Mid	Eucalyptus costata	84	Mid	Maireana decalvans
75	Mid	Eucalyptus socialis	84	Mid	Sclerolaena patenticuspis
75	Mid	Sclerolaena patenticuspis	84	Mid	Senna form taxon 'petiolaris'
75	Ground	Triodia scariosa subsp. scariosa	84	Ground	Triodia scariosa subsp. scariosa
76	Mid	Eucalyptus costata	85	Mid	Acacia colletioides
76	Mid	Eucalyptus socialis	85	Ground	Austrostipa scabra
76	Ground	Halgania cyanea	85	Mid	Dodonaea viscosa subsp.angustissima
76	Mid	Sclerolaena parviflora	85	Mid	Eremophila sturtii
76	Mid	Senna form taxon 'petiolaris'	85	Mid	Eucalyptus socialis
76	Ground	Triodia scariosa subsp. scariosa	85	Upper	Geijera parviflora
77	Ground	Austrostipa scabra	85	Mid	Maireana decalvans
77	Mid	Bossiaea walkeri	86	Ground	Austrostipa scabra
77	Mid	Chenopodium curvispicatum	86	Upper	Casuarina pauper
77	Mid	Eucalyptus socialis	86	Mid	Chenopodium curvispicatum
77	Ground	Halgania cyanea	86	Mid	Dodonaea viscosa subsp.angustissima
77	Mid	Maireana decalvans	86	Mid	Eucalyptus dumosa
77	Ground	Triodia scariosa subsp. scariosa	86	Mid	Maireana decalvans
78	Ground	Austrostipa scabra	86	Mid	Senna form taxon 'coriacea'
78	Mid	Eucalyptus dumosa	87	Mid	Acacia colletioides
78	Mid	Eucalyptus gracilis	87	Ground	Austrostipa nitida
78	Mid	Eucalyptus socialis	87	Ground	Austrostipa scabra
78	Mid	Maireana decalvans	87	Upper	Casuarina pauper
78	Mid	Sclerolaena patenticuspis	87	Mid	Dodonaea viscosa subsp.angustissima
79	Upper	Alectryon oleifolius	87	Mid	Eucalyptus dumosa
79	Mid	Apophyllum anomalum	87	Mid	Grevillea huegelii
79	Ground	Austrostipa scabra	87	Mid	Maireana decalvans
79	Upper	Casuarina pauper	87	Mid	Sclerolaena patenticuspis
79	Mid	Chenopodium curvispicatum	88	Mid	Eremophila glabra
79	Mid	Eucalyptus socialis	88	Mid	Eucalyptus dumosa
79	Mid	Maireana decalvans	88	Mid	Eucalyptus gracilis
80	Ground	Austrostipa nitida	88	Ground	Maireana brevifolia
80	Mid	Dodonaea viscosa subsp.angustissima	88	Mid	Maireana decalvans
80	Mid	Eucalyptus dumosa	88	Mid	Myoporum platycarpum subsp. platycarpum
80	Mid	Eucalyptus gracilis	88	Mid	Nitraria billardierei
80	Mid	Eucalyptus socialis	89	Mid	Eucalyptus dumosa
80	Mid	Maireana decalvans	89	Mid	Eucalyptus gracilis
80	Mid	Sclerolaena patenticuspis	89	Mid	Eucalyptus socialis
80	Mid	Senna form taxon 'coriacea'	89	Ground	Maireana brevifolia
80	Mid	Senna form taxon 'petiolaris'	89	Mid	Maireana decalvans
81	Ground	Austrostipa scabra	89	Mid	Sclerolaena diacantha
81	Mid	Dodonaea viscosa subsp.angustissima	89	Mid	Senna form taxon 'petiolaris'
81	Mid	Eucalyptus dumosa	90	Mid	Eucalyptus dumosa
81	Mid	Eucalyptus socialis	90	Mid	Eucalyptus socialis
81	Mid	Maireana decalvans	90	Ground	Maireana brevifolia
81	Mid	Olearia pimeloides	90	Mid	Maireana decalvans
81	Mid	Sclerolaena patenticuspis	90	Mid	Myoporum platycarpum subsp. platycarpum
81	Mid	Senna form taxon 'petiolaris'	90	Mid	Sclerolaena patenticuspis
82	Ground	Austrostipa scabra	90	Mid	Senna form taxon 'coriacea'
82	Mid	Dodonaea viscosa subsp.angustissima	91	Upper	Alectryon oleifolius
82	Mid	Eucalyptus dumosa	91	Mid	Apophyllum anomalum
82	Mid	Eucalyptus socialis	91	Ground	Austrostipa scabra

Species from Rapid Data Point Sites

Site No.	Stratum	Dominant Species	Site No.	Stratum	Dominant Species
91	Mid	Chenopodium curvispicatum	99	Mid	Apophyllum anomalum
91	Mid	Eucalyptus costata	99	Ground	Austrostipa scabra
91	Upper	Geijera parviflora	99	Upper	Casuarina pauper
91	Mid	Grevillea huegelii	99	Mid	Chenopodium curvispicatum
91	Mid	Maireana decalvans	99	Mid	Dodonaea viscosa subsp.angustissima
91	Mid	Scaevola spinescens	99	Mid	Eremophila sturtii
92	Upper	Alectryon oleifolius	99	Upper	Geijera parviflora
92	Mid	Atriplex stipitata	99	Ground	Maireana brevifolia
92	Upper	Casuarina pauper	99	Mid	Senna form taxon 'coriacea'
92	Upper	Geijera parviflora	99	Mid	Senna form taxon 'petiolaris'
92	Mid	Maireana decalvans	100	Mid	Chenopodium curvispicatum
92	Mid	Sclerolaena patenticuspis	100	Mid	Eucalyptus dumosa
92	Mid	Senna form taxon 'coriacea'	100	Mid	Eucalyptus gracilis
92	Mid	Senna form taxon 'petiolaris'	100	Mid	Eucalyptus socialis
93	Mid	Acacia colletioides	100	Mid	Maireana decalvans
93	Mid	Eucalyptus gracilis	100	Mid	Sclerolaena diacantha
93	Mid	Eucalyptus socialis	100	Mid	Senna form taxon 'coriacea'
93	Mid	Grevillea huegelii	100	Mid	Senna form taxon 'petiolaris'
93	Mid	Maireana decalvans	101	Ground	Austrostipa scabra
93	Mid	Myoporum platycarpum subsp. platycarpum	101	Mid	Eremophila sturtii
93	Mid	Sclerolaena patenticuspis	101	Mid	Eucalyptus costata
93	Mid	Senna form taxon 'coriacea'	101	Mid	Eucalyptus gracilis
93	Ground	Zygophyllum confluens	101	Mid	Eucalyptus socialis
94	Mid	Eucalyptus dumosa	101	Mid	Maireana decalvans
94	Mid	Eucalyptus gracilis	101	Mid	Sclerolaena diacantha
94	Mid	Eucalyptus socialis	101	Mid	Senna form taxon 'coriacea'
94	Ground	Halgania cyanea	102	Upper	Callitris verrucosa
94	Mid	Senna form taxon 'petiolaris'	102	Mid	Dodonaea viscosa subsp.angustissima
94	Ground	Triodia scariosa subsp. scariosa	102	Mid	Eucalyptus costata
94	Ground	Vittadinia dissecta	102	Mid	Eucalyptus dumosa
95	Ground	Austrostipa scabra	102	Ground	Halgania cyanea
95	Mid	Dodonaea viscosa subsp.angustissima	102	Mid	Sclerolaena parviflora
95	Mid	Eucalyptus dumosa	102	Mid	Senna form taxon 'coriacea'
95	Mid	Eucalyptus socialis	102	Ground	Triodia scariosa subsp. scariosa
95	Mid	Maireana decalvans	103	Ground	Austrostipa scabra
95	Mid	Senna form taxon 'coriacea'	103	Mid	Eucalyptus dumosa
95	Mid	Senna form taxon 'petiolaris'	103	Mid	Eucalyptus socialis
95	Ground	Triodia scariosa subsp. scariosa	103	Mid	Maireana decalvans
96	Upper	Alectryon oleifolius	103	Mid	Sclerolaena diacantha
96	Ground	Atriplex angulata	103	Mid	Senna form taxon 'coriacea'
96	Ground	Austrostipa scabra	103	Mid	Senna form taxon 'petiolaris'
96	Upper	Callitris glaucophylla	104	Mid	Dodonaea viscosa subsp.angustissima
96	Upper	Casuarina pauper	104	Mid	Eucalyptus costata
96	Mid	Dodonaea viscosa subsp.angustissima	104	Mid	Eucalyptus socialis
96	Mid	Enchylaena tomentosa	104	Mid	Maireana decalvans
96	Mid	Eucalyptus dumosa	104	Mid	Myoporum platycarpum subsp. platycarpum
96	Mid	Hakea leucoptera	104	Mid	Sclerolaena parviflora
96	Mid	Senna form taxon 'coriacea'	104	Ground	Triodia scariosa subsp. scariosa
96	Mid	Senna form taxon 'petiolaris'	105	Upper	Alectryon oleifolius
97	Mid	Acacia colletioides	105	Ground	Austrostipa scabra
97	Mid	Acacia rigens	105	Upper	Casuarina pauper
97	Mid	Eucalyptus costata	105	Mid	Eucalyptus socialis
97	Mid	Eucalyptus socialis	105	Mid	Maireana decalvans
97	Ground	Halgania cyanea	105	Mid	Myoporum platycarpum subsp. platycarpum
97	Ground	Schoenus subaphyllus	105	Mid	Sclerolaena patenticuspis
97	Ground	Triodia scariosa subsp. scariosa	105	Mid	Senna form taxon 'coriacea'
98	Mid	Atriplex stipitata	105	Mid	Senna form taxon 'petiolaris'
98	Ground	Austrostipa scabra	106	Ground	Austrostipa scabra
98	Mid	Dodonaea viscosa subsp.angustissima	106	Ground	Calotis erinacea
98	Mid	Eremophila sturtii	106	Mid	Dodonaea viscosa subsp.angustissima
98	Mid	Eucalyptus gracilis	106	Mid	Eucalyptus gracilis
98	Mid	Eucalyptus socialis	106	Mid	Eucalyptus socialis
98	Mid	Maireana decalvans	106	Mid	Senna form taxon 'coriacea'
98	Mid	Senna form taxon 'petiolaris'	106	Ground	Triodia scariosa subsp. scariosa
99	Upper	Alectryon oleifolius	107	Ground	Austrostipa scabra

Species from Rapid Data Point Sites

Site No.	Stratum	Dominant Species	Site No.	Stratum	Dominant Species
107	Mid	Dodonaea viscosa subsp.angustissima	116	Ground	Austrostipa scabra
107	Mid	Enchylaena tomentosa	116	Mid	Dodonaea viscosa subsp.angustissima
107	Mid	Eucalyptus socialis	116	Mid	Eucalyptus costata
107	Mid	Senna form taxon 'petiolaris'	116	Mid	Eucalyptus socialis
108	Mid	Dodonaea viscosa subsp.angustissima	116	Ground	Halgania cyanea
108	Mid	Eucalyptus costata	116	Mid	Senna form taxon 'coriacea'
108	Mid	Eucalyptus leptophylla	116	Ground	Triodia scariosa subsp. scariosa
108	Ground	Halgania cyanea	117	Ground	Austrostipa scabra
108	Mid	Senna form taxon 'coriacea'	117	Mid	Eucalyptus dumosa
108	Ground	Triodia scariosa subsp. scariosa	117	Mid	Eucalyptus socialis
108	Ground	Vittadinia cervicularis	117	Mid	Maireana decalvans
109	Ground	Austrostipa scabra	117	Mid	Senna form taxon 'coriacea'
109	Upper	Callitris glaucophylla	117	Mid	Senna form taxon 'petiolaris'
109	Mid	Eremophila glabra	117	Ground	Triodia scariosa subsp. scariosa
109	Mid	Eucalyptus dumosa	118	Mid	Acacia melvillei
109	Mid	Eucalyptus socialis	118	Mid	Apophyllum anomalum
109	Mid	Maireana decalvans	118	Upper	Casuarina pauper
109	Mid	Sclerolaena diacantha	118	Mid	Dodonaea viscosa subsp.angustissima
109	Mid	Senna form taxon 'coriacea'	118	Mid	Eremophila sturtii
110	Mid	Acacia colletioides	118	Mid	Myoporum platycarpum subsp. platycarpum
110	Mid	Dodonaea viscosa subsp.angustissima	119	Ground	Austrostipa scabra
110	Mid	Eucalyptus dumosa	119	Upper	Casuarina pauper
110	Mid	Eucalyptus gracilis	119	Ground	Chenopodium desertorum
110	Mid	Eucalyptus socialis	119	Mid	Dodonaea viscosa subsp.angustissima
110	Mid	Grevillea huegelii	119	Mid	Enchylaena tomentosa
110	Ground	Halgania cyanea	119	Mid	Eremophila sturtii
110	Mid	Sclerolaena parviflora	120	Mid	Acacia colletioides
110	Ground	Triodia scariosa subsp. scariosa	120	Ground	Austrostipa nitida
111	Mid	Acacia colletioides	120	Ground	Austrostipa scabra
111	Upper	Alectryon oleifolius	120	Mid	Eucalyptus gracilis
111	Mid	Apophyllum anomalum	120	Mid	Eucalyptus socialis
111	Ground	Austrostipa scabra	120	Mid	Grevillea huegelii
111	Upper	Casuarina pauper	120	Mid	Maireana decalvans
111	Mid	Dodonaea viscosa subsp.angustissima	120	Mid	Sclerolaena patenticuspis
111	Mid	Eucalyptus socialis	120	Mid	Senna form taxon 'petiolaris'
111	Mid	Maireana decalvans	121	Mid	Acacia colletioides
111	Mid	Sclerolaena diacantha	121	Ground	Atriplex angulata
111	Mid	Senna form taxon 'coriacea'	121	Ground	Austrostipa scabra
112	Ground	Austrostipa scabra	121	Upper	Casuarina pauper
112	Ground	Austrostipa scabra	121	Mid	Dodonaea viscosa subsp.angustissima
112	Mid	Eucalyptus dumosa	121	Mid	Eremophila glabra
112	Mid	Eucalyptus gracilis	121	Mid	Eucalyptus socialis
112	Mid	Eucalyptus socialis	121	Mid	Eucalyptus socialis
112	Mid	Sclerolaena patenticuspis	122	Mid	Acacia melvillei
112	Mid	Senna form taxon 'coriacea'	122	Mid	Apophyllum anomalum
112	Ground	Triodia scariosa subsp. scariosa	122	Ground	Austrostipa nitida
113	Mid	Acacia colletioides	122	Ground	Austrostipa scabra
113	Mid	Eucalyptus dumosa	122	Mid	Dodonaea viscosa subsp.angustissima
113	Mid	Eucalyptus socialis	122	Ground	Vittadinia cervicularis
113	Mid	Olearia pimeloides	123	Ground	Austrostipa drummondii
113	Mid	Sclerolaena patenticuspis	123	Ground	Austrostipa nitida
113	Ground	Triodia scariosa subsp. scariosa	123	Upper	Casuarina pauper
114	Mid	Acacia colletioides	123	Mid	Dodonaea viscosa subsp.angustissima
114	Mid	Eucalyptus costata	123	Mid	Sclerolaena diacantha
114	Mid	Eucalyptus socialis	124	Ground	Aristida sp.
114	Ground	Halgania cyanea	124	Ground	Austrodanthonia setacea
114	Mid	Maireana decalvans	124	Ground	Eragrostis falcata
114	Mid	Senna form taxon 'coriacea'	124	Ground	Maireana brevifolia
114	Ground	Triodia scariosa subsp. scariosa	124	Ground	Minuria cunninghamii
115	Mid	Dodonaea viscosa subsp.angustissima	124	Mid	Nitraria billardierei
115	Mid	Eucalyptus costata	125	Ground	Austrostipa nitida
115	Mid	Eucalyptus socialis	125	Ground	Eragrostis falcata
115	Ground	Halgania cyanea	125	Ground	Minuria cunninghamii
115	Mid	Sclerolaena diacantha	125	Mid	Nitraria billardierei
115	Ground	Triodia scariosa subsp. scariosa	125	Ground	Salvia verbenaca

Species from Rapid Data Point Sites

Site No.	Stratum	Dominant Species	Site No.	Stratum	Dominant Species
126	Upper	Casuarina pauper	136	Mid	Maireana decalvans
126	Ground	Maireana brevifolia	136	Mid	Myoporum platycarpum subsp. platycarpum
126	Mid	Maireana decalvans	136	Ground	Triodia scariosa subsp. scariosa
126	Mid	Sclerolaena patenticuspis	137	Ground	Austrostipa nitida
127	Mid	Apophyllum anomalum	137	Upper	Casuarina pauper
127	Ground	Atriplex angulata	137	Mid	Chenopodium curvispicatum
127	Ground	Austrostipa drummondii	137	Mid	Dodonaea viscosa subsp.angustissima
127	Ground	Austrostipa nitida	137	Mid	Eremophila sturtii
127	Upper	Casuarina pauper	137	Mid	Sclerolaena diacantha
127	Mid	Eucalyptus gracilis	138	Mid	Acacia colletioides
127	Mid	Eucalyptus socialis	138	Ground	Calotis erinacea
127	Ground	Paspalidium constrictum	138	Mid	Dodonaea viscosa subsp.angustissima
128	Mid	Acacia melvillei	138	Mid	Eucalyptus dumosa
128	Ground	Austrostipa nitida	138	Mid	Eucalyptus socialis
128	Mid	Nitraria billardierei	138	Mid	Sclerolaena patenticuspis
128	Mid	Sclerolaena diacantha	138	Ground	Triodia scariosa subsp. scariosa
128	Mid	Sclerolaena patenticuspis	139	Mid	Acacia colletioides
129	Mid	Eucalyptus dumosa	139	Ground	Austrostipa scabra
129	Mid	Eucalyptus gracilis	139	Mid	Enchylaena tomentosa
129	Mid	Eucalyptus socialis	139	Mid	Eucalyptus dumosa
129	Upper	Geijera parviflora	139	Mid	Eucalyptus gracilis
129	Ground	Maireana brevifolia	139	Mid	Eucalyptus socialis
129	Mid	Maireana decalvans	139	Mid	Maireana decalvans
129	Mid	Senna form taxon 'petiolaris'	139	Mid	Myoporum platycarpum subsp. platycarpum
129	Ground	Zygophyllum confluens	140	Mid	Atriplex stipitata
130	Ground	Atriplex angulata	140	Ground	Austrostipa nitida
130	Upper	Casuarina pauper	140	Mid	Dissocarpus paradoxus
130	Mid	Eremophila sturtii	140	Mid	Dodonaea viscosa subsp.angustissima
130	Upper	Geijera parviflora	140	Mid	Eremophila sturtii
130	Mid	Maireana decalvans	141	Mid	Acacia colletioides
130	Mid	Senna form taxon 'petiolaris'	141	Mid	Eremophila sturtii
130	Ground	Zygophyllum glaucum	141	Mid	Eucalyptus dumosa
131	Ground	Austrostipa scabra	141	Mid	Eucalyptus socialis
131	Mid	Enchylaena tomentosa	141	Mid	Maireana decalvans
131	Mid	Eremophila sturtii	141	Mid	Myoporum platycarpum subsp. platycarpum
131	Mid	Eucalyptus socialis	141	Mid	Sclerolaena diacantha
131	Mid	Sclerolaena patenticuspis	141	Ground	Triodia scariosa subsp. scariosa
132	Mid	Acacia colletioides	142	Ground	Austrostipa nitida
132	Upper	Callitris glaucophylla	142	Ground	Chenopodium desertorum
132	Ground	Chenopodium desertorum	142	Mid	Eucalyptus dumosa
132	Mid	Dodonaea viscosa subsp.angustissima	142	Mid	Eucalyptus leptophylla
132	Mid	Eremophila sturtii	142	Mid	Sclerolaena diacantha
132	Mid	Psilocaulon tenue	143	Mid	Dissocarpus paradoxus
132	Mid	Sclerolaena patenticuspis	143	Mid	Enchylaena tomentosa
133	Ground	Conyza bonariensis	143	Mid	Eucalyptus gracilis
133	Ground	Marsilea drummondii	143	Mid	Eucalyptus socialis
133	Ground	Marsilea hirsuta	143	Ground	Maireana brevifolia
133	Ground	Stemodia florulenta	144	Ground	Austrostipa nitida
133	Ground	Teucrium racemosum	144	Ground	Austrostipa scabra
134	Mid	Acacia rigens	144	Mid	Dissocarpus paradoxus
134	Mid	Dodonaea viscosa subsp.angustissima	144	Mid	Eucalyptus gracilis
134	Mid	Eucalyptus socialis	145	Mid	Dissocarpus paradoxus
134	Mid	Maireana decalvans	145	Mid	Dodonaea viscosa subsp.angustissima
134	Mid	Sclerolaena parviflora	145	Mid	Eremophila longifolia
134	Mid	Senna form taxon 'coriacea'	145	Mid	Eremophila sturtii
134	Ground	Triodia scariosa subsp. scariosa	145	Mid	Maireana decalvans
135	Ground	Calotis erinacea	145	Mid	Sclerolaena diacantha
135	Mid	Dodonaea viscosa subsp.angustissima	146	Ground	Austrostipa nitida
135	Mid	Eucalyptus socialis	146	Ground	Chenopodium desertorum
135	Mid	Sclerolaena parviflora	146	Mid	Dodonaea viscosa subsp.angustissima
135	Ground	Triodia scariosa subsp. scariosa	146	Mid	Enchylaena tomentosa
136	Ground	Calotis erinacea	146	Mid	Eremophila sturtii
136	Mid	Dodonaea viscosa subsp.angustissima	147	Ground	Austrostipa nitida
136	Mid	Eucalyptus dumosa	147	Mid	Dissocarpus paradoxus
136	Mid	Eucalyptus socialis	147	Mid	Eremophila sturtii

Species from Rapid Data Point Sites

Site No.	Stratum	Dominant Species	Site No.	Stratum	Dominant Species
147	Mid	Maireana decalvans	158	Mid	Dissocarpus paradoxus
148	Ground	Austrostipa nitida	158	Mid	Eucalyptus dumosa
148	Mid	Eucalyptus gracilis	158	Mid	Maireana decalvans
148	Mid	Sclerolaena patenticuspis	158	Mid	Senna form taxon 'coriacea'
148	Ground	Vittadinia cervicularis	159	Ground	Austrostipa nitida
149	Mid	Dissocarpus paradoxus	159	Mid	Eucalyptus dumosa
149	Mid	Eucalyptus dumosa	159	Mid	Eucalyptus gracilis
149	Mid	Eucalyptus gracilis	159	Mid	Eucalyptus socialis
149	Mid	Eucalyptus socialis	159	Mid	Maireana decalvans
149	Upper	Geijera parviflora	159	Mid	Sclerolaena patenticuspis
149	Mid	Maireana decalvans	159	Mid	Senna form taxon 'coriacea'
149	Mid	Sclerolaena diacantha	160	Mid	Acacia colletioides
149	Mid	Senna form taxon 'coriacea'	160	Upper	Alectryon oleifolius
150	Ground	Austrostipa nitida	160	Ground	Austrostipa nitida
150	Upper	Casuarina pauper	160	Upper	Casuarina pauper
150	Mid	Dissocarpus paradoxus	160	Mid	Eucalyptus socialis
150	Mid	Dodonaea viscosa subsp.angustissima	160	Upper	Geijera parviflora
150	Mid	Enchylaena tomentosa	160	Mid	Maireana decalvans
150	Mid	Eucalyptus socialis	160	Mid	Myoporum platycarpum subsp. platycarpum
150	Mid	Myoporum platycarpum subsp. platycarpum	160	Mid	Sclerolaena patenticuspis
151	Mid	Acacia colletioides	160	Mid	Senna form taxon 'coriacea'
151	Ground	Chenopodium desertorum	161	Mid	Dodonaea viscosa subsp.angustissima
151	Mid	Eucalyptus dumosa	161	Mid	Eucalyptus costata
151	Mid	Eucalyptus socialis	161	Mid	Eucalyptus socialis
151	Upper	Geijera parviflora	161	Ground	Halgania cyanea
151	Mid	Myoporum platycarpum subsp. platycarpum	161	Mid	Sclerolaena patenticuspis
151	Mid	Sclerolaena diacantha	161	Ground	Triodia scariosa subsp. scariosa
151	Ground	Triodia scariosa subsp. scariosa	162	Ground	Austrostipa nitida
152	Ground	Calotis erinacea	162	Ground	Calotis erinacea
152	Mid	Eucalyptus socialis	162	Mid	Dodonaea viscosa subsp.angustissima
152	Mid	Sclerolaena diacantha	162	Mid	Eucalyptus costata
152	Mid	Senna form taxon 'coriacea'	162	Mid	Eucalyptus socialis
152	Ground	Triodia scariosa subsp. scariosa	162	Mid	Sclerolaena patenticuspis
153	Upper	Alectryon oleifolius	162	Mid	Senna form taxon 'coriacea'
153	Mid	Apophyllum anomalum	163	Ground	Calotis erinacea
153	Ground	Austrostipa nitida	163	Mid	Dodonaea viscosa subsp.angustissima
153	Upper	Casuarina pauper	163	Mid	Eucalyptus costata
153	Mid	Enchylaena tomentosa	163	Mid	Eucalyptus socialis
153	Mid	Sclerolaena diacantha	163	Mid	Sclerolaena parviflora
154	Mid	Eucalyptus socialis	163	Mid	Senna form taxon 'coriacea'
154	Mid	Maireana decalvans	164	Ground	Austrostipa nitida
154	Mid	Myoporum platycarpum subsp. platycarpum	164	Mid	Dodonaea viscosa subsp.angustissima
154	Mid	Sclerolaena diacantha	164	Mid	Eucalyptus dumosa
154	Ground	Triodia scariosa subsp. scariosa	164	Mid	Eucalyptus socialis
155	Mid	Acacia colletioides	164	Mid	Maireana decalvans
155	Upper	Alectryon oleifolius	164	Mid	Sclerolaena patenticuspis
155	Ground	Austrostipa nitida	164	Mid	Senna form taxon 'coriacea'
155	Upper	Casuarina pauper	165	Ground	Atriplex acutibractea subs. acutibractea
155	Mid	Eucalyptus socialis	165	Ground	Austrostipa nitida
155	Mid	Maireana decalvans	165	Mid	Eucalyptus dumosa
155	Mid	Sclerolaena patenticuspis	165	Mid	Eucalyptus socialis
156	Upper	Alectryon oleifolius	165	Mid	Maireana decalvans
156	Upper	Casuarina pauper	165	Mid	Senna form taxon 'coriacea'
156	Mid	Dissocarpus paradoxus	165	Mid	Senna form taxon 'petiolaris'
156	Mid	Dodonaea viscosa subsp.angustissima	166	Upper	Alectryon oleifolius
156	Mid	Eremophila sturtii	166	Mid	Atriplex stipitata
156	Ground	Salvia verbenaca	166	Upper	Casuarina pauper
156	Mid	Sclerolaena patenticuspis	166	Ground	Chenopodium desertorum
157	Ground	Austrostipa nitida	166	Mid	Eremophila sturtii
157	Mid	Dissocarpus paradoxus	166	Mid	Eucalyptus socialis
157	Mid	Eucalyptus dumosa	166	Mid	Maireana decalvans
157	Mid	Eucalyptus gracilis	166	Mid	Senna form taxon 'petiolaris'
157	Mid	Sclerolaena patenticuspis	167	Upper	Alectryon oleifolius
157	Mid	Senna form taxon 'coriacea'	167	Ground	Austrostipa nitida
158	Ground	Austrostipa nitida	167	Upper	Casuarina pauper

Species from Rapid Data Point Sites

Site No.	Stratum	Dominant Species	Site No.	Stratum	Dominant Species
167	Mid	Dodonaea viscosa subsp.angustissima	174	Mid	Senna form taxon 'coriacea'
167	Mid	Eucalyptus gracilis	175	Mid	Dodonaea viscosa subsp.angustissima
167	Mid	Eucalyptus socialis	175	Mid	Eucalyptus dumosa
167	Mid	Maireana decalvans	175	Mid	Eucalyptus gracilis
167	Mid	Sclerolaena patenticuspis	175	Mid	Eucalyptus socialis
167	Mid	Senna form taxon 'coriacea'	175	Mid	Maireana decalvans
168	Upper	Alectryon oleifolius	175	Mid	Senna form taxon 'petiolaris'
168	Ground	Austrostipa nitida	175	Ground	Triodia scariosa subsp. scariosa
168	Upper	Casuarina pauper	175	Ground	Vittadinia dissecta
168	Upper	Geijera parviflora	176	Mid	Acacia colletioides
168	Mid	Maireana decalvans	176	Upper	Alectryon oleifolius
168	Mid	Pimelea microcephala subsp. microcephala	176	Mid	Apophyllum anomalum
168	Mid	Sclerolaena diacantha	176	Ground	Austrostipa nitida
168	Mid	Senna form taxon 'petiolaris'	176	Upper	Casuarina pauper
169	Ground	Austrostipa nitida	176	Mid	Eucalyptus socialis
169	Mid	Dodonaea viscosa subsp.angustissima	176	Upper	Geijera parviflora
169	Mid	Eucalyptus costata	176	Mid	Maireana decalvans
169	Mid	Eucalyptus socialis	176	Mid	Myoporum platycarpum subsp. platycarpum
169	Upper	Geijera parviflora	176	Mid	Sclerolaena patenticuspis
169	Mid	Maireana decalvans	176	Mid	Senna form taxon 'petiolaris'
169	Mid	Olearia rudis	177	Upper	Alectryon oleifolius
169	Mid	Pimelea microcephala subsp. microcephala	177	Ground	Austrostipa nitida
169	Mid	Senna form taxon 'coriacea'	177	Upper	Casuarina pauper
170	Upper	Alectryon oleifolius	177	Ground	Chenopodium desertorum
170	Ground	Austrostipa nitida	177	Upper	Geijera parviflora
170	Mid	Dodonaea lobulata	177	Mid	Olearia pimeloides
170	Mid	Dodonaea viscosa subsp.angustissima	177	Mid	Senna form taxon 'coriacea'
170	Ground	Enneapogon nigricans	178	Mid	Acacia colletioides
170	Mid	Eucalyptus dumosa	178	Ground	Austrostipa nitida
170	Mid	Eucalyptus socialis	178	Mid	Eucalyptus dumosa
170	Upper	Geijera parviflora	178	Mid	Eucalyptus socialis
170	Ground	Paspalidium constrictum	178	Mid	Maireana decalvans
170	Mid	Pimelea microcephala subsp. microcephala	178	Mid	Myoporum platycarpum subsp. platycarpum
170	Mid	Senna form taxon 'coriacea'	178	Mid	Sclerolaena patenticuspis
171	Ground	Austrostipa scabra	178	Mid	Senna form taxon 'coriacea'
171	Upper	Callitris glaucophylla	179	Mid	Eucalyptus dumosa
171	Upper	Casuarina pauper	179	Mid	Eucalyptus socialis
171	Mid	Eremophila glabra	179	Mid	Maireana decalvans
171	Upper	Geijera parviflora	179	Mid	Sclerolaena patenticuspis
171	Mid	Maireana decalvans	179	Mid	Senna form taxon 'coriacea'
171	Mid	Sclerolaena patenticuspis	179	Ground	Triodia scariosa subsp. scariosa
171	Mid	Senna form taxon 'coriacea'	180	Upper	Casuarina pauper
172	Upper	Alectryon oleifolius	180	Ground	Chenopodium desertorum
172	Ground	Atriplex acutibractea subs. acutibractea	180	Mid	Eucalyptus socialis
172	Ground	Austrostipa nitida	180	Upper	Geijera parviflora
172	Upper	Callitris glaucophylla	180	Ground	Maireana brevifolia
172	Upper	Casuarina pauper	180	Mid	Myoporum platycarpum subsp. platycarpum
172	Mid	Eucalyptus gracilis	180	Mid	Sclerolaena patenticuspis
172	Mid	Myoporum platycarpum subsp. platycarpum	180	Mid	Senna form taxon 'coriacea'
172	Mid	Sclerolaena patenticuspis	181	Upper	Alectryon oleifolius
172	Mid	Senna form taxon 'coriacea'	181	Upper	Casuarina pauper
172	Mid	Senna form taxon 'petiolaris'	181	Upper	Geijera parviflora
173	Ground	Atriplex acutibractea subs. acutibractea	181	Mid	Maireana decalvans
173	Ground	Austrostipa nitida	181	Mid	Myoporum platycarpum subsp. platycarpum
173	Mid	Dodonaea viscosa subsp.angustissima	181	Mid	Sclerolaena patenticuspis
173	Mid	Myoporum platycarpum subsp. platycarpum	181	Mid	Senna form taxon 'coriacea'
173	Mid	Sclerolaena diacantha	181	Ground	Zygophyllum glaucum
173	Mid	Senna form taxon 'coriacea'	182	Mid	Acacia colletioides
174	Ground	Atriplex acutibractea subs. acutibractea	182	Ground	Austrostipa nitida
174	Ground	Austrostipa nitida	182	Upper	Casuarina pauper
174	Upper	Casuarina pauper	182	Mid	Dodonaea viscosa subsp.angustissima
174	Mid	Dodonaea viscosa subsp.angustissima	182	Mid	Eucalyptus socialis
174	Mid	Dodonaea viscosa subsp.angustissima	182	Upper	Geijera parviflora
174	Mid	Eremophila sturtii	182	Mid	Sclerolaena diacantha
174	Mid	Sclerolaena patenticuspis	182	Mid	Sclerolaena patenticuspis

Species from Rapid Data Point Sites

Site No.	Stratum	Dominant Species	Site No.	Stratum	Dominant Species
182	Mid	Senna form taxon 'coriacea'	191	Ground	Triodia scariosa subsp. scariosa
182	Mid	Senna form taxon 'petiolaris'	192	Upper	Alectryon oleifolius
183	Upper	Alectryon oleifolius	192	Mid	Apophyllum anomalum
183	Ground	Austrostipa nitida	192	Ground	Austrostipa nitida
183	Upper	Casuarina pauper	192	Upper	Casuarina pauper
183	Upper	Geijera parviflora	192	Mid	Dodonaea viscosa subsp.angustissima
183	Mid	Maireana decalvans	192	Mid	Eucalyptus socialis
183	Mid	Myoporum platycarpum subsp. platycarpum	192	Upper	Geijera parviflora
183	Mid	Sclerolaena patenticuspis	192	Mid	Sclerolaena diacantha
183	Mid	Senna form taxon 'coriacea'	192	Mid	Sclerolaena patenticuspis
183	Mid	Senna form taxon 'petiolaris'	192	Mid	Senna form taxon 'coriacea'
184	Upper	Alectryon oleifolius	192	Mid	Senna form taxon 'petiolaris'
184	Mid	Apophyllum anomalum	193	Upper	Alectryon oleifolius
184	Ground	Atriplex acutibractea subs. acutibractea	193	Ground	Austrostipa nitida
184	Ground	Austrostipa nitida	193	Upper	Casuarina pauper
184	Upper	Casuarina pauper	193	Mid	Dissocarpus paradoxus
184	Upper	Geijera parviflora	193	Mid	Eremophila sturtii
184	Mid	Maireana decalvans	193	Upper	Geijera parviflora
184	Mid	Senna form taxon 'coriacea'	193	Mid	Myoporum platycarpum subsp. platycarpum
185	Mid	Acacia colletioides	193	Mid	Sclerolaena diacantha
185	Ground	Austrostipa scabra	193	Mid	Senna form taxon 'petiolaris'
185	Mid	Eremophila sturtii	194	Mid	Dodonaea viscosa subsp.angustissima
185	Mid	Eucalyptus dumosa	194	Mid	Eucalyptus socialis
185	Mid	Eucalyptus socialis	194	Mid	Myoporum platycarpum subsp. platycarpum
185	Mid	Myoporum platycarpum subsp. platycarpum	194	Mid	Sclerolaena diacantha
185	Mid	Sclerolaena patenticuspis	194	Mid	Sclerolaena patenticuspis
185	Mid	Senna form taxon 'coriacea'	194	Mid	Senna form taxon 'petiolaris'
185	Ground	Triodia scariosa subsp. scariosa	194	Ground	Triodia scariosa subsp. scariosa
186	Upper	Alectryon oleifolius	195	Mid	Eucalyptus gracilis
186	Mid	Apophyllum anomalum	195	Mid	Eucalyptus socialis
186	Ground	Austrostipa nitida	195	Mid	Maireana decalvans
186	Upper	Casuarina pauper	195	Mid	Sclerolaena diacantha
186	Upper	Geijera parviflora	195	Ground	Triodia scariosa subsp. scariosa
186	Mid	Maireana decalvans	196	Upper	Alectryon oleifolius
186	Mid	Sclerolaena diacantha	196	Ground	Austrostipa nitida
186	Mid	Senna form taxon 'coriacea'	196	Upper	Casuarina pauper
186	Mid	Senna form taxon 'petiolaris'	196	Mid	Enchylaena tomentosa
187	Ground	Austrostipa scabra	196	Mid	Myoporum platycarpum subsp. platycarpum
187	Mid	Eucalyptus costata	196	Mid	Sclerolaena diacantha
187	Mid	Eucalyptus dumosa	196	Mid	Senna form taxon 'petiolaris'
187	Mid	Eucalyptus socialis	197	Upper	Alectryon oleifolius
187	Ground	Maireana brevifolia	197	Upper	Alectryon oleifolius
187	Mid	Senna form taxon 'petiolaris'	197	Mid	Atriplex stipitata
187	Ground	Triodia scariosa subsp. scariosa	197	Ground	Austrostipa nitida
188	Ground	Austrostipa nitida	197	Upper	Casuarina pauper
188	Mid	Eucalyptus costata	197	Mid	Dodonaea viscosa subsp.angustissima
188	Mid	Eucalyptus leptophylla	197	Upper	Geijera parviflora
188	Ground	Triodia scariosa subsp. scariosa	197	Mid	Myoporum platycarpum subsp. platycarpum
189	Mid	Apophyllum anomalum	197	Mid	Sclerolaena diacantha
189	Upper	Casuarina pauper	197	Mid	Senna form taxon 'coriacea'
189	Mid	Chenopodium curvispicatum	198	Ground	Austrostipa nitida
189	Mid	Enchylaena tomentosa	198	Mid	Eucalyptus gracilis
189	Mid	Eucalyptus socialis	198	Mid	Eucalyptus socialis
189	Upper	Geijera parviflora	198	Ground	Maireana brevifolia
189	Mid	Sclerolaena diacantha	198	Mid	Myoporum platycarpum subsp. platycarpum
189	Mid	Senna form taxon 'coriacea'	198	Mid	Senna form taxon 'coriacea'
190	Ground	Austrostipa nitida	198	Ground	Triodia scariosa subsp. scariosa
190	Upper	Callitris verrucosa	199	Ground	Austrostipa nitida
190	Mid	Eucalyptus costata	199	Mid	Eucalyptus dumosa
190	Mid	Maireana decalvans	199	Mid	Eucalyptus socialis
190	Ground	Triodia scariosa subsp. scariosa	199	Mid	Maireana decalvans
191	Mid	Eucalyptus costata	199	Mid	Senna form taxon 'petiolaris'
191	Mid	Eucalyptus leptophylla	199	Ground	Zygophyllum glaucum
191	Ground	Halgania cyanea	200	Ground	Austrostipa nitida
191	Mid	Sclerolaena parviflora	200	Mid	Eremophila glabra

Species from Rapid Data Point Sites

Site No.	Stratum	Dominant Species	Site No.	Stratum	Dominant Species
200	Mid	Eucalyptus dumosa	212	Mid	Acacia melvillei
200	Mid	Eucalyptus socialis	212	Ground	Austrostipa nitida
200	Mid	Maireana decalvans	212	Mid	Eucalyptus socialis
200	Mid	Myoporum platycarpum subsp. platycarpum	212	Mid	Nitraria billardierei
200	Mid	Senna form taxon 'coriacea'	212	Mid	Sclerolaena patenticuspis
200	Ground	Triodia scariosa subsp. scariosa	212	Ground	Vittadinia cervicularis
201	Mid	Atriplex stipitata	213	Ground	Atriplex angulata
201	Upper	Casuarina pauper	213	Ground	Austrostipa nitida
201	Mid	Dodonaea viscosa subsp.angustissima	213	Mid	Eremophila glabra
201	Mid	Maireana sedifolia	213	Mid	Eucalyptus dumosa
201	Mid	Myoporum platycarpum subsp. platycarpum	213	Mid	Eucalyptus gracilis
201	Mid	Sclerolaena diacantha	213	Mid	Maireana decalvans
201	Mid	Senna form taxon 'coriacea'	213	Mid	Senna form taxon 'coriacea'
202	Upper	Alectryon oleifolius	214	Mid	Dodonaea viscosa subsp.angustissima
202	Ground	Austrostipa scabra	214	Mid	Eucalyptus costata
202	Upper	Casuarina pauper	214	Mid	Eucalyptus leptophylla
202	Mid	Olearia pimeloides	214	Mid	Eucalyptus socialis
202	Mid	Sclerolaena patenticuspis	214	Ground	Halgania cyanea
203	Ground	Austrodanthonia setacea	214	Ground	Lomandra leucocephala
203	Ground	Austrostipa nitida	214	Ground	Triodia scariosa subsp. scariosa
203	Mid	Sclerolaena patenticuspis	215	Mid	Acacia melvillei
204	Ground	Austrodanthonia setacea	215	Ground	Austrostipa nitida
204	Ground	Austrostipa nitida	215	Upper	Casuarina pauper
204	Mid	Dodonaea viscosa subsp.angustissima	215	Mid	Nitraria billardierei
204	Mid	Sclerolaena patenticuspis	215	Mid	Sclerolaena patenticuspis
205	Ground	Austrostipa nitida	215	Ground	Vittadinia cervicularis
205	Ground	Centipeda cunninghamii	216	Mid	Acacia melvillei
205	Ground	Eragrostis falcata	216	Ground	Austrostipa nitida
205	Mid	Eremophila glabra	216	Ground	Chenopodium desertorum
205	Mid	Eucalyptus socialis	216	Mid	Eremophila sturtii
205	Ground	Minuria integerrima	216	Mid	Nitraria billardierei
205	Mid	Nitraria billardierei	216	Mid	Sclerolaena patenticuspis
206	Ground	Austrodanthonia setacea	216	Ground	Vittadinia cervicularis
206	Ground	Eragrostis falcata	217	Mid	Acacia melvillei
206	Mid	Eremophila sturtii	217	Ground	Austrostipa nitida
206	Ground	Minuria integerrima	217	Upper	Casuarina pauper
206	Mid	Nitraria billardierei	217	Mid	Eucalyptus socialis
206	Ground	Teucrium racemosum	217	Mid	Maireana decalvans
207	Ground	Maireana brevifolia	217	Mid	Nitraria billardierei
207	Ground	Salvia verbenaca	217	Mid	Sclerolaena patenticuspis
207	Mid	Sclerolaena patenticuspis	218	Mid	Acacia melvillei
208	Ground	Austrostipa nitida	218	Ground	Austrostipa nitida
208	Ground	Chenopodium desertorum	218	Upper	Callitris glaucophylla
208	Mid	Dodonaea viscosa subsp.angustissima	218	Mid	Dodonaea viscosa subsp.angustissima
208	Upper	Eucalyptus largiflorens	218	Upper	Eucalyptus largiflorens
208	Upper	Eucalyptus largiflorens	218	Mid	Sclerolaena diacantha
208	Ground	Paspalidium constrictum	218	Mid	Sclerolaena patenticuspis
209	Ground	Austrostipa nitida	219	Ground	Austrostipa nitida
209	Mid	Dissocarpus paradoxus	219	Mid	Dissocarpus paradoxus
209	Mid	Dodonaea viscosa subsp.angustissima	219	Mid	Eucalyptus socialis
209	Mid	Eremophila sturtii	219	Mid	Sclerolaena diacantha
209	Mid	Sclerolaena patenticuspis	219	Mid	Sclerolaena patenticuspis
210	Ground	Austrostipa nitida	220	Ground	Calotis erinacea
210	Mid	Nitraria billardierei	220	Mid	Dodonaea viscosa subsp.angustissima
210	Ground	Salvia verbenaca	220	Mid	Eucalyptus costata
210	Mid	Sclerolaena patenticuspis	220	Mid	Eucalyptus dumosa
211	Mid	Acacia melvillei	220	Mid	Eucalyptus leptophylla
211	Upper	Casuarina pauper	220	Ground	Halgania cyanea
211	Ground	Chenopodium desertorum	220	Ground	Triodia scariosa subsp. scariosa
211	Mid	Dissocarpus paradoxus	221	Mid	Eucalyptus dumosa
211	Mid	Eremophila glabra	221	Mid	Eucalyptus socialis
211	Mid	Eremophila sturtii	221	Mid	Maireana decalvans
211	Mid	Eucalyptus socialis	221	Mid	Myoporum platycarpum subsp. platycarpum
211	Mid	Nitraria billardierei	221	Mid	Sclerolaena diacantha
211	Mid	Sclerolaena patenticuspis	221	Mid	Senna form taxon 'coriacea'

Species from Rapid Data Point Sites

Site No.	Stratum	Dominant Species	Site No.	Stratum	Dominant Species
221	Ground	Triodia scariosa subsp. scariosa	230	Mid	Eremophila glabra
222	Mid	Eucalyptus gracilis	230	Mid	Eremophila sturtii
222	Mid	Eucalyptus socialis	230	Mid	Eucalyptus socialis
222	Mid	Maireana decalvans	230	Upper	Geijera parviflora
222	Mid	Sclerolaena diacantha	230	Mid	Senna form taxon 'coriacea'
222	Mid	Sclerolaena patenticuspis	231	Mid	Acacia colletioides
222	Mid	Senna form taxon 'petiolaris'	231	Upper	Alectryon oleifolius
223	Ground	Austrostipa nitida	231	Mid	Apophyllum anomalum
223	Mid	Eucalyptus dumosa	231	Ground	Austrostipa nitida
223	Mid	Eucalyptus gracilis	231	Upper	Casuarina pauper
223	Mid	Eucalyptus socialis	231	Mid	Dodonaea viscosa subsp.angustissima
223	Mid	Maireana decalvans	231	Mid	Eremophila sturtii
223	Mid	Myoporum platycarpum subsp. platycarpum	231	Mid	Maireana decalvans
223	Mid	Sclerolaena diacantha	231	Mid	Myoporum platycarpum subsp. platycarpum
224	Ground	Austrostipa nitida	231	Mid	Sclerolaena diacantha
224	Mid	Eucalyptus dumosa	232	Mid	Acacia colletioides
224	Mid	Eucalyptus gracilis	232	Mid	Eucalyptus dumosa
224	Mid	Eucalyptus socialis	232	Mid	Eucalyptus socialis
224	Mid	Senna form taxon 'petiolaris'	232	Mid	Maireana decalvans
224	Ground	Triodia scariosa subsp. scariosa	232	Mid	Sclerolaena diacantha
224	Ground	Vittadinia dissecta	232	Ground	Triodia scariosa subsp. scariosa
225	Mid	Acacia colletioides	233	Mid	Eremophila glabra
225	Mid	Eucalyptus gracilis	233	Mid	Eucalyptus dumosa
225	Mid	Eucalyptus socialis	233	Mid	Eucalyptus socialis
225	Mid	Maireana decalvans	233	Mid	Maireana decalvans
225	Mid	Senna form taxon 'petiolaris'	233	Mid	Myoporum platycarpum subsp. platycarpum
225	Ground	Triodia scariosa subsp. scariosa	233	Ground	Triodia scariosa subsp. scariosa
225	Ground	Zygophyllum glaucum	233	Mid	Westringia rigida
226	Ground	Aristida sp.	234	Mid	Acacia wilhelmiana
226	Mid	Dodonaea viscosa subsp.angustissima	234	Upper	Callitris verrucosa
226	Mid	Eucalyptus dumosa	234	Mid	Eucalyptus costata
226	Mid	Eucalyptus gracilis	234	Mid	Eucalyptus socialis
226	Mid	Eucalyptus socialis	234	Ground	Halgania cyanea
226	Mid	Grevillea huegelii	234	Mid	Senna form taxon 'petiolaris'
226	Mid	Maireana decalvans	234	Ground	Solanum coactiliferum
226	Mid	Senna form taxon 'petiolaris'	234	Ground	Triodia scariosa subsp. scariosa
226	Ground	Vittadinia cervicularis	235	Ground	Austrostipa nitida
227	Ground	Austrostipa nitida	235	Mid	Eucalyptus costata
227	Mid	Eucalyptus socialis	235	Mid	Eucalyptus dumosa
227	Mid	Myoporum platycarpum subsp. platycarpum	235	Mid	Eucalyptus socialis
227	Mid	Sclerolaena parviflora	235	Mid	Senna form taxon 'petiolaris'
227	Ground	Triodia scariosa subsp. scariosa	235	Ground	Triodia scariosa subsp. scariosa
228	Ground	Austrostipa nitida	235	Mid	Westringia rigida
228	Mid	Bossiaea walkeri	236	Mid	Eremophila sturtii
228	Mid	Eremophila glabra	236	Mid	Eucalyptus dumosa
228	Mid	Eucalyptus socialis	236	Mid	Eucalyptus socialis
228	Mid	Senna form taxon 'petiolaris'	236	Mid	Maireana decalvans
228	Ground	Triodia scariosa subsp. scariosa	236	Mid	Sclerolaena diacantha
228	Ground	Vittadinia cervicularis	236	Mid	Sclerolaena patenticuspis
229	Ground	Austrostipa nitida	239	Mid	Sclerolaena diacantha
229	Mid	Eremophila glabra	239	Mid	Sclerolaena parviflora
229	Mid	Eucalyptus gracilis	239	Mid	Senna form taxon 'petiolaris'
229	Mid	Eucalyptus socialis	239	Ground	Triodia scariosa subsp. scariosa
229	Mid	Maireana decalvans	240	Mid	Eucalyptus gracilis
229	Mid	Senna form taxon 'coriacea'	240	Mid	Eucalyptus socialis
229	Mid	Senna form taxon 'petiolaris'	240	Ground	Maireana brevifolia
229	Ground	Triodia scariosa subsp. scariosa	240	Mid	Myoporum platycarpum subsp. platycarpum
230	Mid	Acacia colletioides	240	Mid	Sclerolaena diacantha
230	Upper	Alectryon oleifolius	240	Mid	Senna form taxon 'petiolaris'
230	Mid	Apophyllum anomalum	240	Ground	Triodia scariosa subsp. scariosa
230	Ground	Austrostipa nitida	241	Mid	Eucalyptus dumosa
230	Upper	Casuarina pauper	241	Mid	Eucalyptus gracilis
230	Mid	Chenopodium curvispicatum	241	Mid	Eucalyptus socialis
230	Mid	Dodonaea viscosa subsp.angustissima	241	Ground	Maireana brevifolia
230	Mid	Enchylaena tomentosa	241	Mid	Maireana decalvans

Species from Rapid Data Point Sites

Site No.	Stratum	Dominant Species	Site No.	Stratum	Dominant Species
241	Mid	Myoporum platycarpum subsp. platycarpum	251	Mid	Eremophila sturtii
241	Mid	Sclerolaena diacantha	251	Mid	Eucalyptus gracilis
242	Ground	Austrostipa nitida	251	Mid	Eucalyptus socialis
242	Mid	Eucalyptus gracilis	251	Mid	Maireana decalvans
242	Mid	Eucalyptus socialis	251	Mid	Sclerolaena diacantha
242	Mid	Nitraria billardierei	252	Ground	Austrostipa nitida
242	Mid	Sclerolaena patenticuspis	252	Upper	Casuarina pauper
242	Ground	Vittadinia cervicularis	252	Mid	Dodonaea viscosa subsp.angustissima
243	Ground	Austrostipa nitida	252	Mid	Nitraria billardierei
243	Mid	Dodonaea viscosa subsp.angustissima	252	Mid	Sclerolaena diacantha
243	Mid	Eremophila sturtii	253	Mid	Dissocarpus paradoxus
243	Mid	Eucalyptus gracilis	253	Mid	Dodonaea viscosa subsp.angustissima
243	Mid	Eucalyptus socialis	253	Mid	Eucalyptus socialis
243	Mid	Sclerolaena diacantha	253	Mid	Nitraria billardierei
243	Mid	Sclerolaena patenticuspis	253	Mid	Sclerolaena diacantha
243	Mid	Senna form taxon 'petiolaris'	253	Mid	Sclerolaena patenticuspis
244	Mid	Acacia melvillei	254	Ground	Austrostipa nitida
244	Ground	Austrostipa nitida	254	Mid	Dodonaea viscosa subsp.angustissima
244	Upper	Casuarina pauper	254	Mid	Eucalyptus gracilis
244	Mid	Dodonaea viscosa subsp.angustissima	254	Mid	Nitraria billardierei
244	Mid	Eremophila sturtii	254	Mid	Sclerolaena diacantha
244	Mid	Eucalyptus gracilis	254	Mid	Sclerolaena patenticuspis
244	Mid	Myoporum platycarpum subsp. platycarpum	255	Ground	Austrostipa nitida
244	Ground	Salvia verbenaca	255	Mid	Dissocarpus paradoxus
244	Mid	Sclerolaena patenticuspis	255	Mid	Dodonaea viscosa subsp.angustissima
245	Mid	Acacia colletioides	255	Ground	Eragrostis falcata
245	Upper	Alectryon oleifolius	255	Mid	Eucalyptus gracilis
245	Mid	Apophyllum anomalum	255	Mid	Nitraria billardierei
245	Upper	Casuarina pauper	255	Mid	Senna form taxon 'petiolaris'
245	Mid	Dodonaea viscosa subsp.angustissima	256	Ground	Austrostipa nitida
245	Mid	Maireana decalvans	256	Upper	Callitris glaucophylla
245	Mid	Myoporum platycarpum subsp. platycarpum	256	Mid	Dissocarpus paradoxus
245	Mid	Sclerolaena diacantha	256	Mid	Dodonaea viscosa subsp.angustissima
245	Mid	Sclerolaena patenticuspis	256	Upper	Eucalyptus largiflorens
245	Mid	Senna form taxon 'coriacea'	256	Ground	Teucrium albicaule
246	Ground	Austrostipa nitida	257	Ground	Austrostipa nitida
246	Mid	Dodonaea viscosa subsp.angustissima	257	Mid	Dodonaea viscosa subsp.angustissima
246	Mid	Eremophila sturtii	257	Mid	Eucalyptus gracilis
246	Mid	Eucalyptus socialis	257	Mid	Eucalyptus socialis
246	Mid	Maireana decalvans	257	Mid	Maireana decalvans
246	Mid	Sclerolaena diacantha	257	Mid	Myoporum platycarpum subsp. platycarpum
247	Mid	Acacia colletioides	257	Mid	Sclerolaena patenticuspis
247	Ground	Austrostipa nitida	258	Mid	Apophyllum anomalum
247	Mid	Dodonaea viscosa subsp.angustissima	258	Ground	Austrostipa nitida
247	Mid	Enchylaena tomentosa	258	Mid	Dissocarpus paradoxus
247	Mid	Eremophila sturtii	258	Mid	Dodonaea viscosa subsp.angustissima
247	Mid	Eucalyptus dumosa	258	Mid	Hakea leucoptera
247	Mid	Eucalyptus socialis	258	Mid	Sclerolaena diacantha
247	Mid	Sclerolaena diacantha	259	Ground	Austrodanthonia setacea
248	Ground	Austrostipa nitida	259	Ground	Austrostipa nitida
248	Mid	Dodonaea viscosa subsp.angustissima	259	Mid	Maireana coronata
248	Mid	Eremophila sturtii	259	Mid	Nitraria billardierei
248	Ground	Maireana brevifolia	260	Ground	Austrostipa nitida
248	Mid	Myoporum platycarpum subsp. platycarpum	260	Ground	Austrostipa platychaeta
248	Mid	Sclerolaena diacantha	260	Mid	Maireana coronata
249	Ground	Austrostipa nitida	260	Mid	Nitraria billardierei
249	Mid	Dodonaea viscosa subsp.angustissima	1_1	Ground	Austrostipa nitida
249	Ground	Salvia verbenaca	1_1	Ground	Enchylaena tomentosa
249	Mid	Sclerolaena diacantha	1_1	Upper	Eucalyptus gracilis
250	Ground	Austrostipa nitida	1_1	Upper	Eucalyptus oleosa subsp. oleosa
250	Mid	Eucalyptus socialis	1_1	Mid	Maireana georgei
250	Mid	Maireana decalvans	1_1	Ground	Sclerolaena diacantha
250	Mid	Sclerolaena diacantha	1_10	Ground	Austrostipa nitida
251	Ground	Austrostipa nitida	1_10	Ground	Brachycome ciliaris
251	Mid	Dodonaea viscosa subsp.angustissima	1_10	Mid	Dodonaea viscosa subsp.angustissima

Species from Rapid Data Point Sites

Site No.	Stratum	Dominant Species	Site No.	Stratum	Dominant Species
1_10	Mid	Eremophila sturtii	1_22	Mid	Eremophila sturtii
1_10	Ground	Paspalidium constrictum	1_22	Ground	Sida sp.
1_11	Upper	Eucalyptus gracilis	1_23	Mid	Alectryon oleifolius
1_11	Upper	Eucalyptus leptophylla	1_23	Ground	Austrostipa scabra
1_11	Ground	Maireana radiata	1_23	Upper	Casuarina pauper
1_11	Ground	Sclerolaena diacantha	1_23	Mid	Eucalyptus leptophylla
1_11	Ground	Sclerolaena parviflora	1_23	Ground	Maireana triptera
1_12	Upper	Alectryon oleifolius	1_23	Ground	Sclerolaena parviflora
1_12	Upper	Apophyllum anomalum	1_24	Ground	Austrostipa scabra
1_12	Mid	Atriplex stipitata	1_24	Ground	Chrysocephalum apiculatum
1_12	Ground	Austrostipa nitida	1_24	Mid	Dodonaea viscosa subsp.angustissima
1_12	Upper	Casuarina pauper	1_24	Ground	Vittadinia cervicularis
1_12	Mid	Maireana triptera	1_25	Mid	Acacia melvillei
1_12	Ground	Sclerolaena diacantha	1_25	Ground	Austrostipa scabra
1_12	Mid	Senna form taxon 'coriacea'	1_25	Ground	Brachycome ciliaris
1_12	Ground	Sida sp.	1_25	Mid	Eremophila sturtii
1_13	Mid	Acacia melvillei	1_25	Ground	Maireana triptera
1_13	Ground	Austrostipa scabra	1_26	Ground	Austrostipa scabra
1_13	Upper	Eucalyptus gracilis	1_26	Mid	Dodonaea viscosa subsp.angustissima
1_13	Upper	Eucalyptus socialis	1_26	Mid	Eremophila sturtii
1_13	Mid	Maireana decalvens	1_26	Ground	Maireana triptera
1_13	Ground	Sclerolaena diacantha	1_26	Ground	Vittadinia cervicularis
1_13	Ground	Triodia scariosa subsp. scariosa	1_28	Mid	Acacia melvillei
1_14	Ground	Chenopodium desertorum	1_28	Ground	Austrostipa scabra
1_14	Upper	Eucalyptus gracilis	1_28	Ground	Dissocarpus paradoxus
1_14	Upper	Eucalyptus socialis	1_28	Mid	Dodonaea viscosa subsp.angustissima
1_14	Mid	Myoporum platycarpum subsp. platycarpum	1_28	Mid	Eremophila sturtii
1_14	Ground	Sclerolaena diacantha	1_28	Ground	Vittadinia cervicularis
1_14	Ground	Triodia scariosa subsp. scariosa	1_29	Ground	Atriplex stipitata
1_15	Mid	Alectryon oleifolius	1_29	Upper	Eucalyptus largiflorens
1_15	Upper	Casuarina pauper	1_29	Ground	Maireana triptera
1_15	Ground	Dissocarpus paradoxus	1_29	Ground	Rhagodia spinescens
1_15	Ground	Enchylaena tomentosa	1_3	Ground	Eragrostis sp.
1_15	Ground	Sclerolaena obliquicuspis	1_3	Upper	Eucalyptus largiflorens
1_16	Mid	Alectryon oleifolius	1_3	Mid	Eucalyptus largiflorens
1_16	Upper	Casuarina pauper	1_3	Ground	Lachnagrostis filiformis
1_16	Ground	Dissocarpus paradoxus	1_3	Ground	Marsilea drummondii
1_16	Ground	Sclerolaena obliquicuspis	1_30	Mid	Acacia melvillei
1_16	Ground	Vittadinia cervicularis	1_30	Ground	Austrodanthonia setacea
1_17	Ground	Austrostipa nitida	1_30	Ground	Austrostipa nitida
1_17	Ground	Austrostipa scabra	1_30	Upper	Casuarina pauper
1_17	Upper	Casuarina pauper	1_30	Mid	Eremophila sturtii
1_17	Ground	Maireana triptera	1_30	Mid	Geijera parviflora
1_18	Ground	Austrostipa nitida	1_30	Ground	Vittadinia cervicularis
1_18	Ground	Brachycome ciliaris	1_31	Mid	Acacia melvillei
1_18	Mid	Dodonaea viscosa subsp.angustissima	1_31	Mid	Alectryon oleifolius
1_18	Mid	Eremophila sturtii	1_31	Ground	Atriplex stipitata
1_18	Ground	Maireana triptera	1_31	Ground	Austrostipa nitida
1_19	Mid	Acacia melvillei	1_31	Upper	Casuarina pauper
1_19	Ground	Austrostipa nitida	1_31	Mid	Casuarina pauper
1_19	Ground	Austrostipa scabra	1_31	Ground	Zygophyllum iodocarpum
1_19	Mid	Dodonaea viscosa subsp.angustissima	1_32	Mid	Acacia melvillei
1_19	Mid	Eremophila sturtii	1_32	Ground	Austrodanthonia setacea
1_19	Ground	Maireana triptera	1_32	Ground	Austrostipa nitida
1_20	Mid	Acacia melvillei	1_32	Upper	Callitris glaucophylla
1_20	Ground	Austrostipa scabra	1_32	Upper	Casuarina pauper
1_20	Ground	Dissocarpus paradoxus	1_32	Mid	Dodonaea viscosa subsp.angustissima
1_20	Mid	Eremophila sturtii	1_32	Mid	Eremophila sturtii
1_20	Upper	Eucalyptus gracilis	1_32	Ground	Vittadinia cervicularis
1_20	Mid	Maireana decalvens	1_33	Ground	Austrostipa nitida
1_20	Ground	Sclerolaena diacantha	1_33	Ground	Enchylaena tomentosa
1_22	Mid	Acacia melvillei	1_33	Mid	Eremophila sturtii
1_22	Ground	Austrostipa scabra	1_33	Upper	Eucalyptus gracilis
1_22	Ground	Dissocarpus paradoxus	1_33	Upper	Eucalyptus leptophylla
1_22	Mid	Dodonaea viscosa subsp.angustissima	1_33	Mid	Maireana decalvens

Species from Rapid Data Point Sites

Site No.	Stratum	Dominant Species	Site No.	Stratum	Dominant Species
1_33	Ground	Sclerolaena obliquicuspis	2_2	Mid	Eremophila longifolia
1_34	Ground	Austrostipa nitida	2_2	Mid	Rhagodia spinescens
1_34	Upper	Callitris glaucophylla	2_2	Ground	Sclerolaena diacantha
1_34	Ground	Chrysocephalum apiculatum	2_2	Ground	Sclerolaena obliquicuspis
1_34	Mid	Dodonaea viscosa subsp.angustissima	2_3	Upper	Eucalyptus leptophylla
1_34	Mid	Eremophila sturtii	2_3	Upper	Eucalyptus socialis
1_34	Mid	Maireana brevifolia	2_3	Mid	Grevillea huegelii
1_34	Ground	Vittadinia cervicularis	2_3	Mid	Maireana georgei
1_4	Mid	? Lignum sp.	2_3	Ground	Sclerolaena diacantha
1_4	Ground	Eragrostis sp.	2_3	Ground	Sclerolaena parviflora
1_4	Upper	Eucalyptus largiflorens	2_3	Ground	Triodia scariosa subsp. scariosa
1_4	Mid	Eucalyptus largiflorens	2_4	Mid	Eremophila longifolia
1_4	Ground	Marsilea drummondii	2_4	Upper	Eucalyptus largiflorens
1_4	Mid	Rhagodia sp.	2_4	Ground	Paspalidium constrictum
1_4	Ground	Vittadinia cervicularis	2_4	Ground	Spergularia sp.
1_5	Mid	Alectryon oleifolius	2_4	Ground	Teucrium racemosum
1_5	Upper	Casuarina pauper	2_5	Mid	Atriplex stipitata
1_5	Ground	Psilocaulon tenue	2_5	Ground	Austrostipa nitida
1_5	Ground	Rhagodia sp.	2_5	Mid	Eremophila sturtii
1_5	Ground	Zygophyllum aurantiacum	2_5	Ground	Maireana sclerolaenoides
1_7	Mid	Acacia melvillei	2_5	Mid	Nitraria billardierei
1_7	Ground	Maireana brevifolia	2_5	Ground	Sclerolaena obliquicuspis
1_7	Ground	Maireana triptera	2_6	Mid	Acacia melvillei
1_7	Ground	Oxalis perennans	2_6	Ground	Austrostipa nitida
1_8	Ground	Austrostipa nitida	2_6	Mid	Eremophila sturtii
1_8	Ground	Brachycome ciliaris	2_6	Mid	Maireana triptera
1_8	Ground	Sclerolaena obliquicuspis	2_6	Ground	Sclerolaena diacantha
1_9	Ground	Centaurea melitensis	2_6	Ground	Sclerolaena obliquicuspis
1_9	Mid	Chenopodium curvispicatum	2_7	Ground	Austrostipa nitida
1_9	Ground	Conyza sp.	2_7	Mid	Enchylaena tomentosa
1_9	Mid	Eucalyptus largiflorens	2_7	Upper	Eucalyptus gracilis
1_9	Mid	Nitraria billardierei	2_7	Upper	Eucalyptus leptophylla
1_9	Ground	Stemodia florulenta	2_7	Mid	Maireana decalvens
10X	Mid	Alectryon oleifolius	2_7	Mid	Maireana radiata
10X	Ground	Austrostipa nitida	2_7	Ground	Sclerolaena diacantha
10X	Ground	Austrostipa scabra	2_7	Ground	Vittadinia cervicularis
10X	Upper	Casuarina pauper	2_8	Ground	Conyza sp.
10X	Mid	Eremophila sturtii	2_8	Mid	Maireana triptera
10X	Upper	Eucalyptus gracilis	2_8	Ground	Medicago sp.
10X	Ground	Rhagodia spinescens	2_8	Mid	Nitraria billardierei
10X	Mid	Senna form taxon 'petiolaris'	2_8	Ground	Teucrium racemosum
10Y	Mid	Alectryon oleifolius	2_9	Ground	Austrostipa nitida
10Y	Ground	Austrostipa nitida	2_9	Mid	Dodonaea viscosa subsp.angustissima
10Y	Upper	Casuarina pauper	2_9	Mid	Eremophila sturtii
10Y	Ground	Dissocarpus paradoxus	2_9	Mid	Maireana triptera
10Y	Mid	Dodonaea viscosa subsp.angustissima	2_9	Ground	Sclerolaena diacantha
10Y	Mid	Eremophila sturtii	2_9	Ground	Vittadinia cervicularis
10Y	Upper	Eucalyptus gracilis	2_10	Ground	Austrostipa scabra
10Y	Upper	Eucalyptus oleosa subsp. oleosa	2_10	Mid	Calotis erinacea
10Y	Ground	Maireana triptera	2_10	Mid	Dodonaea viscosa subsp.angustissima
10Z	Ground	Austrostipa nitida	2_10	Upper	Eucalyptus leptophylla
10Z	Mid	Dodonaea viscosa subsp.angustissima	2_10	Upper	Eucalyptus socialis
10Z	Mid	Eremophila sturtii	2_10	Ground	Halgania cyanea
10Z	Ground	Maireana sclerolaenoides	2_10	Ground	Triodia scariosa subsp. scariosa
10Z	Mid	Olearia pimelioides	2_11	Upper	Alectryon oleifolius
10Z	Ground	Sclerolaena diacantha	2_11	Mid	Apophyllum anomalum
2_1	Mid	Atriplex stipitata	2_11	Ground	Austrostipa nitida
2_1	Ground	Austrostipa tuckeri	2_11	Upper	Casuarina pauper
2_1	Ground	Dissocarpus paradoxus	2_11	Ground	Chenopodium curvispicatum
2_1	Ground	Einadia nutans subsp. nutans	2_11	Ground	Enchylaena tomentosa
2_1	Upper	Eucalyptus largiflorens	2_11	Mid	Eremophila sturtii
2_1	Mid	Maireana georgei	2_11	Upper	Geijera parviflora
2_1	Mid	Paspalidium constrictum	2_11	Mid	Senna form taxon 'filifolia'
2_2	Ground	Austrodanthonia setacea	2_12	Ground	Austrostipa scabra
2_2	Upper	Callitris glaucophylla	2_12	Mid	Callitris verucosa

Species from Rapid Data Point Sites

Site No.	Stratum	Dominant Species	Site No.	Stratum	Dominant Species
2_12	Upper	Eucalyptus dumosa	3_10	Ground	Enchylaena tomentosa
2_12	Upper	Eucalyptus gracilis	3_10	Mid	Eremophila sturtii
2_12	Mid	Halgania cyanea	3_10	Upper	Eucalyptus gracilis
2_12	Ground	Podolepis capillaris	3_10	Upper	Eucalyptus socialis
2_12	Ground	Triodia scariosa subsp. scariosa	3_10	Mid	Geijera parviflora
3_1	Upper	Alectryon oleifolius	3_10	Ground	Olearia pimelioides
3_1	Upper	Casuarina pauper	3_11	Mid	Alectryon oleifolius
3_1	Ground	Dissocarpus paradoxus	3_11	Mid	Austrostipa nitida
3_1	Ground	Enchylaena tomentosa	3_11	Upper	Casuarina pauper
3_1	Upper	Geijera parviflora	3_11	Mid	Eremophila sturtii
3_1	Mid	Maireana georgei	3_11	Upper	Eucalyptus socialis
3_1	Ground	Maireana sclerolaenoides	3_11	Upper	Geijera parviflora
3_1	Mid	Maireana sp.	3_11	Ground	Maireana georgei
3_1	Mid	Maireana triptera	3_11	Ground	Sclerolaena diacantha
3_2	Ground	Austrostipa nitida	3_13	Ground	Austrostipa nitida
3_2	Upper	Casuarina pauper	3_13	Upper	Eucalyptus gracilis
3_2	Mid	Eremophila sturtii	3_13	Upper	Eucalyptus leptophylla
3_2	Upper	Eucalyptus leptophylla	3_13	Mid	Maireana georgei
3_2	Mid	Maireana decalvens	3_13	Mid	Maireana triptera
3_2	Mid	Maireana radiata	3_13	Ground	Triodia scariosa subsp. scariosa
3_2	Ground	Maireana sclerolaenoides	3_13	Ground	Vittadinia cervicularis
3_2	Upper	Myoporum platycarpum subsp. platycarpum	3_14	Mid	Alectryon oleifolius
3_2	Ground	Zygophyllum sp.	3_14	Upper	Casuarina pauper
3_4	Mid	Alectryon oleifolius	3_14	Ground	Maireana decalvens
3_4	Ground	Austrostipa nitida	3_14	Ground	Maireana triptera
3_4	Upper	Eucalyptus gracilis	3_14	Ground	Sclerolaena obliquicuspis
3_4	Upper	Geijera parviflora	3_15	Mid	Acacia melvillei
3_4	Ground	Maireana georgei	3_15	Mid	Alectryon oleifolius
3_4	Ground	Maireana triptera	3_15	Ground	Austrostipa nitida
3_5	Ground	Austrostipa nitida	3_15	Mid	Eremophila sturtii
3_5	Upper	Casuarina pauper	3_15	Ground	Salvia verbenaca
3_5	Ground	Maireana radiata	3_15	Ground	Sclerolaena diacantha
3_5	Upper	Myoporum platycarpum subsp. platycarpum	3_16	Mid	Dodonaea viscosa subsp.angustissima
3_5	Ground	Sclerolaena diacantha	3_16	Upper	Eucalyptus dumosa
3_6	Ground	Austrostipa nitida	3_16	Upper	Eucalyptus gracilis
3_6	Ground	Austrostipa scabra	3_16	Upper	Eucalyptus sp.
3_6	Upper	Casuarina pauper	3_16	Ground	Halgania cyanea
3_6	Mid	Eremophila sturtii	3_16	Mid	Maireana decalvens
3_6	Upper	Eucalyptus gracilis	3_16	Mid	Senna form taxon 'petiolaris'
3_6	Mid	Geijera parviflora	3_16	Ground	Triodia scariosa subsp. scariosa
3_6	Ground	Maireana triptera	3_16	Ground	Vittadinia dissecta
3_7	Ground	Austrostipa scabra	4_10	Mid	Alectryon oleifolius
3_7	Upper	Eucalyptus dumosa	4_10	Ground	Austrostipa nitida
3_7	Upper	Eucalyptus gracilis	4_10	Upper	Casuarina pauper
3_7	Mid	Eucalyptus sp.	4_10	Ground	Enchylaena tomentosa
3_7	Ground	Triodia scariosa subsp. scariosa	4_10	Upper	Geijera parviflora
3_7	Ground	Vittadinia cervicularis	4_10	Mid	Geijera parviflora
3_8	Ground	Austrostipa scabra	4_10	Ground	Sclerolaena diacantha
3_8	Ground	Chenopodium desertorum	4_11	Mid	Alectryon oleifolius
3_8	Upper	Eucalyptus gracilis	4_11	Ground	Austrostipa nitida
3_8	Upper	Eucalyptus socialis	4_11	Ground	Austrostipa scabra
3_8	Mid	Eucalyptus socialis	4_11	Upper	Casuarina pauper
3_8	Mid	Maireana decalvens	4_11	Mid	Eremophila longifolia
3_8	Ground	Triodia scariosa subsp. scariosa	4_11	Mid	Maireana decalvens
3_9	Mid	Alectryon oleifolius	4_11	Ground	Sclerolaena obliquicuspis
3_9	Upper	Casuarina pauper	4_12	Ground	Austrostipa nitida
3_9	Mid	Casuarina pauper	4_12	Mid	Myoporum platycarpum subsp. platycarpum
3_9	Mid	Eremophila sturtii	4_12	Ground	Sclerolaena obliquicuspis
3_9	Upper	Geijera parviflora	4_12	Upper	Casuarina pauper
3_9	Ground	Maireana radiata	4_12	Mid	Eremophila sturtii
3_9	Ground	Maireana triptera	4_12	Upper	Eucalyptus gracilis
3_9	Ground	Zygophyllum eremeum	4_12	Upper	Eucalyptus oleosa subsp. oleosa
3_10	Mid	Alectryon oleifolius	4_12	Ground	Maireana georgei
3_10	Ground	Austrostipa scabra	4_13	Upper	Eucalyptus gracilis
3_10	Upper	Casuarina pauper	4_13	Mid	Geijera parviflora

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Site No.	Stratum	Dominant Species	Site No.	Stratum	Dominant Species
4_13	Mid	Alectryon oleifolius	4_3	Ground	Sclerolaena obliquicuspis
4_13	Ground	Austrostipa nitida	4_30	Ground	Abutilon olocarpum
4_13	Upper	Casuarina pauper	4_30	Upper	Acacia aneura
4_13	Ground	Dissocarpus paradoxus	4_30	Ground	Austrostipa nitida
4_13	Mid	Myoporum platycarpum subsp. platycarpum	4_30	Ground	Austrostipa tuckeri
4_13	Ground	Sclerolaena diacantha	4_30	Mid	Dodonaea viscosa subsp.angustissima
4_14	Mid	Alectryon oleifolius	4_30	Mid	Enchylaena tomentosa
4_14	Ground	Austrostipa nitida	4_30	Mid	Xerochrysum bracteatum
4_14	Upper	Casuarina pauper	4_4	Mid	Alectryon oleifolius
4_14	Ground	Enchylaena tomentosa	4_4	Ground	Austrostipa nitida
4_14	Upper	Eucalyptus sp.	4_4	Upper	Casuarina pauper
4_14	Mid	Geijera parviflora	4_4	Ground	Enchylaena tomentosa
4_14	Upper	Myoporum platycarpum subsp. platycarpum	4_4	Mid	Geijera parviflora
4_14	Ground	Sclerolaena obliquicuspis	4_4	Ground	Olearia sp.
4_15	Mid	Alectryon oleifolius	4_5	Ground	Austrostipa nitida
4_15	Upper	Casuarina pauper	4_5	Upper	Eucalyptus gracilis
4_15	Ground	Enchylaena tomentosa	4_5	Upper	Eucalyptus socialis
4_15	Ground	Sclerolaena obliquicuspis	4_5	Mid	Maireana decalvens
4_17	Upper	Eucalyptus gracilis	4_5	Ground	Maireana georgei
4_17	Ground	Halgania cyanea	4_5	Mid	Olearia sp.
4_17	Ground	Sclerolaena obliquicuspis	4_5	Ground	Sclerolaena obliquicuspis
4_17	Ground	Triodia scariosa subsp. scariosa	4_5	Mid	Westringia rigida
4_2	Ground	Austrostipa nitida	4_6	Ground	Austrostipa nitida
4_2	Upper	Callitris glaucophylla	4_6	Upper	Callitris glaucophylla
4_2	Upper	Casuarina pauper	4_6	Mid	Dodonaea viscosa subsp.angustissima
4_2	Mid	Dodonaea viscosa subsp.angustissima	4_6	Mid	Eremophila sturtii
4_2	Mid	Eremophila sturtii	4_6	Ground	Maireana triptera
4_2	Ground	Sclerolaena diacantha	4_6	Ground	Vittadinia cervicularis
4_2	Ground	Wahlenbergia communis	4_7	Mid	Acacia cotellioides
4_2	Mid	Alectryon oleifolius	4_7	Ground	Austrostipa nitida
4_25	Mid	Acacia aneura	4_7	Upper	Eucalyptus gracilis
4_25	Ground	Austrostipa nitida	4_7	Upper	Eucalyptus leptophylla
4_25	Mid	Dodonaea viscosa subsp.angustissima	4_7	Ground	Maireana radiata
4_25	Ground	Enchylaena tomentosa	4_7	Ground	Vittadinia cervicularis
4_25	Ground	Xerochrysum bracteatum	4_8	Mid	Alectryon oleifolius
4_26	Mid	Acacia aneura	4_8	Ground	Atriplex stipitata
4_26	Ground	Austrostipa nitida	4_8	Ground	Austrostipa nitida
4_26	Mid	Dodonaea viscosa subsp.angustissima	4_8	Upper	Callitris glaucophylla
4_26	Mid	Geijera parviflora	4_8	Upper	Casuarina pauper
4_26	Ground	Sclerolaena diacantha	4_8	Mid	Eremophila sturtii
4_26	Ground	Xerochrysum bracteatum	4_8	Mid	Geijera parviflora
4_27	Ground	Dissocarpus paradoxus	4_8	Ground	Vittadinia cervicularis
4_27	Mid	Dodonaea viscosa subsp.angustissima	4_9	Ground	Austrostipa nitida
4_27	Upper	Eucalyptus gracilis	4_9	Mid	Dodonaea viscosa subsp.angustissima
4_27	Upper	Eucalyptus socialis	4_9	Mid	Eremophila sturtii
4_27	Mid	Myoporum platycarpum subsp. platycarpum	4_9	Ground	Lepidium phlebopetalum
4_27	Ground	Sclerolaena obliquicuspis	4_9	Ground	Sclerolaena diacantha
4_27	Ground	Triodia scariosa subsp. scariosa	5_1	Mid	Atriplex stipitata
4_28	Mid	Acacia aneura	5_1	Ground	Austrostipa nitida
4_28	Mid	Alectryon oleifolius	5_1	Upper	Eucalyptus leptophylla
4_28	Ground	Austrostipa nitida	5_1	Upper	Eucalyptus socialis
4_28	Ground	Austrostipa scabra	5_1	Mid	Maireana georgei
4_28	Mid	Dodonaea viscosa subsp.angustissima	5_1	Ground	Maireana sclerolaenoides
4_29	Mid	Acacia aneura	5_1	Mid	Sclerolaena obliquicuspis
4_29	Ground	Austrostipa nitida	5_1	Ground	Vittadinia cervicularis
4_29	Ground	Brachycome sp.	5_2	Ground	Austrostipa nitida
4_29	Mid	Dodonaea viscosa subsp.angustissima	5_2	Ground	Dissocarpus paradoxus
4_29	Ground	Sclerolaena diacantha	5_2	Mid	Dodonaea viscosa subsp.angustissima
4_3	Mid	Alectryon oleifolius	5_2	Mid	Eremophila sturtii
4_3	Ground	Austrostipa scabra	5_2	Mid	Maireana decalvens
4_3	Upper	Casuarina pauper	5_2	Ground	Sclerolaena diacantha
4_3	Mid	Dodonaea viscosa subsp.angustissima	5_3	Mid	Atriplex stipitata
4_3	Ground	Enchylaena tomentosa	5_3	Ground	Austrostipa nitida
4_3	Upper	Myoporum platycarpum subsp. platycarpum	5_3	Ground	Dissocarpus paradoxus
4_3	Mid	Myoporum platycarpum subsp. platycarpum	5_3	Mid	Dodonaea bursariifolia

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Site No.	Stratum	Dominant Species	Site No.	Stratum	Dominant Species
5_3	Mid	Maireana decalvens	8_1	Upper	Casuarina pauper
5_3	Ground	Sclerolaena diacantha	8_10	Mid	Alectryon oleifolius
5_4	Ground	Austrostipa nitida	8_10	Ground	Atriplex stipitata
5_4	Ground	Chenopodium curvispicatum	8_10	Ground	Austrostipa scabra
5_4	Mid	Dodonaea viscosa subsp.angustissima	8_10	Upper	Casuarina pauper
5_4	Mid	Eremophila sturtii	8_10	Upper	Eucalyptus sp.
5_4	Upper	Eucalyptus leptophylla	8_10	Ground	Sclerolaena obliquicuspis
5_4	Mid	Maireana georgei	8_10	Mid	Senna form taxon 'coriacea'
5_4	Ground	Sclerolaena obliquicuspis	8_11	Mid	Alectryon oleifolius
5_5	Upper	Alectryon oleifolius	8_11	Ground	Austrostipa nitida
5_5	Ground	Austrostipa nitida	8_11	Upper	Casuarina pauper
5_5	Ground	Brachycome ciliaris	8_11	Ground	Enchylaena tomentosa
5_5	Mid	Dodonaea viscosa subsp.angustissima	8_11	Mid	Eucalyptus leptophylla
5_5	Mid	Eremophila sturtii	8_11	Ground	Sclerolaena obliquicuspis
5_5	Upper	Eucalyptus gracilis	8_13	Ground	Austrostipa nitida
5_5	Mid	Maireana georgei	8_13	Ground	Dissocarpus paradoxus
5_5	Ground	Sclerolaena diacantha	8_13	Mid	Senna form taxon 'coriacea'
5_6	Mid	Alectryon oleifolius	8_14	Ground	Austrostipa nitida
5_6	Ground	Atriplex stipitata	8_14	Mid	Dodonaea viscosa subsp.angustissima
5_6	Ground	Austrostipa nitida	8_14	Mid	Eremophila sturtii
5_6	Upper	Casuarina pauper	8_14	Ground	Maireana georgei
5_6	Mid	Dodonaea viscosa subsp.angustissima	8_14	Upper	Myoporum platycarpum subsp. platycarpum
5_6	Mid	Myoporum platycarpum subsp. platycarpum	8_14	Mid	Senna form taxon 'coriacea'
5_6	Ground	Rhagodia sp.	8_15	Upper	Eucalyptus leptophylla
5_7	Ground	Austrostipa nitida	8_15	Upper	Eucalyptus socialis
5_7	Ground	Austrostipa scabra	8_15	Ground	Halgania cyanea
5_7	Mid	Dodonaea viscosa subsp.angustissima	8_15	Ground	Sclerolaena diacantha
5_7	Mid	Eremophila sturtii	8_15	Ground	Triodia scariosa subsp. scariosa
5_7	Ground	Maireana radiata	8_16	Ground	Austrostipa nitida
5_7	Mid	Myoporum platycarpum subsp. platycarpum	8_16	Ground	Dissocarpus paradoxus
5_8	Upper	Alectryon oleifolius	8_16	Mid	Eremophila sturtii
5_8	Ground	Austrostipa nitida	8_16	Upper	Eucalyptus leptophylla
5_8	Upper	Casuarina pauper	8_16	Ground	Sclerolaena diacantha
5_8	Mid	Maireana georgei	8_17	Mid	Alectryon oleifolius
5_8	Ground	Maireana sclerolaenoides	8_17	Ground	Austrostipa nitida
5_8	Mid	Rhagodia ulicina	8_17	Mid	Eremophila sturtii
5_8	Ground	Sclerolaena diacantha	8_17	Mid	Maireana decalvens
5_8	Mid	Senna form taxon 'petiolaris'	8_17	Ground	Maireana georgei
5_9	Ground	Austrostipa nitida	8_17	Ground	Sclerolaena diacantha
5_9	Mid	Dodonaea viscosa subsp.angustissima	8_19	Ground	Austrostipa nitida
5_9	Mid	Eremophila maculata	8_19	Ground	Brachycome ciliaris
5_9	Ground	Maireana sclerolaenoides	8_19	Mid	Dodonaea viscosa subsp.angustissima
5_9	Mid	Rhagodia ulicina	8_19	Mid	Eremophila sturtii
5_9	Ground	Sclerolaena diacantha	8_19	Upper	Eucalyptus leptophylla
6_1	Mid	Atriplex stipitata	8_19	Ground	Maireana georgei
6_1	Ground	Austrostipa nitida	8_19	Mid	Olearia pimelioides
6_1	Mid	Dodonaea viscosa subsp.angustissima	8_2	Ground	Austrostipa nitida
6_1	Mid	Eremophila sturtii	8_2	Ground	Brachycome ciliaris
6_1	Ground	Sclerolaena diacantha	8_2	Upper	Callitris glaucophylla
6_1	Ground	Vittadinia cervicularis	8_2	Mid	Eremophila sturtii
6_2	Ground	Atriplex stipitata	8_2	Upper	Eucalyptus leptophylla
6_2	Ground	Austrostipa nitida	8_2	Mid	Geijera parviflora
6_2	Ground	Brachycome ciliaris	8_2	Mid	Maireana decalvens
6_2	Upper	Casuarina pauper	8_2	Ground	Sclerolaena diacantha
6_2	Mid	Dodonaea viscosa subsp.angustissima	8_20	Mid	Acacia cotellioides
6_2	Mid	Eremophila sturtii	8_20	Mid	Dodonaea viscosa subsp.angustissima
6_3	Ground	Austrostipa nitida	8_20	Upper	Eucalyptus leptophylla
6_3	Upper	Callitris glaucophylla	8_20	Upper	Eucalyptus socialis
6_3	Ground	Centaurea melitensis	8_20	Ground	Halgania cyanea
6_3	Mid	Chenopodium curvispicatum	8_21	Mid	Eremophila sturtii
6_3	Mid	Dodonaea viscosa subsp.angustissima	8_21	Mid	Olearia pimelioides
6_3	Mid	Eremophila sturtii	8_20	Ground	Maireana georgei
6_3	Ground	Sclerolaena diacantha	8_20	Ground	Triodia scariosa subsp. scariosa
8_1	Mid	Alectryon oleifolius	8_21	Mid	Alectryon oleifolius
8_1	Ground	Austrostipa nitida	8_21	Ground	Austrostipa nitida

Species from Rapid Data Point Sites

Site No.	Stratum	Dominant Species	Site No.	Stratum	Dominant Species
8_21	Ground	Brachycome ciliaris	9_10	Ground	Sclerolaena diacantha
8_21	Upper	Casuarina pauper	9_10	Ground	Vittadinia cervicularis
8_21	Ground	Sclerolaena diacantha	9_11	Ground	Chenopodium desertorum
8_22	Ground	Atriplex stipitata	9_11	Mid	Dodonaea viscosa subsp.angustissima
8_22	Ground	Austrostipa nitida	9_11	Upper	Eucalyptus gracilis
8_22	Mid	Chenopodium curvispicatum	9_11	Upper	Eucalyptus socialis
8_22	Mid	Dodonaea viscosa subsp.angustissima	9_11	Ground	Halgania cyanea
8_22	Mid	Eremophila longifolia	9_11	Mid	Maireana georgei
8_22	Upper	Eucalyptus leptophylla	9_11	Ground	Triodia scariosa subsp. scariosa
8_22	Ground	Sida sp.	9_12	Ground	Austrostipa nitida
8_23	Ground	Austrostipa nitida	9_12	Mid	Dodonaea viscosa subsp.angustissima
8_23	Mid	Dodonaea viscosa subsp.angustissima	9_12	Upper	Eucalyptus gracilis
8_23	Upper	Eucalyptus leptophylla	9_12	Upper	Eucalyptus socialis
8_23	Ground	Maireana georgei	9_12	Mid	Maireana decalvens
8_23	Ground	Paspalidium constrictum	9_12	Ground	Maireana sclerolaenoides
8_23	Mid	Senna form taxon 'petiolaris'	9_12	Ground	Sclerolaena diacantha
8_3	Mid	Alectryon oleifolius	9_12	Mid	Senna form taxon 'filifolia'
8_3	Mid	Apophyllum anomalum	9_13	Mid	Atriplex stipitata
8_3	Ground	Austrostipa nitida	9_13	Ground	Austrostipa scabra
8_3	Ground	Austrostipa scabra	9_13	Ground	Dissocarpus paradoxus
8_3	Upper	Casuarina pauper	9_13	Mid	Dodonaea viscosa subsp.angustissima
8_3	Ground	Einadia nutans subsp. nutans	9_13	Mid	Eremophila sturtii
8_3	Mid	Myoporum platycarpum subsp. platycarpum	9_13	Ground	Sclerolaena diacantha
8_4	Mid	Alectryon oleifolius	9_14	Ground	Austrostipa nitida
8_4	Ground	Dissocarpus paradoxus	9_14	Mid	Eremophila glabra
8_4	Ground	Enchylaena tomentosa	9_14	Upper	Eucalyptus gracilis
8_4	Upper	Eucalyptus socialis	9_14	Upper	Eucalyptus leptophylla
8_4	Mid	Maireana decalvens	9_14	Upper	Eucalyptus socialis
8_4	Mid	Maireana georgei	9_14	Mid	Maireana decalvens
8_4	Ground	Sida sp.	9_14	Mid	Maireana georgei
8_5	Mid	Alectryon oleifolius	9_14	Ground	Sclerolaena diacantha
8_5	Ground	Austrostipa nitida	9_14	Ground	Triodia scariosa subsp. scariosa
8_5	Upper	Casuarina pauper	9_15	Ground	Austrostipa nitida
8_5	Ground	Chenopodium desertorum	9_15	Mid	Dodonaea viscosa subsp.angustissima
8_5	Upper	Geijera parviflora	9_15	Mid	Eremophila sturtii
8_5	Mid	Myoporum platycarpum subsp. platycarpum	9_15	Mid	Maireana georgei
8_5	Ground	Sclerolaena obliquicuspis	9_15	Ground	Maireana sp.
8_7	Mid	Alectryon oleifolius	9_15	Ground	Sclerolaena diacantha
8_7	Ground	Austrostipa scabra	9_16	Mid	Acacia rigens
8_7	Upper	Casuarina pauper	9_16	Ground	Brachycome ciliaris
8_7	Ground	Dissocarpus paradoxus	9_16	Upper	Eucalyptus gracilis
8_7	Ground	Maireana decalvens	9_16	Upper	Eucalyptus leptophylla
8_8	Ground	Austrostipa nitida	9_16	Ground	Halgania cyanea
8_8	Ground	Austrostipa scabra	9_16	Ground	Triodia scariosa subsp. scariosa
8_8	Upper	Eucalyptus socialis	9_17	Upper	Alectryon oleifolius
8_8	Mid	Maireana decalvens	9_17	Upper	Casuarina pauper
8_8	Mid	Maireana georgei	9_17	Upper	Eucalyptus leptophylla
8_8	Ground	Sclerolaena obliquicuspis	9_17	Mid	Maireana decalvens
8_9	Mid	Alectryon oleifolius	9_17	Mid	Maireana georgei
8_9	Ground	Austrostipa nitida	9_17	Ground	Sclerolaena diacantha
8_9	Upper	Casuarina pauper	9_17	Ground	Sclerolaena obliquicuspis
8_9	Mid	Eremophila sturtii	9_17	Ground	Zygophyllum iodocarpum
8_9	Mid	Eucalyptus leptophylla	9_18	Upper	Alectryon oleifolius
8_9	Ground	Maireana brevifolia	9_18	Ground	Austrostipa scabra
8_9	Ground	Sclerolaena diacantha	9_18	Upper	Casuarina pauper
9_1	Upper	Eucalyptus gracilis	9_18	Mid	Chenopodium curvispicatum
9_1	Upper	Eucalyptus socialis	9_18	Ground	Chenopodium desertorum
9_1	Ground	Halgania cyanea	9_18	Mid	Enchylaena tomentosa
9_1	Upper	Myoporum platycarpum subsp. platycarpum	9_18	Upper	Geijera parviflora
9_1	Ground	Sclerolaena diacantha	9_18	Mid	Maireana georgei
9_1	Mid	Senna form taxon 'petiolaris'	9_18	Ground	Sclerolaena diacantha
9_1	Ground	Triodia scariosa subsp. scariosa	9_2	Upper	Alectryon oleifolius
9_10	Ground	Austrostipa nitida	9_2	Ground	Austrostipa nitida
9_10	Mid	Dodonaea viscosa subsp.angustissima	9_2	Upper	Casuarina pauper
9_10	Mid	Eremophila sturtii	9_2	Ground	Lepidium phlebopetalum

Species from Rapid Data Point Sites

Site No.	Stratum	Dominant Species	Site No.	Stratum	Dominant Species
9_2	Mid	Maireana radiata	Offset32	Ground	Eragrostis falcata
9_2	Upper	Myoporum platycarpum subsp. platycarpum	Offset32	Mid	Eremophila maculata
9_2	Ground	Sclerolaena obliquicuspis	Offset32	Upper	Eucalyptus largiflorens
9_2	Mid	Senna form taxon 'coriacea'	Offset32	Mid	Maireana triptera
9_2	Mid	Senna form taxon 'filifolia'	Offset32	Ground	Minuria integrimma
9_3	Ground	Austrostipa scabra	Offset32	Mid	Rhagodia spinescens
9_3	Mid	Dodonaea viscosa subsp.angustissima	Offset33	Upper	Absent
9_3	Mid	Eremophila sturtii	Offset33	Ground	Austrostipa nitida
9_3	Mid	Maireana georgei	Offset33	Mid	Enchylaena tomentosa
9_3	Ground	Nicotiana goodspeedii	Offset33	Ground	Eragrostis falcata
9_3	Ground	Oxalis perrenans	Offset33	Mid	Nitraria billardierei
9_6	Ground	Austrostipa nitida	Offset33	Mid	Rhagodia spinescens
9_6	Upper	Eucalyptus gracilis	Offset33	Ground	Salvia verbenaca
9_6	Upper	Eucalyptus leptophylla	Offset34	Upper	Absent
9_6	Upper	Eucalyptus socialis	Offset34	Ground	Austrodanthonia setacea
9_6	Mid	Maireana decalvens	Offset34	Ground	Austrostipa nitida
9_6	Ground	Maireana radiata	Offset34	Mid	Dissocarpus paradoxus
9_6	Ground	Westringia rigida	Offset34	Ground	Eragrostis falcata
9_7	Ground	Austrostipa nitida	Offset34	Mid	Nitraria billardierei
9_7	Ground	Calotis erinacea	Offset34	Mid	Sclerolaena obliquicuspis
9_7	Mid	Dodonaea viscosa subsp.angustissima	Offset35	Upper	Absent
9_7	Ground	Einadia nutans subsp. nutans	Offset35	Mid	Acacia melvillei
9_7	Mid	Eremophila sturtii	Offset35	Ground	Austrostipa nitida
9_8	Mid	Dodonaea viscosa subsp.angustissima	Offset35	Mid	Eremophila sturtii
9_8	Mid	Eremophila glabra	Offset35	Mid	Sclerolaena diacantha
9_8	Upper	Eucalyptus leptophylla	Offset39	Ground	Austrostipa nitida
9_8	Upper	Eucalyptus socialis	Offset39	Upper	Eucalyptus gracilis
9_8	Mid	Myoporum platycarpum subsp. platycarpum	Offset39	Upper	Eucalyptus socialis
9_8	Ground	Sclerolaena diacantha	Offset39	Mid	Halgania cyanea
9_8	Ground	Triodia scariosa subsp. scariosa	Offset39	Mid	Maireana georgei
9_9	Ground	Austrostipa nitida	Offset39	Mid	Westringia rigida
9_9	Mid	Eremophila glabra	Offset41	Ground	Austrostipa nitida
9_9	Upper	Eucalyptus dumosa	Offset41	Mid	Dodonaea viscosa subsp.angustissima
9_9	Upper	Eucalyptus leptophylla	Offset41	Mid	Eremophila sturtii
9_9	Mid	Grevillea huegelii	Offset41	Mid	Maireana triptera
9_9	Mid	Maireana triptera	Offset41	Upper	Myoporum platycarpum subsp. platycarpum
9_9	Ground	Sclerolaena diacantha	Offset42	Ground	Austrostipa nitida
9_9	Ground	Zygophyllum iodocarpum	Offset42	Mid	Dodonaea viscosa subsp.angustissima
9U	Ground	Austrostipa nitida	Offset42	Ground	Enneapogon avenaceus
9U	Ground	Brachycome ciliaris	Offset42	Upper	Eucalyptus gracilis
9U	Mid	Dodonaea viscosa subsp.angustissima	Offset42	Mid	Myoporum platycarpum subsp. platycarpum
9U	Mid	Eremophila sturtii	Offset42	Ground	Paspalidium constrictum
9U	Upper	Myoporum platycarpum subsp. platycarpum	Offset42	Mid	Sclerolaena diacantha
9U	Ground	Sclerolaena diacantha	Offset43	Ground	Austrostipa nitida
Offset10	Ground	Austrostipa nitida	Offset43	Mid	Chenopodium curvispicatum
Offset10	Ground	Brachycome ciliarus	Offset43	Upper	Eucalyptus dumosa
Offset10	Upper	Casuarina pauper	Offset43	Upper	Eucalyptus gracilis
Offset10	Mid	Eremophila sturtii	Offset43	Mid	Maireana georgei
Offset10	Mid	Nitraria billardierei	Offset43	Mid	Sclerolaena diacantha
Offset10	Ground	Paspalidium constrictum	Offset45	Ground	Austrodanthonia setacea
Offset10	Mid	Sida cunninghamii	Offset45	Ground	Austrostipa nitida
Offset11	Upper	Absent	Offset45	Upper	Casuarina pauper
Offset11	Ground	Austrodanthonia setacea	Offset45	Ground	Enneapogon avenaceus
Offset11	Ground	Austrostipa nitida	Offset45	Mid	Maireana pyramidata
Offset11	Mid	Dodonaea viscosa subsp.angustissima	Offset45	Mid	Olearia calcerea
Offset11	Mid	Olearia pimelioides	Offset45	Mid	Sclerolaena diacantha
Offset11	Ground	Paspalidium constrictum	Offset46	Ground	Austrostipa nitida
Offset11	Mid	Sclerolaena diacantha	Offset46	Mid	Chenopodium desertorum
Offset30	Ground	Austrostipa nitida	Offset46	Mid	Eremophila glabra
Offset30	Mid	Chenopodium desertorum	Offset46	Upper	Eucalyptus costata
Offset30	Ground	Enneapogon avenaceus	Offset46	Upper	Eucalyptus dumosa
Offset30	Upper	Eucalyptus gracilis	Offset46	Upper	Eucalyptus gracilis
Offset30	Mid	Maireana georgei	Offset46	Mid	Olearia calcerea
Offset30	Mid	Senna form taxon 'petiolaris'	Offset46	Ground	Triodia scariosa subsp. scariosa
Offset32	Ground	Enteropogon ramosa	Offset48	Mid	Alectryon oleifolius

Species from Rapid Data Point Sites

Site No.	Stratum	Dominant Species	Site No.	Stratum	Dominant Species
Offset48	Ground	Austrostipa nitida	Offset71	Mid	Eremophila sturtii
Offset48	Upper	Casuarina pauper	Offset71	Ground	Maireana sclerolaenoides
Offset48	Mid	Enchylaena tomentosa	Offset71	Upper	Myoporum platycarpum subsp. platycarpum
Offset48	Mid	Rhagodia ulicina	Offset71	Mid	Nitraria billardierei
Offset55	Ground	Austrostipa scabra	Offset71	Ground	Sclerolaena obliquicuspis
Offset55	Upper	Casuarina pauper	Offset79a	Ground	Austrostipa nitida
Offset55	Mid	Chenopodium curvispicatum	Offset79a	Upper	Casuarina pauper
Offset55	Mid	Enchylaena tomentosa	Offset79a	Mid	Eremophila sturtii
Offset55	Ground	Enneapogon avenaceus	Offset79a	Ground	Maireana obliquicuspis
Offset55	Upper	Geijera parviflora	Offset79a	Upper	Myoporum platycarpum subsp. platycarpum
Offset55	Mid	Maireana georgei	Offset79a	Mid	Senna form taxon 'coriacea'
Offset56	Mid	Apophyllum anomalum	Offset79a	Mid	Senna form taxon 'filifolia'
Offset56	Ground	Austrostipa nitida	Offset79a	Ground	Sida corrugata
Offset56	Upper	Casuarina pauper	Offset80a	Ground	Amphipogon caricinus var. caricinus
Offset56	Mid	Chenopodium curvispicatum	Offset80a	Ground	Austrostipa nitida
Offset56	Ground	Enneapogon avenaceus	Offset80a	Upper	Eucalyptus dumosa
Offset56	Upper	Eucalyptus gracilis	Offset80a	Upper	Eucalyptus socialis
Offset56	Upper	Myoporum platycarpum subsp. platycarpum	Offset80a	Mid	Maireana georgei
Offset56	Mid	Olearia calcerea	Offset80a	Mid	Maireana radiata
Offset56	Ground	Triodia scariosa subsp. scariosa	Offset80a	Ground	Maireana sclerolaenoides
Offset57	Mid	Alectryon oleifolius	Offset80a	Mid	Maireana triptera
Offset57	Ground	Austrostipa nitida	Offset80a	Upper	Myoporum platycarpum subsp. platycarpum
Offset57	Upper	Casuarina pauper	Offset81a	Upper	Absent
Offset57	Mid	Chenopodium curvispicatum	Offset81a	Ground	Austrostipa elegantissima
Offset57	Ground	Enneapogon avenaceus	Offset81a	Mid	Dodonaea viscosa subsp.angustissima
Offset57	Mid	Myoporum platycarpum subsp. platycarpum	Offset81a	Mid	Eremophila sturtii
Offset58	Upper	Eucalyptus gracilis	Offset81a	Ground	Goodenia fascicularis
Offset58	Upper	Eucalyptus socialis	Offset81a	Ground	Oxalis perennans
Offset58	Mid	Halgania cyanea	Offset81a	Mid	Rhagodia spinescens
Offset58	Upper	Myoporum platycarpum subsp. platycarpum	Offset82a	Mid	Dodonaea viscosa subsp.angustissima
Offset58	Mid	Myoporum platycarpum subsp. platycarpum	Offset82a	Upper	Eucalyptus socialis
Offset58	Mid	Senna form taxon 'petiolaris'	Offset82a	Ground	Halgania cyanea
Offset58	Ground	Triodia scariosa subsp. scariosa	Offset82a	Mid	Maireana decalvens
Offset59	Upper	Alectryon oleifolius	Offset82a	Mid	Myoporum platycarpum subsp. platycarpum
Offset59	Ground	Austrostipa nitida	Offset82a	Ground	Sclerolaena diacantha
Offset59	Upper	Casuarina pauper	Offset82a	Ground	Triodia scariosa subsp. scariosa
Offset59	Mid	Chenopodium curvispicatum	Offset83	Mid	Acacia melvillei
Offset59	Mid	Enchylaena tomentosa	Offset83	Mid	Atriplex stipitata
Offset59	Upper	Myoporum platycarpum subsp. platycarpum	Offset83	Ground	Austrostipa elegantissima
Offset59	Mid	Senna form taxon 'coriacea'	Offset83	Upper	Casuarina pauper
Offset59	Ground	Sida sp.	Offset83	Ground	Enneapogon avenaceus
Offset59	Ground	Vittadinia cervicularis var. cervicularis	Offset83	Mid	Eremophila sturtii
Offset60	Mid	Dodonaea bursariifolia	Offset83	Upper	Eucalyptus socialis
Offset60	Upper	Eucalyptus socialis	Offset83	Ground	Medicago sp.
Offset60	Ground	Lomandra collina	Offset90a	Upper	Absent
Offset60	Mid	Scaevola spinescens	Offset90a	Ground	Austrostipa nitida
Offset60	Ground	Sclerolaena parviflora	Offset90a	Mid	Eremophila sturtii
Offset60	Ground	Triodia scariosa subsp. scariosa	Offset90a	Ground	Nicotiana goodspeedii
Offset61	Mid	Dodonaea bursariifolia	Offset90a	Mid	Nitraria billardierei
Offset61	Upper	Eucalyptus costata	Offset90a	Ground	Salvia verbenaca
Offset61	Upper	Eucalyptus socialis	Offset90a	Mid	Sclerolaena obliquicuspis
Offset61	Ground	Lomandra collina	Offset93	Upper	Absent
Offset61	Mid	Maireana decalvens	Offset93	Ground	Austrostipa nitida
Offset61	Ground	Sclerolaena parviflora	Offset93	Ground	Chenopodium desertorum
Offset61	Ground	Triodia scariosa subsp. scariosa	Offset93	Mid	Eremophila sturtii
Offset62	Ground	Austrostipa nitida	Offset93	Mid	Maireana triptera
Offset62	Mid	Dodonaea bursariifolia	Offset93	Mid	Olearia pimelioides
Offset62	Upper	Eucalyptus dumosa	Offset93	Ground	Sclerolaena diacantha
Offset62	Mid	Maireana georgei	Offset95	Mid	Acacia ligulata
Offset62	Ground	Sclerolaena diacantha	Offset95	Ground	Austrostipa nitida
Offset62	Mid	Senna form taxon 'petiolaris'	Offset95	Mid	Eremophila oppositifolia
Offset62	Ground	Triodia scariosa subsp. scariosa	Offset95	Upper	Eucalyptus costata
Offset71	Upper	Acacia melvillei	Offset95	Upper	Eucalyptus gracilis
Offset71	Mid	Atriplex stipitata	Offset95	Mid	Podolepis capillaris
Offset71	Ground	Austrostipa nitida	Offset95	Ground	Triodia scariosa subsp. scariosa

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Site No.	Stratum	Dominant Species	Site No.	Stratum	Dominant Species
Offset96	Ground	Austrostipa nitida	Offset114	Upper	Eucalyptus gracilis
Offset96	Ground	Brachycome ciliarus	Offset114	Ground	Lomandra leucocephala
Offset96	Upper	Eucalyptus dumosa	Offset114	Ground	Triodia scariosa subsp. scariosa
Offset96	Upper	Eucalyptus socialis	Offset115	Ground	Austrostipa nitida
Offset96	Mid	Maireana georgei	Offset115	Mid	Chenopodium desertorum
Offset96	Mid	Sclerolaena obliquicuspis	Offset115	Ground	Enneapogon avenaceus
Offset96	Mid	Senna form taxon 'petiolaris'	Offset115	Mid	Eremophila glabra
Offset96	Ground	Zygophyllum glaucum	Offset115	Upper	Eucalyptus dumosa
Offset100	Ground	Austrostipa nitida	Offset115	Upper	Eucalyptus gracilis
Offset100	Mid	Eremophila glabra	Offset115	Mid	Maireana georgei
Offset100	Upper	Eucalyptus dumosa	Offset115	Ground	Vittadinia sp.
Offset100	Upper	Eucalyptus gracilis	Offset116	Ground	Amphipogon caricinus var. caricinus
Offset100	Mid	Eucalyptus gracilis	Offset116	Ground	Austrostipa nitida
Offset100	Mid	Sclerolaena diacantha	Offset116	Mid	Calotis erinacea
Offset100	Ground	Triodia scariosa subsp. scariosa	Offset116	Mid	Dodonaea viscosa subsp.angustissima
Offset100	Ground	Vittadinia gracilis	Offset116	Upper	Eucalyptus costata
Offset103	Ground	Austrostipa nitida	Offset116	Upper	Eucalyptus dumosa
Offset103	Mid	Chenopodium desertorum	Offset116	Mid	Olearia pimelioides
Offset103	Ground	Enneapogon avenaceus	Offset116	Ground	Vittadinia dissecta
Offset103	Upper	Eucalyptus socialis	Offset120	Mid	Acacia cotellioides
Offset103	Mid	Sclerolaena diacantha	Offset120	Mid	Acacia rigens
Offset103	Mid	Senna form taxon 'petiolaris'	Offset120	Ground	Austrostipa nitida
Offset103	Ground	Vittadinia gracilis	Offset120	Mid	Dodonaea viscosa subsp.angustissima
Offset105	Mid	Austrostipa nitida	Offset120	Upper	Eucalyptus dumosa
Offset105	Mid	Eremophila sp.	Offset120	Upper	Eucalyptus gracilis
Offset105	Upper	Eucalyptus socialis	Offset120	Upper	Eucalyptus leptophylla
Offset105	Mid	Halgania cyanea	Offset120	Ground	Triodia scariosa subsp. scariosa
Offset105	Mid	Senna form taxon 'petiolaris'	Offset121	Ground	Austrostipa nitida
Offset105	Mid	Triodia scariosa subsp. scariosa	Offset121	Mid	Chenopodium desertorum
Offset105	Mid	Vittadinia dissecta	Offset121	Upper	Eucalyptus gracilis
Offset106	Ground	Austrostipa nitida	Offset121	Upper	Eucalyptus socialis
Offset106	Mid	Eremophila glabra	Offset121	Mid	Maireana decalvens
Offset106	Upper	Eucalyptus socialis	Offset121	Mid	Maireana triptera
Offset106	Mid	Eutaxia microphylla	Offset121	Ground	Vittadinia dissecta
Offset106	Ground	Paspalidium constrictum	Offset122	Ground	Amphipogon caricinus var. caricinus
Offset106	Mid	Senna form taxon 'petiolaris'	Offset122	Ground	Austrostipa nitida
Offset106	Ground	Vittadinia dissecta	Offset122	Mid	Chenopodium desertorum
Offset109	Upper	Absent	Offset122	Upper	Eucalyptus dumosa
Offset109	Mid	Atriplex stipitata	Offset122	Upper	Eucalyptus gracilis
Offset109	Ground	Brachycome ciliarus	Offset122	Upper	Eucalyptus socialis
Offset109	Mid	Calotis sp.	Offset122	Mid	Leptospermum coriacea
Offset109	Ground	Teucrium racemosum	Offset122	Mid	Lomandra leucocephala
Offset109	Ground	Wahlenbergia sp.	Offset122	Ground	Triodia scariosa subsp. scariosa
Offset111	Upper	Absent	Offset123	Ground	Austrostipa nitida
Offset111	Mid	Dodonaea viscosa subsp.angustissima	Offset123	Upper	Eucalyptus costata
Offset111	Ground	Enneapogon avenaceus	Offset123	Upper	Eucalyptus leptophylla
Offset112	Mid	Acacia wilhelmiana	Offset123	Upper	Eucalyptus socialis
Offset112	Ground	Austrostipa nitida	Offset123	Mid	Halgania cyanea
Offset112	Ground	Chrysocephalum apiculatum	Offset123	Mid	Leptospermum coriacea
Offset112	Upper	Eucalyptus dumosa	Offset123	Mid	Sclerolaena diacantha
Offset112	Upper	Eucalyptus gracilis	Offset123	Ground	Triodia scariosa subsp. scariosa
Offset112	Mid	Grevillea huegellii	Offset123	Ground	Vittadinia dissecta
Offset112	Ground	Triodia scariosa subsp. scariosa	Offset124	Mid	Acacia rigens
Offset113	Mid	Acacia cotellioides	Offset124	Mid	Acacia wilhelmiana
Offset113	Ground	Austrostipa nitida	Offset124	Ground	Amphipogon caricinus var. caricinus
Offset113	Ground	Enneapogon avenaceus	Offset124	Ground	Austrostipa nitida
Offset113	Upper	Eucalyptus dumosa	Offset124	Upper	Eucalyptus costata
Offset113	Upper	Eucalyptus gracilis	Offset124	Upper	Eucalyptus leptophylla
Offset113	Mid	Maireana georgei	Offset124	Mid	Leptospermum coriacea
Offset113	Mid	Sclerolaena obliquicuspis	Offset124	Ground	Triodia scariosa subsp. scariosa
Offset113	Ground	Vittadinia sp.	Offset125	Mid	Acacia wilhelmiana
Offset114	Mid	Acacia wilhelmiana	Offset125	Ground	Amphipogon caricinus var. caricinus
Offset114	Ground	Amphipogon caricinus var. caricinus	Offset125	Mid	Chenopodium desertorum
Offset114	Mid	Calotis erinacea	Offset125	Upper	Eucalyptus costata
Offset114	Upper	Eucalyptus dumosa	Offset125	Upper	Eucalyptus leptophylla

Species from Rapid Data Point Sites

Site No.	Stratum	Dominant Species	Site No.	Stratum	Dominant Species
Offset125	Upper	Eucalyptus socialis	Offset136	Mid	Geijera parviflora
Offset125	Mid	Leptospermum coriacea	Offset136	Mid	Maireana radiata
Offset125	Ground	Lomandra leucocephala	Offset136	Ground	Vittadinia sp.
Offset125	Ground	Triodia scariosa subsp. scariosa	Offset137	Mid	Alectryon oleifolius
Offset126	Mid	Callitris verrucosa	Offset137	Ground	Austrostipa nitida
Offset126	Mid	Chenopodium desertorum	Offset137	Upper	Callitris glaucophylla
Offset126	Ground	Enneapogon avenaceus	Offset137	Mid	Dodonaea viscosa subsp.angustissima
Offset126	Upper	Eucalyptus dumosa	Offset137	Mid	Maireana georgei
Offset126	Mid	Eucalyptus gracilis	Offset138	Mid	Alectryon oleifolius
Offset126	Upper	Eucalyptus leptophylla	Offset138	Ground	Austrostipa nitida
Offset126	Upper	Eucalyptus socialis	Offset138	Mid	Chenopodium desertorum
Offset126	Ground	Triodia scariosa subsp. scariosa	Offset138	Ground	Enneapogon avenaceus
Offset126	Ground	Vittadinia dissecta	Offset138	Upper	Eucalyptus gracilis
Offset127	Mid	Acacia rigens	Offset138	Mid	Solanum coactiliferum
Offset127	Mid	Acacia wilhelmiana	Offset140	Upper	Absent
Offset127	Ground	Amphipogon caricinus var. caricinus	Offset140	Mid	Alectryon oleifolius
Offset127	Upper	Eucalyptus leptophylla	Offset140	Ground	Austrodanthonia setacea
Offset127	Upper	Eucalyptus socialis	Offset140	Ground	Austrostipa nitida
Offset127	Mid	Solanum esuriale	Offset140	Mid	Maireana georgei
Offset127	Ground	Triodia scariosa subsp. scariosa	Offset140	Mid	Senna form taxon 'coriacea'
Offset128	Mid	Acacia wilhelmiana	Offset142	Mid	Atriplex stipitata
Offset128	Upper	Eucalyptus dumosa	Offset142	Ground	Austrodanthonia setacea
Offset128	Upper	Eucalyptus leptophylla	Offset142	Ground	Austrostipa nitida
Offset128	Ground	Lomandra leucocephala	Offset142	Upper	Casuarina pauper
Offset128	Ground	Schoenus subaphyllus	Offset142	Mid	Casuarina pauper
Offset128	Ground	Triodia scariosa subsp. scariosa	Offset142	Upper	Eucalyptus dumosa
Offset129	Mid	Acacia rigens	Offset142	Mid	Maireana georgei
Offset129	Mid	Bossiaea walkeri	Offset142	Upper	Myoporum platycarpum subsp. platycarpum
Offset129	Upper	Eucalyptus costata	Offset143	Ground	Austrostipa nitida
Offset129	Upper	Eucalyptus leptophylla	Offset143	Mid	Calotis erinacea
Offset129	Mid	Leptospermum coriacea	Offset143	Mid	Chenopodium desertorum
Offset129	Ground	Lomandra leucocephala	Offset143	Ground	Chrysocephalum apiculatum
Offset129	Ground	Triodia scariosa subsp. scariosa	Offset143	Mid	Dodonaea viscosa subsp.angustissima
Offset130	Upper	Absent	Offset143	Upper	Eucalyptus dumosa
Offset130	Ground	Amphipogon caricinus var. caricinus	Offset143	Upper	Eucalyptus socialis
Offset130	Ground	Austrostipa nitida	Offset143	Ground	Triodia scariosa subsp. scariosa
Offset130	Mid	Eucalyptus costata	Offset144	Ground	Austrodanthonia setacea
Offset130	Mid	Eucalyptus gracilis	Offset144	Ground	Austrostipa nitida
Offset130	Mid	Leptospermum coriacea	Offset144	Mid	Chenopodium desertorum
Offset130	Ground	Triodia scariosa subsp. scariosa	Offset144	Upper	Eucalyptus dumosa
Offset132	Ground	Austrostipa nitida	Offset144	Upper	Eucalyptus gracilis
Offset132	Mid	Chenopodium desertorum	Offset144	Mid	Maireana triptera
Offset132	Upper	Eucalyptus gracilis	Offset144	Mid	Sclerolaena diacantha
Offset132	Mid	Maireana decalvens	Offset144	Ground	Vittadinia cervicularis var. cervicularis
Offset132	Mid	Sclerolaena diacantha	Offset145	Ground	Austrodanthonia setacea
Offset132	Ground	Triodia scariosa subsp. scariosa	Offset145	Ground	Austrostipa nitida
Offset132	Ground	Vittadinia dissecta	Offset145	Upper	Eucalyptus gracilis
Offset133	Mid	Acacia wilhelmiana	Offset145	Upper	Eucalyptus socialis
Offset133	Ground	Austrostipa nitida	Offset145	Mid	Maireana georgei
Offset133	Mid	Eremophila glabra	Offset145	Ground	Paspalidium constrictum
Offset133	Upper	Eucalyptus dumosa	Offset145	Mid	Sclerolaena diacantha
Offset133	Upper	Eucalyptus gracilis	Offset145	Mid	Solanum esuriale
Offset133	Mid	Maireana decalvens	Offset146	Ground	Austrostipa nitida
Offset133	Ground	Triodia scariosa subsp. scariosa	Offset146	Mid	Chenopodium desertorum
Offset133	Ground	Vittadinia dissecta	Offset146	Mid	Dodonaea viscosa subsp.angustissima
Offset135	Mid	Alectryon oleifolius	Offset146	Upper	Eucalyptus costata
Offset135	Ground	Austrostipa nitida	Offset146	Mid	Sclerolaena parviflora
Offset135	Upper	Casuarina pauper	Offset146	Ground	Triodia scariosa subsp. scariosa
Offset135	Mid	Maireana radiata	Offset146	Ground	Vittadinia sp.
Offset135	Mid	Olearia pimelioides	Offset147	Mid	Acacia ligulata
Offset135	Ground	Vittadinia sp.	Offset147	Mid	Acacia rigens
Offset136	Upper	Absent	Offset147	Ground	Amphipogon caricinus var. caricinus
Offset136	Ground	Austrodanthonia setacea	Offset147	Upper	Eucalyptus costata
Offset136	Ground	Austrostipa nitida	Offset147	Upper	Eucalyptus gracilis
Offset136	Mid	Dodonaea viscosa subsp.angustissima	Offset147	Ground	Podolepis capillaris
			Offset147	Ground	Triodia scariosa subsp. scariosa

Location Points for Rapid Data Point Sites

Site Number	Easting_GDA94	Northing_GDA94	Site Number	Easting_GDA94	Northing_GDA94
1	708,378.00	6,259,437.00	64	708,928.00	6,252,802.00
2	705,265.00	6,255,087.00	65	708,747.00	6,252,902.00
3	705,288.00	6,255,337.00	66	708,573.00	6,253,110.00
4	705,280.00	6,255,562.00	67	708,398.00	6,253,205.00
5	705,278.00	6,255,771.00	68	708,234.00	6,253,312.00
6	705,278.00	6,255,771.00	69	708,438.00	6,253,307.00
7	705,561.00	6,255,960.00	70	708,601.00	6,253,425.00
8	705,737.00	6,255,842.00	71	708,663.00	6,253,626.00
9	705,925.00	6,255,726.00	72	708,838.00	6,253,723.00
10	705,873.00	6,255,495.00	73	709,023.00	6,253,755.00
11	705,749.00	6,255,297.00	74	709,179.00	6,253,628.00
12	705,660.00	6,255,098.00	75	709,340.00	6,253,550.00
13	705,590.00	6,254,837.00	76	709,525.00	6,253,500.00
14	705,570.00	6,254,614.00	77	709,712.00	6,253,497.00
15	705,383.00	6,254,621.00	78	709,871.00	6,257,367.00
16	705,173.00	6,254,644.00	79	709,915.00	6,253,173.00
17	707,973.00	6,254,587.00	80	709,901.00	6,252,939.00
18	708,021.00	6,254,809.00	81	709,775.00	625,778.00
19	708,029.00	6,255,035.00	82	709,598.00	6,252,734.00
20	708,048.00	6,255,262.00	83	709,721.00	6,252,569.00
21	707,833.00	6,255,257.00	84	709,827.00	6,252,395.00
22	707,631.00	6,255,240.00	85	709,669.00	6,252,361.00
23	707,474.00	6,255,250.00	86	712,445.00	6,252,014.00
24	707,279.00	6,255,273.00	87	712,437.00	6,251,748.00
25	707,091.00	6,255,280.00	88	712,288.00	6,251,323.00
26	706,885.00	6,255,236.00	89	712,199.00	6,250,931.00
27	706,967.00	6,255,033.00	90	712,115.00	6,250,527.00
28	707,128.00	6,254,883.00	91	712,046.00	6,250,250.00
29	707,306.00	6,254,683.00	92	712,247.00	6,251,500.00
30	707,317.00	6,254,526.00	93	711,974.00	6,251,513.00
31	707,319.00	6,254,272.00	94	711,578.00	6,251,517.00
32	707,315.00	6,254,034.00	95	711,277.00	6,251,525.00
33	707,344.00	6,253,825.00	96	711,023.00	6,251,469.00
34	707,546.00	6,253,893.00	97	710,790.00	6,251,610.00
35	707,734.00	6,253,979.00	98	710,635.00	6,251,746.00
36	707,653.00	6,253,776.00	99	710,529.00	6,251,901.00
37	707,566.00	6,253,590.00	100	710,445.00	6,252,098.00
38	707,484.00	6,253,409.00	101	710,621.00	6,252,216.00
39	707,406.00	6,253,236.00	102	710,807.00	6,252,410.00
40	708,175.00	6,254,331.00	103	710,994.00	6,252,592.00
41	708,460.00	6,254,292.00	104	711,197.00	6,252,583.00
42	708,460.00	6,254,292.00	105	711,427.00	6,252,681.00
43	708,922.00	6,254,227.00	106	711,560.00	6,252,531.00
45	709,619.00	6,254,148.00	107	711,765.00	6,252,473.00
46	709,904.00	6,254,103.00	108	711,880.00	6,252,319.00
47	710,182.00	6,254,056.00	109	712,042.00	6,252,229.00
48	710,483.00	6,254,003.00	110	712,038.00	6,252,021.00
49	710,778.00	6,253,972.00	111	711,918.00	6,251,859.00
50	711,063.00	6,253,913.00	112	711,881.00	6,251,666.00
51	711,355.00	6,253,896.00	113	711,726.00	6,251,327.00
52	711,344.00	6,253,670.00	114	711,587.00	6,251,281.00
53	711,141.00	6,253,432.00	115	711,480.00	6,251,128.00
54	711,035.00	6,253,151.00	116	711,287.00	6,251,150.00
55	710,917.00	6,252,907.00	117	711,066.00	6,251,371.00
56	710,670.00	6,252,757.00	118	712,588.00	6,251,444.00
57	710,450.00	6,252,539.00	119	712,869.00	6,251,387.00
58	710,243.00	6,252,320.00	120	713,175.00	6,251,394.00
59	710,038.00	6,252,115.00	121	713,410.00	6,251,561.00
60	709,825.00	6,252,157.00	122	714,341.00	6,250,475.00
61	709,535.00	6,252,189.00	123	714,335.00	6,250,163.00
62	709,293.00	6,252,401.00	124	714,187.00	6,249,922.00
63	709,050.00	6,252,655.00	125	714,058.00	6,249,697.00

Location Points for Rapid Data Point Sites

Site Number	Easting_GDA94	Northing_GDA94	Site Number	Easting_GDA94	Northing_GDA94
126	714,081.00	6,249,438.00	188	716,629.00	6,244,040.00
127	714,004.00	6,249,136.00	189	716,633.00	6,244,238.00
128	714,325.00	6,249,055.00	190	716,666.00	6,244,374.00
129	714,397.00	6,249,404.00	191	716,754.00	6,244,562.00
130	714,379.00	6,249,715.00	192	716,830.00	6,244,755.00
131	711,918.00	6,274,384.00	193	716,975.00	6,244,913.00
132	711,837.00	6,274,429.00	194	717,170.00	6,244,990.00
133	711,878.00	6,274,560.00	195	717,399.00	6,244,924.00
134	711,728.00	6,274,213.00	196	717,596.00	6,244,739.00
135	711,531.00	6,274,005.00	197	717,844.00	6,244,699.00
136	711,440.00	6,273,812.00	198	718,005.00	6,244,557.00
137	711,331.00	6,273,640.00	199	718,073.00	6,244,371.00
138	711,046.00	6,273,687.00	200	718,105.00	6,244,181.00
139	710,839.00	6,273,855.00	201	718,031.00	6,243,215.00
140	711,083.00	6,274,099.00	202	718,034.00	6,243,727.00
141	711,233.00	6,274,322.00	203	713,993.00	6,247,448.00
142	711,483.00	6,274,412.00	204	713,732.00	6,247,493.00
143	711,682.00	6,274,374.00	205	713,529.00	6,247,670.00
144	711,506.00	6,274,615.00	206	713,460.00	6,247,913.00
145	711,223.00	6,274,700.00	207	714,222.00	6,247,386.00
146	710,943.00	6,274,706.00	208	713,973.00	6,247,159.00
147	710,704.00	6,274,996.00	209	714,013.00	6,246,858.00
148	710,515.00	6,274,956.00	210	714,096.00	6,246,690.00
149	710,450.00	6,274,490.00	211	714,248.00	6,246,462.00
150	710,405.00	6,274,218.00	212	714,412.00	6,246,258.00
151	710,360.00	6,273,916.00	213	714,638.00	6,246,128.00
152	710,319.00	6,273,625.00	214	714,709.00	6,245,982.00
153	710,274.00	6,273,338.00	215	714,662.00	6,246,357.00
154	710,551.00	6,273,067.00	216	714,486.00	6,246,661.00
155	710,854.00	6,272,762.00	217	714,372.00	6,246,929.00
156	711,174.00	6,272,433.00	218	714,597.00	6,247,513.00
157	707,003.00	6,271,832.00	219	714,774.00	6,247,229.00
158	706,957.00	6,271,570.00	220	715,143.00	6,247,084.00
159	706,910.00	6,271,169.00	221	715,497.00	6,246,892.00
160	706,810.00	6,270,761.00	222	715,852.00	6,246,745.00
161	706,776.00	6,270,416.00	223	716,225.00	6,246,586.00
162	706,697.00	6,270,004.00	224	716,895.00	6,246,340.00
163	706,640.00	6,269,581.00	225	717,359.00	6,246,144.00
164	706,594.00	6,269,173.00	226	717,743.00	6,245,978.00
165	706,538.00	6,268,777.00	227	718,148.00	6,245,802.00
166	706,457.00	6,268,215.00	228	718,087.00	6,245,603.00
167	706,400.00	6,267,809.00	229	718,060.00	6,245,415.00
168	706,338.00	6,267,437.00	230	717,888.00	6,245,530.00
169	706,268.00	6,267,018.00	231	716,643.00	6,246,632.00
170	706,223.00	6,266,567.00	232	716,607.00	6,246,840.00
171	706,288.00	6,266,178.00	233	716,516.00	6,247,013.00
172	717,907.00	6,241,722.00	234	716,501.00	6,247,205.00
173	717,966.00	6,242,118.00	235	716,528.00	6,247,414.00
174	718,032.00	6,242,534.00	236	716,432.00	6,247,591.00
175	718,087.00	6,242,908.00	237	716,232.00	6,247,659.00
176	718,144.00	6,243,288.00	238	716,061.00	6,247,763.00
177	718,203.00	6,243,691.00	239	715,882.00	6,247,682.00
178	718,267.00	6,244,103.00	240	715,677.00	6,247,691.00
179	718,335.00	6,244,555.00	241	715,576.00	6,247,503.00
180	718,398.00	6,244,967.00	242	715,482.00	6,247,385.00
181	718,039.00	6,243,960.00	243	715,649.00	6,247,218.00
182	717,838.00	6,243,996.00	244	715,883.00	6,247,172.00
183	717,634.00	6,244,046.00	245	716,121.00	6,247,024.00
184	717,375.00	6,244,110.00	246	716,350.00	6,246,866.00
185	717,167.00	6,244,076.00	247	716,427.00	6,246,701.00
186	716,970.00	6,244,060.00	248	716,530.00	6,246,490.00
187	716,770.00	6,243,986.00	249	714,115.00	6,247,598.00

Location Points for Rapid Data Point Sites

Site Number	Easting_GDA94	Northing_GDA94	Site Number	Easting_GDA94	Northing_GDA94
250	713,800.00	6,247,839.00	3_16	712839	6255578
251	713,478.00	6,248,088.00	3_2	715221	6256205
252	713,241.00	6,248,254.00	3_4	714500	6255477
253	713,354.00	6,248,423.00	3_5	714850	6255210
254	713,431.00	6,248,859.00	3_6	713412	6255709
255	713,521.00	6,249,165.00	3_7	713350	6255601
256	714,289.00	6,247,675.00	3_8	713704	6255182
257	714,384.00	6,248,077.00	3_9	713834	6255266
258	714,239.00	6,248,245.00	4_10	714361	6256159
259	714,272.00	6,248,462.00	4_11	714256	6256416
260	714,477.00	6,248,954.00	4_12	714249	6256519
1_1	716944	6253195	4_13	714495	6256603
1_10	718000	6253466	4_14	714454	6256360
1_11	718535	6253805	4_15	714557	6256275
1_12	718294	6254017	4_17	712802	6255692
1_13	718290	6254346	4_2	715730	6256648
1_14	718299	6254288	4_25	714620	6258809
1_15	717563	6254675	4_26	714669	6258485
1_16	717519	6254601	4_27	714494	6258744
1_17	718129	6254865	4_28	714935	6259159
1_18	718161	6254944	4_29	714937	6259104
1_19	718191	6255027	4_3	714491	6257723
1_20	718115	6255210	4_30	714774	6259108
1_22	717230	6255428	4_4	714876	6257565
1_23	717299	6255657	4_5	715294	6257336
1_24	717252	6255673	4_6	715836	6256771
1_25	717104	6255649	4_7	715896	6256832
1_26	717215	6255584	4_8	715701	6256900
1_28	716365	6254703	4_9	715663	6256555
1_29	716834	6254086	5_1	707171	6260430
1_3	717135	6253117	5_2	707252	6260464
1_30	716021	6256199	5_3	706907	6260432
1_31	716058	6256247	5_4	706645	6262427
1_32	716010	6256269	5_5	706591	6262456
1_33	716020	6256444	5_6	706758	6261759
1_34	715933	6256495	5_7	706689	6261717
1_4	717082	6252993	5_8	706842	6261698
1_5	717534	6253448	5_9	706839	6261757
1_7	717509	6253232	6_1	709766	6262655
1_8	717362	6253172	6_2	709785	6262600
1_9	717362	6253141	6_3	709522	6262468
10X	708633	6254986	8_1	709411	6273109
10Y	708362	6254793	8_10	708406	6273011
10Z	707625	6255870	8_11	708570	6273283
2_1	716054	6251897	8_13	707002	6271617
2_10	718061	6252682	8_14	707178	6271606
2_11	719514	6252407	8_15	707415	6271783
2_12	719162	6250203	8_16	707524	6271977
2_2	716196	6251976	8_17	707142	6271895
2_3	716380	6252319	8_19	708535	6264445
2_4	716502	6252122	8_2	709219	6273025
2_5	716865	6252439	8_20	708749	6264474
2_6	716738	6252539	8_21	708848	6264338
2_7	716165	6252958	8_22	708822	6264195
2_8	717343	6252824	8_23	708579	6264280
2_9	717958	6252592	8_3	709238	6272967
3_1	715578	6256259	8_4	709280	6272760
3_10	713949	6255588	8_5	709590	6272890
3_11	714092	6255379	8_7	708166	6273182
3_13	715600	6253616	8_8	708103	6272986
3_14	715581	6254104	8_9	708289	6273014
3_15	716138	6254059	9_1	710951	6254956

Location Points for Rapid Data Point Sites

Site Number	Easting_GDA94	Northing_GDA94	Site Number	Easting_GDA94	Northing_GDA94
9_10	704987	6257940	Offset135	706513	6267004
9_11	705136	6258366	Offset136	706889	6266877
9_12	705311	6259763	Offset137	706662	6266569
9_13	705341	6260216	Offset138	706418	6266771
9_14	706065	6260197	Offset140	706593	6267802
9_15	706800	6260023	Offset142	706683	6268231
9_16	709022	6259885	Offset143	706740	6268755
9_17	711451	6259859	Offset144	707085	6269649
9_18	712376	6259705	Offset145	706990	6270173
9_2	710919	6255168	Offset146	707175	6270586
9_3	707860	6255793	Offset147	712091	6268665
9_6	708217	6255400	Offset30	711950	6248487
9_7	707464	6256081	Offset32	713273	6246328
9_8	706472	6256806	Offset33	713535	6246848
9_9	705530	6257527	Offset34	713461	6247494
9U	707681	6255959	Offset35	713126	6247229
Offset10	714046	6245726	Offset39	712540	6247334
Offset100	713574	6265839	Offset41	712957	6247806
Offset103	710425	6265415	Offset42	712649	6248321
Offset105	710393	6265617	Offset43	711987	6248949
Offset106	710918	6265606	Offset45	711778	6248060
Offset109	710790	6265203	Offset46	711855	6247756
Offset11	714049	6246395	Offset48	711525	6248166
Offset111	709769	6266100	Offset55	711765	6249381
Offset112	709896	6266638	Offset56	711373	6249900
Offset113	709604	6266790	Offset57	710743	6249784
Offset114	710535	6267170	Offset58	711213	6249394
Offset115	710357	6267323	Offset59	709905	6250799
Offset116	710578	6267454	Offset60	709327	6251091
Offset120	713217	6267089	Offset61	709089	6251936
Offset121	712900	6267418	Offset62	708871	6251280
Offset122	713028	6267513	Offset71	707705	6252239
Offset123	712756	6267536	Offset79a	707365	6252601
Offset124	713020	6267354	Offset80a	707033	6252743
Offset125	713368	6267784	Offset81a	707226	6253038
Offset126	713388	6267526	Offset82a	706966	6253170
Offset127	713289	6268396	Offset83	707142	6253344
Offset128	713068	6268221	Offset90a	706432	6253116
Offset129	713190	6267837	Offset93	708237	6251377
Offset130	713120	6268568	Offset95	714801	6266496
Offset132	712685	6269081	Offset96	714568	6266336
Offset133	712752	6268956			

Appendix D: Potentially Occurring Threatened Flora and Likelihood of Occurrence

Threatened Flora Species for which:

- there are known records in the New South Wales (NSW) Wildlife Atlas within a defined perimeter around the study area or
- the Commonwealth *Environment and Protection and Biodiversity Conservation Act, 1999* (EPBC Act) Protected Matters Search Tool has identified as potentially occurring within a defined perimeter around the study area.

Information regarding species habitat and distribution has been sourced from one or a combination of the following:

- the OEH Threatened Species Profile Database (OEH 2011b);
- OEH Threatened Species Profiles (OEH 2011c); or
- SEWPaC Threatened Species Profile and Threats Database (SEWPaC 2012).

Scientific Name	Common Name	TSC Status[1]	EPBC Status[2]	Habitat	Distribution	Likelihood of Occurrence	Recommended Survey Period[3]
Acacia acanthoclada	Harrow Wattle	E	-	Mallee communities on ridges and dunes; generally grows in deep, loose, sandy soil.	Sporadically in south-west NSW. Most records in NSW are either in the Scotia mallee (Scotia Sanctuary and adjoining properties) or from an area to the north east of Buronga (between the Mallee Cliffs and Mungo National Parks but not within either of these reserves) (OEH 2012a). Some of these sites occur within Southern Mallee Reserves on leasehold land which stock grazing excluded. A single (dead) plant has also recently been recorded west of Lake Victoria, so additional survey may expand the number of known populations in south western NSW.	Potential	August - December
Acacia carneorum	Needle Wattle	V	V	Needle Wattle occurs on sand ridges or sandy flats or in alluvium along watercourses. Also occurs in Mulga communities, White Cypress Pine woodland, Red Mallee woodland, grassland and chenopod low shrubland.	Needle Wattle is known from the far south-east of Central Australia (Jessop 1981). It has a scattered distribution from south-west of Lake Frome and near Peterborough, in eastern South Australia, to near Tibooburra, Menindee Lakes and Wanaaring in western NSW (Orchard and Wilson 2001; Harden 2002). Occurs within the Western and Lower Murray Darling (NSW) and South Australian Arid Lands Natural Resource Management Regions.	Potential- unconfirmed record on Boree Plains in 1989.	All Year
Atriplex infrequens	A saltbush	V	V	*Atriplex infrequens* is associated with broad drainage tracts, clay flats and possibly occasionally	Confined to the NSW far western plains. North western records recorded from east of Tibooburra, south east of Brewarrina and near Wilcannia with isolated collections from the Pooncarie area in the south.	Unlikely - study area is grazed.	All Year

Scientific Name	Common Name	TSC Status[1]	EPBC Status[2]	Habitat	Distribution	Likelihood of Occurrence	Recommended Survey Period[3]
				inundated habitats. Very little ecological information is available for this species so its critical habitat components can only be speculated as relatively undisturbed and ungrazed drainage lines and flats.			
Austrostipa metatoris		V	V	Sandhills, sand ridges, undulating plains and flat open mallee country, with red to red-brown clay-loam to sandy-loam soils.	Most records occur in the Murray Valley with sites including Cunninyeuk Station, Stony Crossing, Kyalite State Forest (now part of Murrumbidgee Valley Regional Park) and Lake Benanee. Scattered records also occur in central NSW including Lake Cargelligo, east of Goolgowi, Condobolin and south west of Nymagee. Otherwise only known from near Bordertown in south east South Australia, where it may be locally extinct.	Unlikely- previous records are some distance from the study area.	All Year
Austrostipa nullanulla	Club Speargrass	E	-	Within the Murray Mallee it is restricted to gypseous lunettes and copi rises and at Nulla Station it grows on the margins of relict lakes, on the crests and sides of lunettes above old lake floors.	Currently known only in NSW from Nulla Station to the north of Lake Victoria in the far south west, with the total population estimated at 200,000+ individuals. In Victoria there are an estimated 1500 plants in the Towan Plains Flora and Fauna Reserve, 300 plants in Murray-Sunset National Park and 330 plants on the Raak Plain. It is more widespread in South Australia, but is still considered Vulnerable in that state.	Unlikely - previous records are some distance from the study area; suitable habitat not present.	December - February
Austrostipa wakoolica	A speargrass	E	E	Grows on floodplains of the Murray River tributaries, in open woodland on grey, silty clay or sandy loam soils; habitats include the edges of a lignum swamp with box and mallee; creek banks in grey, silty clay; mallee and lignum sandy-loam flat; open Cypress Pine forest on low sandy range; and a low,	Confined to the floodplains of the Murray River tributaries of central-western and south-western NSW, with localities including Manna State Forest, Matong, Lake Tooim, Merran Creek, Tulla, Cunninyeuk and Mairjimmy State Forest (now part of South West Woodland Nature Reserve).	Unlikely - previous records are some distance from the study area; suitable habitat not present	September - December

Scientific Name	Common Name	TSC Status[1]	EPBC Status[2]	Habitat	Distribution	Likelihood of Occurrence	Recommended Survey Period[3]
				rocky rise. Associated species include *Callitris glaucophylla, Eucalyptus microcarpa, E. populnea, Austrostipa eremophila, A. drummondii, Austrodanthonia eriantha* and *Einadia nutans.*			
Brachyscome papillosa	Mossgiel Daisy	V	V	Recorded primarily in clay soils on Bladder Saltbush (Atriplex vesicaria) and Maireana aphylla plains, but also in grassland and in Grey Box (*Eucalyptus microcarpa*) - Cypress Pine (*Callitris spp.*) woodland.	Occurs chiefly from Mossgiel to Urana, with sites in the Jerilderie area, the Hay Plain, Willandra Lakes district and north to Ivanhoe. A north-western outlier is a Byrnedale Station, north of Menindee. The only known slopes on South Western Slopes is Ganmain Reserve.	Potential.	June to December
Convolvulus tedmoorei	Blue-bush Daisy	E	-	Grows in self-mulching grey clay soils on the floodplains of the Darling and Murrumbidgee Rivers.	Originally known from only two areas on the Murrumbidgee and Darling River floodplains in central-western NSW, from Toganmain Station, Darlington Point, and from a locality 5 miles NW of Louth. Two other recorded localities for the species are ENE of Broken Hill on the road to Wilcannia, and Menindee Road, Scarsdale.	Unlikely - previous records are some distance from the study area; suitable habitat not present.	All Year
Cratystylis conocephala		E	-	Bluebush Daisy grows in mallee with areas of Belah (*Casuarina pauper*) on calcareous red soil. NSW populations are invariably found in Belah-Rosewood woodland or on the edge of sandplain mallee in calcareous soils.	Very rare in NSW, restricted to a few small populations in the Wentworth district in the far south-western plains. Most records are from the Scotia mallee near the South Australian border, including Tarawi Nature Reserve, Scotia Sanctuary and Nanya Station. It has also been recorded from near Lake Victoria and from Garston Station between the Darling River and the Great Darling Anabranch. The species is also rare in Victoria, known from only seven plants in three reserves in the far north-west. Bluebush Daisy is more common in South Australia, Western Australia and the Northern Territory.	Unlikely - previous records are some distance from the study area.	September - December
Eleocharis obicis	Striate Spike-sedge	V	V	It grows in ephemerally wet situations such as roadside mitre drains and	Found near Condobolin and Hay, as well as being known from an old collection from the Barrier Range near Broken Hill. The later collection was made on the	Previous records are some	All Year

Scientific Name	Common Name	TSC Status[1]	EPBC Status[2]	Habitat	Distribution	Likelihood of Occurrence	Recommended Survey Period[3]
				depressions, usually in low-lying grassland. NSW sites include depressions with heavy clay soils on the Lachlan River floodplain.	Lachlan River floodplain at Micabil, near Condobolin.	distance from the study area; suitable habitat not present.	
Lasiopetalum behrii	Pink Velvet Bush	CE	-	Grows in mallee and red dune and swale country. In Victoria recorded in Eucalyptus gracilis mallee woodland with an understorey of Acacia and Triodia, *Halgania andromedifolia* and *Eutaxia microphylla*, on deep sand.	Pink Velvet Bush is known in NSW from a single record made in 1997 on leasehold land to the south east of Pooncarie in the far south western plains. The species is common in mallee areas of north western Victoria, with an outlier in the whipstick mallee near Bendigo. It is also widespread in south eastern South Australia.	Potential.	Late winter - spring
Lepidium monoplocoides	Winged Peppercress	E	E	Occurs on seasonally moist to waterlogged sites, on heavy fertile soils, with a mean annual rainfall of around 300-500 mm. Predominant vegetation is usually an open woodland dominated by *Allocasuarina luehmannii* (Bulloak) and/or eucalypts, particularly *Eucalyptus largiflorens* (Black Box) or *Eucalyptus populnea* (Poplar Box). The field layer of the surrounding woodland is dominated by tussock grasses.	Widespread in the semi-arid western plains regions of NSW. Collected from widely scattered localities, with large numbers of historical records but few recent collections. There is a single collection from Broken Hill and only two collections since 1915, the most recent being 1950. Also previously recorded from Bourke, Cobar, Urana, Lake Cargelligo, Balranald, Wanganella and Deniliquin. Recorded more recently from the Hay Plain, south-eastern Riverina, and from near Pooncarie.	Potential	November - February
Phyllanthus maderaspatanus		E	-	Grows in floodplain areas on heavy soils and may rely on appropriate and intermittent rainfall and flooding events for its survival. The species is	Recorded for the Brewarrina and Collarenebri districts in the north-western plains of NSW. Also occurs in Queensland, the Northern Territory, South Australia and Western Australia.	Unlikely - previous records are some distance from the	September - February

Scientific Name	Common Name	TSC Status[1]	EPBC Status[2]	Habitat	Distribution	Likelihood of Occurrence	Recommended Survey Period[3]
				described as being a summer-growing annual and is thus dependent on seasonal conditions. Often associated with open grasslands and eucalypt woodlands in or near creek beds, and grassy flats and levees near watercourses.		study area; suitable habitat not present	
Pimelea serpyllifolia subsp. serpyllifolia	Thyme Rice-Flower	E	-	Grows in scrub and woodland on calcareous soils. Often found in sandy red soils supporting mallee scrub. Associated species include *Eucalyptus oleosa, E. leptophylla, E. dumosa, Melaleuca lanceolata, Leptospermum laevigatum, Leucopogon parviflorus, Olearia axillaris, Myoporum insulare, Rhagodia candolleana, Acacia* and *Hakea spp.,* Spinifex and other tall grasses.	Not common in NSW, found only in the far south-western plains in the Euston district, becoming more abundant in Victoria and South Australia.	Unlikely - previous records are some distance from the study area.	Most of the year especially July to November
Santalum murrayanum	Bitter Quandong	E	-	Usually grows in mallee communities. Generally grows in gravely and sandy loam soils on dunes, in open woodland and tall shrubland. Also recorded in sand in spinifex-shrub steppe. NSW populations found in mallee habitats on soft linear dune-crests, with deep and well-drained calcareous earths or red and brown sands, loamy	The Bitter Quandong occurs between inland southern Western Australia, through South Australia, east to north-western Victoria and south-western NSW. Many of the NSW records occur within the vicinity of the Sturt Highway (between Dareton and Balranald), but recently more plants have been over a much wider distribution, including between Kyalite and Moulamein in the east, west of Lake Victoria in the west and in mallee to the south east of Menindee in the north. Only one plant is known from formal conservation reserves in NSW (Mallee Cliffs National Park), though another is known from the Travelling Stock Route within northern Mungo National Park and a number are known from various conservation initiatives on leasehold land.	Potential.	August to January

Scientific Name	Common Name	TSC Status[1]	EPBC Status[2]	Habitat	Distribution	Likelihood of Occurrence	Recommended Survey Period[3]
				sands or clay-loams. Associated species include *Eucalyptus socialis* and *Pimelea microcephala, Eucalyptus costata, E. leptophylla, E. dumosa, Callitris verrucosa* and *Triodia scariosa.*			
Solanum karsense	Menindee Nightshade	V	V	Grows in occasionally flooded depressions with heavy soil, including level river floodplains of grey clay with Black Box and Old Man Saltbush, and open treeless plains with solonized brown soils (OEH 2012a).	Menindee Nightshade is the only species of Solanum endemic to NSW and is restricted to the far south-western plains, extending up the Darling River to the Menindee and Wilcannia districts. Mainly restricted to the area between the Darling and Lachlan Rivers. Localities include Kars Station, Lake Tandou, Lake Cawndilla, Oxley area, between Broken Hill and Menindee, and the Darling River. It has been recorded from Kinchega National Park and Nearie Lake Nature Reserve (OEH 2012a).	Potential.	Spring
Swainsona colutoides	Bladder Senna	E	-	Grows on sandy flats or skeletal hillside soils in mallee woodland. Plants are usually found in large numbers in areas of previous controlled burns and wildfires.	Occurs in the south-western corner of NSW, with several populations all located within Tarawi Nature Reserve. Also found in inland parts of southern Western and South Australia (where it is widespread), and in the Northern Territory near Alice Springs.	Unlikely - previous records are some distance from the study area.	All Year (except October, March & January)
Swainsona murrayana	Slender Darling-pea	V	V	The species has been collected from clay-based soils, ranging from grey, red and brown cracking clays to red-brown earths and loams. Grows in a variety of vegetation types including bladder saltbush, black box and grassland communities on level plains, floodplains and depressions and is often found with Maireana species. Plants	Found throughout NSW, it has been recorded in the Jerilderie and Deniliquin areas of the southern riverine plain, the Hay plain as far north as Willandra National Park, near Broken Hill and in various localities between Dubbo and Moree.	Potential.	September to February

Scientific Name	Common Name	TSC Status[1]	EPBC Status[2]	Habitat	Distribution	Likelihood of Occurrence	Recommended Survey Period[3]
				have been found in remnant native grasslands or grassy woodlands that have been intermittently grazed or cultivated.			
Swainsona pyrophila	Yellow Swainson-pea	V	V	Grows in mallee scrub on sandy or loamy soil, usually found only after fire. Sites include cleared and burnt mallee scrub on red loam to sand, previously burnt *Eucalyptus dumosa* mallee, disturbed woodland in sheltered aspects, a bulldozed firebreak adjacent to wheat paddocks, roadsides, claypans and at the edge of fire ash.	Occurs in the south-western plains regions of NSW and into Victoria and South Australia. The species is distributed in the south-eastern half of South Australia, along the Murray River valley into north-western Victoria, with isolated occurrences northward.	Potential	September - December

[1] Threatened species status under the NSW *Threatened Species Conservation Act*, 1995 .
[2] Threatened species status under the Commonwealth *Environment Protection and Biodiversity Conservation Act,* 1999.
[3] Recommended survey period taken from the BioBanking Threatened Species Profile Database (OEH 2011b)

Appendix E: Native Species List

Family	Scientific Name	Common Name	Status
Malvaceae	*Abutilon fraseri*	Dwarf Lantern-flower	
Malvaceae	*Abutilon otocarpum*	Desert Lantern	extension of range within SFWP
Fabaceae	*Acacia aneura*	Mulga	
Fabaceae	*Acacia brachybotrya*	Grey Mulga	
Fabaceae	*Acacia colletioides*	Wait-a-while	
Fabaceae	*Acacia halliana*		extension of range within SFWP
Fabaceae	*Acacia homalophylla*	Yarran	
Fabaceae	*Acacia ligulata*	Small Cooba	
Fabaceae	*Acacia melvillei*	Yarran	
Fabaceae	*Acacia oswaldii*	Miljee	
Fabaceae	*Acacia rigens*	Needle Wattle	
Fabaceae	*Acacia sclerophylla*		
Fabaceae	*Acacia wilhelmiana*	Wilhelmi's Wattle	
Asteraceae	*Actinobole uliginosum*	Flannel Cudweed	
Sapindaceae	*Alectryon oleifolius*	Western Rosewood	
Amaranthaceae	*Alternanthera denticulata*	Lesser Joy Weed	
Poaceae	*Amphipogon caricinus var. caricinus*	Long Greybeard Grass	
Loranthaceae	*Amyema miraculosum*		
Loranthaceae	*Amyema preissii*		
Asteraceae	*Angianthus brachypappus*	Spreading Cup-flower	
Fabaceae	*Aotus subspinescens*		uncommon
Capparaceae	*Apophyllum anomalum*	Warrior Bush	
Brassicaceae	*Arabidella nasturtium*		
Brassicaceae	*Arabidella trisecta*		
Rubiaceae	*Asperula conferta*	Common Woodruff	

Family	Scientific Name	Common Name	Status
Chenopodiaceae	*Atriplex acutibractea* subsp. *acutibractea*		
Chenopodiaceae	*Atriplex angulata*	Fan Saltbush	
Chenopodiaceae	*Atriplex eardleyae*		
Chenopodiaceae	*Atriplex holocarpa*	Pop Saltbush	
Chenopodiaceae	*Atriplex leptocarpa*	Slender-fruit Saltbush	
Chenopodiaceae	*Atriplex lindleyi*		
Chenopodiaceae	*Atriplex semibaccata*	Creeping Saltbush	
Chenopodiaceae	*Atriplex spinibractea*	Spiny-fruit Saltbush	
Chenopodiaceae	*Atriplex stipitata*	Mallee Saltbush	
Poaceae	*Austrodanthonia setacea*	Smallflower Wallaby Grass	
Poaceae	*Austrostipa drummondii*		
Poaceae	*Austrostipa elegantissima*	Feather Speargrass	
Poaceae	*Austrostipa eremophila*		
Poaceae	*Austrostipa nitida*		
Poaceae	*Austrostipa platychaeta*	Flatawn Speargrass	
Poaceae	*Austrostipa puberula*		
Poaceae	*Austrostipa scabra*	Speargrass	
Poaceae	*Austrostipa tuckeri*	Tucker's Spear-grass	
Elatinaceae	*Bergia trimera*	Small Water-fire	
Nyctaginaceae	*Boerhavia dominii*	Tarvine	
Fabaceae	*Bossiaea walker*	Cactus Pea	
Asteraceae	*Brachyscome ciliaris var. ciliaris*	Variable Daisy	
Asteraceae	*Brachyscome ciliaris var. subintegrifolia*		
Asteraceae	*Brachyscome multifida*	Cut-leaved Daisy	
Asteraceae	*Brachyscome trachycarpa*	Smooth Daisy	
Asphodelaceae	*Bulbine alata*	Bulbine Lily	
Asphodelaceae	*Bulbine semibarbata*	Wild Onion	

Family	Scientific Name	Common Name	Status
Portulacaceae	*Calandrinia eremaea*		
Cupressaceae	*Callitris glaucophylla*	White Cypress Pine	
Cupressaceae	*Callitris verrucosa*	Mallee Pine	
Asteraceae	*Calotis erinacea*	Tangled Burr-daisy	
Asteraceae	*Calotis scapigera*	Tufted Burr-daisy	
Asteraceae	*Cassinia laevis*	Cough Bush	
Lauraceae	*Cassytha melantha*		
Casuarinaceae	*Casuarina pauper*	Belah	
Asteraceae	*Centipeda crateriformis*		
Asteraceae	*Centipeda cunninghamii*	Common Sneezeweed	
Asteraceae	*Centipeda thespidioides*	Desert Sneezeweed	
Euphorbiaceae	*Chamaesyce drummondii*	Caustic Weed	
Adiantaceae	*Cheilanthes sieberi subsp. sieberi*	Mulga Fern	
Chenopodiaceae	*Chenopodium cristatum*	Crested Goosefoot	
Chenopodiaceae	*Chenopodium curvispicatum*		
Chenopodiaceae	*Chenopodium desertorum subsp. desertorum*		
Chenopodiaceae	*Chenopodium desertorum subsp. rectum*	Frosted Goosefoot	
Chenopodiaceae	*Chenopodium melanocarpum*	Black Crumbweed	
Poaceae	*Chloris truncate*	Windmill Grass	
Asteraceae	*Chrysocephalum apiculatum*	Common Everlasting, Yellow Buttons	
Asteraceae	*Chthonocephalus pseudevax*	Ground-heads	
Convolvulaceae	*Convolvulus clementii*	Desert Bindweed	
Convolvulaceae	*Convolvulus graminetinus*		
Convolvulaceae	*Convolvulus remotus*		
Anthericaceae	*Corynotheca licrota*	Club-fruit Lily	
Crassulaceae	*Crassula colorata*		
Crassulaceae	*Crassula sieberiana*	Australian Stonecrop	

Family	Scientific Name	Common Name	Status
Amaryllidaceae	*Crinum flaccidum*	Darling Lily	
Rhamnaceae	*Cryptandra propinqua*		
Fabaceae	*Cullen discolour*	Grey Scurf-pea	
Boraginaceae	*Cynoglossum suaveolens*		new record for SFWP
Apiaceae	*Daucus glochidiatus*	Native Carrot	
Phormiaceae	*Dianella revoluta var. revoluta*		
Lamiaceae	*Dicrastylis verticillata*	Sand-sage	
Poaceae	*Diplachne fusca*	Brown Beetle Grass	
Chenopodiaceae	*Dissocarpus paradoxus*	Cannonball Burr	
Sapindaceae	*Dodonaea bursariifolia*		
Sapindaceae	*Dodonaea lobulata*		second record for the region
Sapindaceae	*Dodonaea viscosa subsp. angustissima*	Narrow-lead Hop-bush	
Solanaceae	*Duboisia hopwoodii*	Pituri	
Chenopodiaceae	*Dysphania littoralis*		
Asteraceae	*Eclipta platyglossa*		
Chenopodiaceae	*Einadia nutans subsp. nutans*	Climbing Saltbush	
Chenopodiaceae	*Einadia nutans subsp. oxycarpa*		
Chenopodiaceae	*Einadia polygonoides*		
Chenopodiaceae	*Einadia trigonos*	Fishweed	
Cyperaceae	*Eleocharis acuta*		
Cyperaceae	*Eleocharis pusilla*		
Poaceae	*Elymus scaber*		
Chenopodiaceae	*Enchylaena tomentosa*	Ruby Saltbush	
Poaceae	*Enneapogon avenaceus*	Bottle Washers	
Poaceae	*Enneapogon nigricans*	Niggerheads	
Poaceae	*Enteropogon acicularis*		
Poaceae	*Enteropogon ramosus*	Curly Windmill Grass	

Family	Scientific Name	Common Name	Status
Asteraceae	*Epaltes australis*	Spreading Nut-heads	
Poaceae	*Eragrostis australasica*	Cane Grass	
Poaceae	*Eragrostis dielsii*	Mallee Lovegrass	
Poaceae	*Eragrostis elongata*	Clustered Lovegrass	new record for SFWP
Poaceae	*Eragrostis falcate*	Sickle Lovegrass	extension of range within SFWP
Poaceae	*Eragrostis lacunaria*	Purple Lovegrass	
Poaceae	*Eragrostis setifolia*	Bristly Love	
Myoporaceae	*Eremophila alternifolia*	Narrow-leaved Fuchsia Bush	
Myoporaceae	*Eremophila deserti*	Turkeybush	
Myoporaceae	*Eremophila glabra subsp. glabra*	Tar Bush	
Myoporaceae	*Eremophila glabra subsp. murrayana*	Tar Bush	
Myoporaceae	*Eremophila longifolia*	Emubush	
Myoporaceae	*Eremophila maculata*	Spotted Fuchsia-bush	
Myoporaceae	*Eremophila oppositifolia subsp. rubra*	Weeooka	
Myoporaceae	*Eremophila sturtii*	Turpentine Bush	
Geraniaceae	*Erodium crinitum*	Blue Storksbill, Blue Crowfoot	
Geraniaceae	*Erodium cygnorum*		
Myrtaceae	*Eucalyptus costata subsp. murrayana*	Ridge-fruited Mallee	
Myrtaceae	*Eucalyptus dumosa*	White Mallee	
Myrtaceae	*Eucalyptus gracilis*	Yorrell	
Myrtaceae	*Eucalyptus largiflorens*	Black Box	
Myrtaceae	*Eucalyptus leptophylla*	Narrow-leaved Red Mallee	
Myrtaceae	*Eucalyptus oleosa* subsp. *oleosa*	Red Mallee	
Myrtaceae	*Eucalyptus porosa*	Mallee Box	
Myrtaceae	*Eucalyptus socialis*	Red Mallee	
Asteraceae	*Euchiton involucratus*	Star Cudweed	
Asteraceae	*Euchiton sphaericus*		

Family	Scientific Name	Common Name	Status
Euphorbiaceae	*Euphorbia tannensis* subsp. *eremophila*	Desert Spurge	
Fabaceae	*Eutaxia microphylla*		
Santalaceae	*Exocarpos aphyllus*	Leafless Ballart	
Rutaceae	*Geijera parviflora*	Wilga	
Asteraceae	*Gnephosis tenuissima*		
Goodeniaceae	*Goodenia cycloptera*		
Goodeniaceae	*Goodenia fascicularis*		
Goodeniaceae	*Goodenia glauca*		
Goodeniaceae	*Goodenia havilandii*		new record for SFWP
Goodeniaceae	*Goodenia pinnatifida*		
Goodeniaceae	*Goodenia willisiana*		
Proteaceae	*Grevillea huegelii*		
Caryophyllaceae	*Gypsophila tubulosa*	Annual Chalkwort	new record for SFWP
Proteaceae	*Hakea leucoptera*	Needlewood	
Proteaceae	*Hakea tephrosperma*	Hooked Needlewood	
Boraginaceae	*Halgania cyanea*	Rough Halgania	
Haloragaceae	*Haloragis odontocarpa*		
Brassicaceae	*Harmsiodoxa brevipes var. brevipes*		
Dilleniaceae	*Hibbertia virgata subsp. virgata*		
Malvaceae	*Hibiscus sturtii*	Hill Hibiscus	
Asteraceae	*Hyalosperma spp.*		
Violaceae	*Hybanthus floribundus subsp. floribundus*	Shrub Violet	
Isoetaceae	*Isoetes muelleri*	Quillwort	new record for SFWP
Asteraceae	*Isoetopsis graminifolia*	Grass Cushion	
Cyperaceae	*Isolepis australiensis*		
Juncaceae	*Juncus aridicola*		
Juncaceae	*Juncus flavidus*		

Family	Scientific Name	Common Name	Status
Poaceae	*Lachnagrostis filiformis*		
Asteraceae	*Leiocarpa leptolepis*	Pale Plover-daisy	extension of range within South Far Western Plains Botanical Region (SFWP)
Asteraceae	*Leiocarpa panaetioides*	Woolly Buttons	
Asteraceae	*Leiocarpa websteri*		
Asteraceae	*Lemooria burkittii*	Wires-a-wool	
Brassicaceae	*Lepidium fasciculatum*		
Brassicaceae	*Lepidium leptopetalum*		
Brassicaceae	*Lepidium monoplocoides*	Winged Peppercress	endangered under the NSW *Threatened Species Conservation Act, 1995* and the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999*
Brassicaceae	*Lepidium papillosum*	Warty Peppercress	
Brassicaceae	*Lepidium phlebopetalum*	Veined Peppercress	
Brassicaceae	*Lepidium pseudohyssopifolium*	Peppercress	
Asteraceae	*Leptorhynchos baileyi*	Wooly buttons	
Myrtaceae	*Leptospermum coriaceum*	Green Tea-tree	
Loganiaceae	*Logania nuda*		uncommon
Lomandraceae	*Lomandra collina*	Pale Mat-rush	
Lomandraceae	*Lomandra effuse*	Scented Mat-rush	
Lomandraceae	*Lomandra leucocephala*	Woolly Mat-rush	
Fabaceae	*Lotus cruentus*	Red-flowered Lotus	
Loranthaceae	*Lysiana exocarpi*		
Lythraceae	*Lythrum wilsonii*		
Chenopodiaceae	*Maireana appressa*		
Chenopodiaceae	*Maireana brevifolia*	Small-leaf Bluebush	
Chenopodiaceae	*Maireana coronate*	Crown Fissure-weed	
Chenopodiaceae	*Maireana decalvans*	Black Cotton Bush	
Chenopodiaceae	*Maireana enchylaenoides*	Wingless Bluebush	
Chenopodiaceae	*Maireana georgei*	Slit-wing Bluebush	

Family	Scientific Name	Common Name	Status
Chenopodiaceae	*Maireana integra*		
Chenopodiaceae	*Maireana pentagona*	Hairy Bluebush	
Chenopodiaceae	*Maireana pentatropis*	Erect Mallee Bluebush	
Chenopodiaceae	*Maireana pyramidata*	Black Bluebush	
Chenopodiaceae	*Maireana radiate*	Grey Bluebush	
Chenopodiaceae	*Maireana sclerolaenoides*		
Chenopodiaceae	*Maireana sedifolia*	Pearl Bluebush	
Chenopodiaceae	*Maireana trichoptera*	Pink-seeded Bluebush	
Chenopodiaceae	*Maireana triptera*	Three-wing Bluebush	
Chenopodiaceae	*Maireana turbinate*	Satiny Bluebush	
Apocynaceae	*Marsdenia australis*	Doubah	
Marsileaceae	*Marsilea drummondii*	Common Nardoo	
Marsileaceae	*Marsilea hirsute*	Nardoo	
Asteraceae	*Millotia tenuifolia*		
Asteraceae	*Minuria cunninghamii*		
Polygonaceae	*Muehlenbeckia florulenta*	Lignum	
Loranthaceae	*Muellerina eucalyptoides*		
Myoporaceae	*Myoporum platycarpum subsp. platycarpum*	Sugarwood	
Haloragaceae	*Myriophyllum verrucosum*	Red Water-milfoil	
Solanaceae	*Nicotiana goodspeedii*		
Solanaceae	*Nicotiana simulans*		
Nitrariaceae	*Nitraria billardierei*	Dillon Bush	
Asteraceae	*Olearia calcarea*	Limestone Daisy Bush	
Asteraceae	*Olearia decurrens*	Clammy Daisy-bush	
Asteraceae	*Olearia passerinoides subsp. passerinoides*	Slender daisy Bush	
Asteraceae	*Olearia pimeleoides*		
Asteraceae	*Olearia rudis*	Azure Daisy Bush	

Family	Scientific Name	Common Name	Status
Boraginaceae	*Omphalolappula concava*	Burr Stickseed	
Oxalidaceae	*Oxalis chnoodes*		
Oxalidaceae	*Oxalis perennans*		
Poaceae	*Panicum effusum*	Hairy Panic	
Apocynaceae	*Parsonsia eucalyptophylla*	Gargaloo	
Poaceae	*Paspalidium constrictum*	Knottybutt Grass	
Poaceae	*Paspalidium jubiflorum*	Warrego Grass	
Geraniaceae	*Pelargonium australe*	Native Storksbill	
Polygonaceae	*Persicaria lapathifolia*	Pale Knotweed	
Thymelaeaceae	*Pimelea microcephala subsp. microcephala*		
Thymelaeaceae	*Pimelea trichostachya*		
Plantaginaceae	*Plantago cunninghamii*		
Plantaginaceae	*Plantago debilis*		
Plantaginaceae	*Plantago drummondii*		
Plantaginaceae	*Plantago turrifera*		
Poaceae	*Poa fax*	Scaly Poa	
Asteraceae	*Podolepis canescens*	Large Copper-wire Daisy	new record for SFWP
Asteraceae	*Podolepis capillaries*	Invisible Plant	
Asteraceae	*Podolepis neglecta*		
Polygonaceae	*Polygonum plebeium*	Small Knotweed	
Portulacaceae	*Portulaca oleracea*	Pigweed	
Lobeliaceae	*Pratia purpurascens*	Whiteroot	
Asteraceae	*Pseudognaphalium luteoalbum*	Jersey Cudweed	
Amaranthaceae	*Ptilotus exaltatus var. exaltatus*	Tall Mulla Mulla	
Amaranthaceae	*Ptilotus gaudichaudii*	Paper Foxtail	
Amaranthaceae	*Ptilotus obovatus var. obovatus*	Smoke Bush	
Amaranthaceae	*Ptilotus polystachyus*	Long Tails	

Family	Scientific Name	Common Name	Status
Amaranthaceae	*Ptilotus sessilifolius var. sessiliflorus*	Silver Tails	
Asteraceae	*Pycnosorus thompsonianus*		
Malvaceae	*Radyera farragei*	Bush Hibiscus	
Ranunculaceae	*Ranunculus sessiliflorus*	Small-flowered Buttercup	
Chenopodiaceae	*Rhagodia spinescens*	Spiny Saltbush	
Chenopodiaceae	*Rhagodia ulicina*	Spiny Goosefoot	
Asteraceae	*Rhodanthe corymbiflora*	Small White Sunray	
Asteraceae	*Rhodanthe floribunda*	Common White Sunray	
Apocynaceae	*Rhyncharrhena linearis*		
Polygonaceae	*Rumex crystallinus*	Shiny Dock	
Polygonaceae	*Rumex tenax*	Shiny Dock	
Asteraceae	*Rutidosis helichrysoides*	Grey Wrinklewort	
Chenopodiaceae	*Salsola kali*		
Goodeniaceae	*Scaevola depauperata*	Skeleton Fan-flower	
Goodeniaceae	*Scaevola spinescens*	Maroon Bush	
Gentianaceae	*Schenkia spicata*	Spike Centaury	
Cyperaceae	*Schoenus subaphyllus*	Desert Bog-rush	
Caryophyllaceae	*Scleranthus minisculus*		
Caryophyllaceae	*Scleranthus pungens*	Prickly Knawel	
Chenopodiaceae	*Sclerolaena brachyptera*		
Chenopodiaceae	*Sclerolaena decurrens*	Green Copperburr	
Chenopodiaceae	*Sclerolaena diacantha*	Grey Copperburr	
Chenopodiaceae	*Sclerolaena intricate*	Poverty Bush	
Chenopodiaceae	*Sclerolaena lanicuspis*	Woolly Copperburr	
Chenopodiaceae	*Sclerolaena obliquicuspis*	Limestone Bindii	
Chenopodiaceae	*Sclerolaena parviflora*		
Chenopodiaceae	*Sclerolaena patenticuspis*	Spear-fruit Copperburr	

Family	Scientific Name	Common Name	Status
Chenopodiaceae	*Sclerolaena tricuspis*	Giant Redburr	
Asteraceae	*Senecio glossanthus*		
Asteraceae	*Senecio productus subsp. productus*		
Asteraceae	*Senecio quadridentatus*	Cotton Fireweed	extension of range within SFWP
Asteraceae	*Senecio runcinifolius*	Tall Groundsel	
Fabaceae	*Senna form taxon 'coriacea'*		
Fabaceae	*Senna form taxon 'filifolia'*		
Fabaceae	*Senna form taxon 'petiolaris'*	Woody Cassia	
Fabaceae	*Senna phyllodinea*		
Malvaceae	*Sida corrugate*	Corrugated Sida	
Malvaceae	*Sida cunninghamii*	Ridged Sida	
Malvaceae	*Sida filiformis*	Fine Sida	
Malvaceae	*Sida intricate*	Twiggy Sida	
Malvaceae	*Sida sp. C* sensu Harden (1990)		
Solanaceae	*Solanum coactiliferum*	Western Nightshade	
Solanaceae	*Solanum esuriale*	Quena	
Solanaceae	*Solanum simile*	Oondoroo	
Caryophyllaceae	*Spergularia marina*	Lesser Sea-spurrey	
Poaceae	*Sporobolus caroli*	Fairy Grass	
Stackhousiaceae	*Stackhousia muricata*	Western Stackhousia	
Scrophulariaceae	*Stemodia florulenta*	Blue-rod	
Brassicaceae	*Stenopetalum lineare*	Threadcress	
Brassicaceae	*Stenopetalum sphaerocarpum*		
Brassicaceae	*Stenopetalum velutinum*	Velvet Thread-petal	presumed extinct- unconfirmed record
Aizoaceae	*Tetragonia tetragonioides*	New Zealand Spinach	
Lamiaceae	*Teucrium albicaule*		
Lamiaceae	*Teucrium racemosum*	Forest Germander	

Family	Scientific Name	Common Name	Status
Anthericaceae	*Thysanotus bauera*	Mallee Fringe Lily	
Poaceae	*Triodia scariosa subsp. scariosa*	Porcupine Grass	
Poaceae	*Tripogon loliiformis*	Fiveminute Grass	
Asteraceae	*Triptilodiscus pygmaeus*	Common Sunray	new record for SFWP
Typhaceae	*Typha domingensis*	Narrow-leaved Cumbungi	
Goodeniaceae	*Velleia arguta*		new record for SFWP
Verbenaceae	*Verbena gaudichaudii*		
Asteraceae	*Vittadinia blackii*	Western New Holland Daisy	uncommon
Asteraceae	*Vittadinia cervicularis*		
Asteraceae	*Vittadinia condyloides*		
Asteraceae	*Vittadinia cuneata*	Fuzzweed	
Asteraceae	*Vittadinia dissecta*	Dissected New Holland Daisy	
Asteraceae	*Vittadinia eremaea*		
Asteraceae	*Vittadinia gracilis*	Woolly New Holland Daisy	
Asteraceae	*Vittadinia muelleri*		
Asteraceae	*Vittadinia pterochaeta*	Rough Fuzzweed	new record for SFWP
Asteraceae	*Vittadinia sulcata*		
Campanulaceae	*Wahlenbergia communis*	Tufted Bluebell	
Campanulaceae	*Wahlenbergia fluminalis*	River Bluebell	
Campanulaceae	*Wahlenbergia gracilenta*	Annual Bluebell	
Campanulaceae	*Wahlenbergia luteola*		
Campanulaceae	*Wahlenbergia tumidifructa*		
Lamiaceae	*Westringia rigida*	Stiff Westringia	
Asteraceae	*Xerochrysum bracteatum*	Golden Everlasting	
Zygophyllaceae	*Zygophyllum ammophilum*	Sand Twinleaf	
Zygophyllaceae	*Zygophyllum apiculatum*	Gallweed, Pointed Twinleaf, Common Twinleaf	
Zygophyllaceae	*Zygophyllum aurantiacum*	Shrubby Twinleaf	

Family	Scientific Name	Common Name	Status
Zygophyllaceae	*Zygophyllum confluens*		
Zygophyllaceae	*Zygophyllum eremaeum*	Climbing Twinleaf	
Zygophyllaceae	*Zygophyllum glaucum*	Pale Twinleaf	
Zygophyllaceae	*Zygophyllum iodocarpum*	Violet Twinleaf	

Appendix F: Introduced Species

Family	Scientific Name	Common Name	Status
Brassicaceae	*Alyssum linifolium*	Flax-leaf Alyssum	
Boraginaceae	*Amsinckia intermedia*	Common Fiddleneck	
Asteraceae	*Arctotheca calendula*	Capeweed	
Asphodelaceae	*Asphodelus fistulosus*	Onion Weed	Noxious (class 4)
Asteraceae	*Aster subulatus*	Wild Aster	
Poaceae	*Avena barbata*	Bearded Oats	
Poaceae	*Bromus rubens*	Red Brome	
Asteraceae	*Calendula arvensis*	Field Marigold	
Brassicaceae	*Carrichtera annua*	Ward's Weed	
Asteraceae	*Carthamus lanatus*	Saffron Thistle	
Asteraceae	*Centaurea calcitrapa*	Star Thistle	
Asteraceae	*Centaurea melitensis*	Maltese Cockspur	
Chenopodiaceae	*Chenopodium murale*	Nettle-leaf Goosefoot	
Asteraceae	*Chondrilla juncea*	Skeleton Weed	
Asteraceae	*Cirsium vulgare*	Spear Thistle	
Cucurbitaceae	*Citrullus colocynthis*	Colocynth	
Cucurbitaceae	*Citrullus lanatus* var. *lanatus*	Wild Melon	
Asteraceae	*Conyza bonariensis*	Flaxleaf Fleabane	
Asteraceae	*Conyza sumatrensis*	Tall fleabane	
Cucurbitaceae	*Cucumis myriocarpus* subsp. *leptodermis*	Paddy Melon	
Convolvulaceae	*Cuscuta campestris*	Golden Dodder	Noxious (class 4)
Cyperaceae	*Cyperus sesquiflorus*		
Fumariaceae	*Fumaria indica*		
Asteraceae	*Gamochaeta coarctata*		
Asteraceae	*Hedypnois rhagadioloides*	Cretan Weed	
Boraginaceae	*Heliotropium europaeum*	Potato Weed	
Boraginaceae	*Heliotropium supinum*	Prostrate Heliotrope	
Poaceae	*Hordeum leporinum*	Barley Grass	
Asteraceae	*Hypochaeris glabra*	Smooth Catsear	
Juncaceae	*Juncus bufonius*	Toad Rush	
Asteraceae	*Lactuca serriola*	Prickly Lettuce	
Brassicaceae	*Lepidium bonariense*		
Poaceae	*Lolium perenne*	Perennial Ryegrass	
Solanaceae	*Lycium ferocissimum*	African Boxthorn	Noxious (class 4)
Malvaceae	*Malva parviflora*	Small-flowered Mallow	
Lamiaceae	*Marrubium vulgare*	White Horehound	
Fabaceae	*Medicago laciniata*	Cut-leaved Medic	
Fabaceae	*Medicago minima*	Woolly Burr Medic	
Fabaceae	*Medicago polymorpha*	Burr Medic	

Family	Scientific Name	Common Name	Status
Solanaceae	*Nicotiana glauca*	Tree Tobacco	
Asteraceae	*Onopordum acaulon*	Stemless Thistle	
Asteraceae	*Picris angustifolia subsp. angustifolia*	Hawkweed Picris	
Poaceae	*Poa annua*	Winter Grass	
Aizoaceae	*Psilocaulon tenue*	Wiry Noon-flower	
Brassicaceae	*Rapistrum rugosum*	Turnip Weed	
Asteraceae	*Reichardia tingitana*	False Sowthistle	
Brassicaceae	*Rorippa palustris*	Yellow Cress	
Lamiaceae	*Salvia verbenaca*	Vervain	
Poaceae	*Schismus barbatus*	Arabian Grass	
Caryophyllaceae	*Silene apetala*		
Caryophyllaceae	*Silene vulgaris*	Bladder Campion	
Brassicaceae	*Sisymbrium erysimoides*	Smooth Mustard	
Solanaceae	*Solanum nigrum*	Black-berry Nightshade	
Asteraceae	*Sonchus asper*	Prickly Sowthistle	
Asteraceae	*Sonchus oleraceus*	Common Sowthistle	
Caryophyllaceae	*Spergularia diandra*	Lesser Sand-spurry	
Caryophyllaceae	*Spergularia rubra*	Sandspurry	
Asteraceae	*Taraxacum officinale*	Dandelion	
Aizoaceae	*Tetragonia decumbens*		
Verbenaceae	*Verbena supina*	Trailing Verbena	
Asteraceae	*Verbesina encelioides*		
Asteraceae	*Xanthium orientale*	Californian Burr	Noxious (class 4)
Asteraceae	*Xanthium spinosum*	Bathurst Burr	Noxious (class 4)

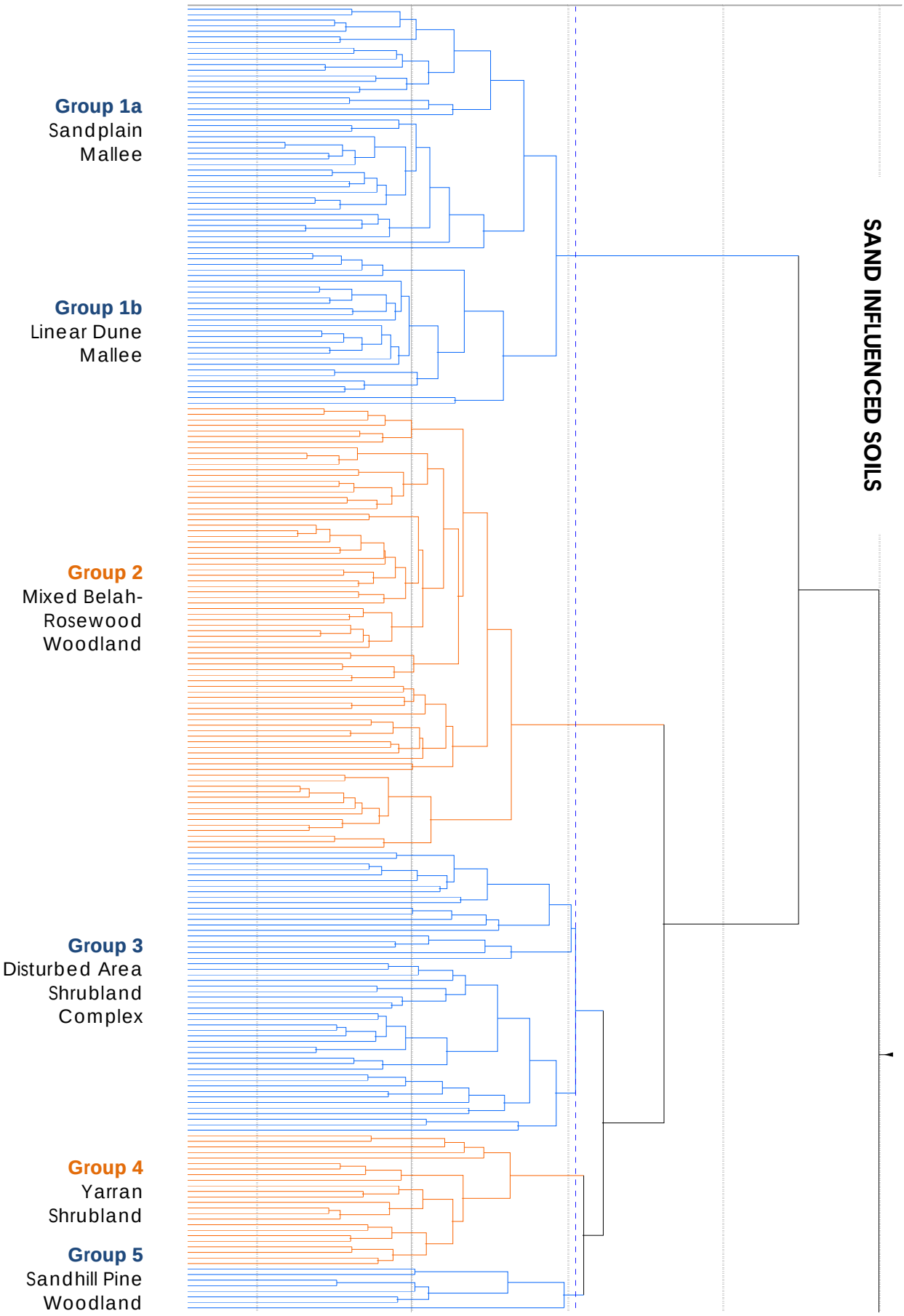
Appendix G: Weed Species listed by Plant Community

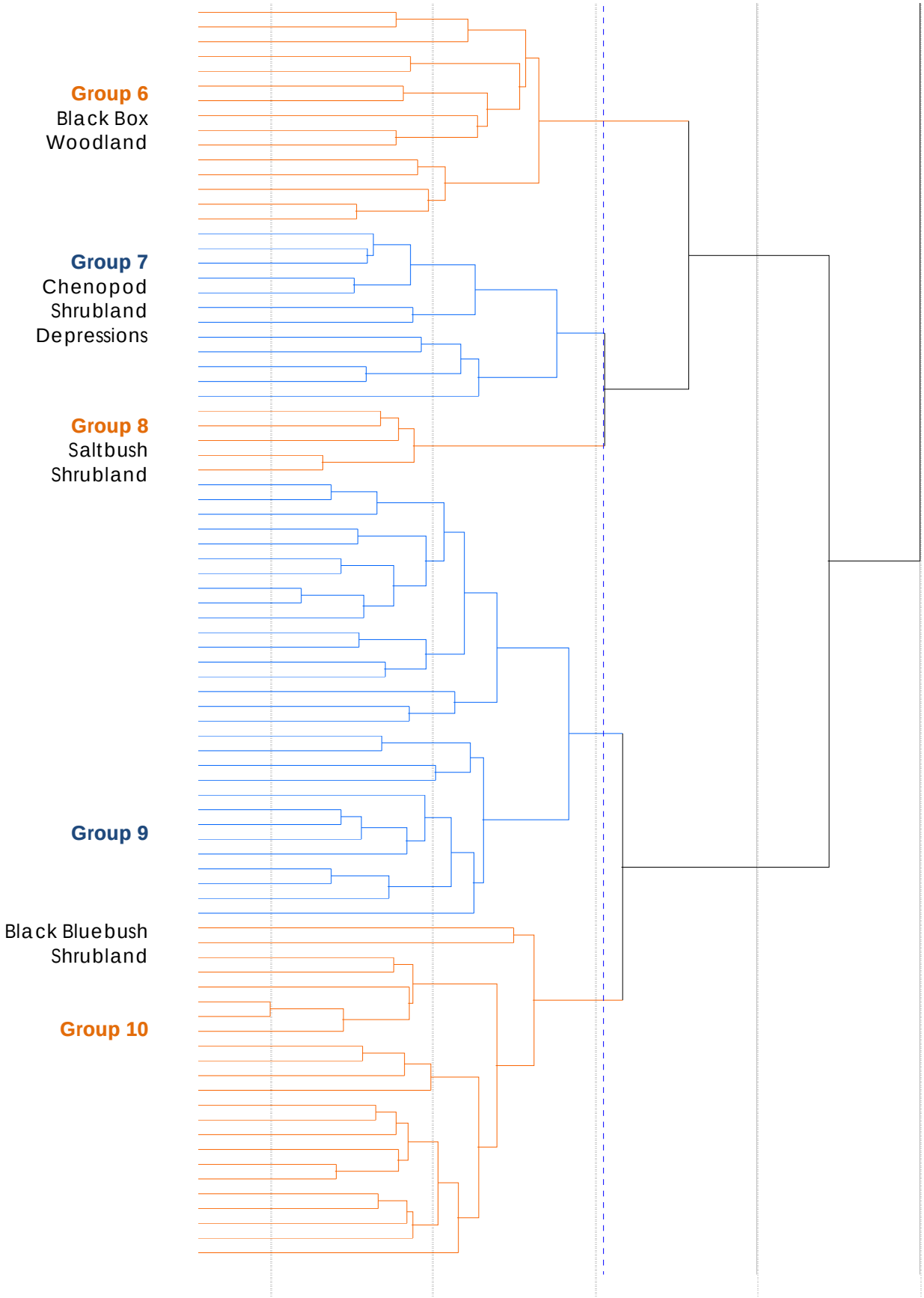
Weed species recorded for each vegetation community listed in order of most common to least common. Note: Does not include species recorded opportunistically.

Sandplain Woodland	Linear Dune Mallee	Belah-Rosewood Woodland	Disturbed Area Shrubland Complex	Yarran Shrubland	Black Box Woodland
Salvia verbenaca	*Conyza bonariensis*	*Medicago minima*	*Salvia verbenaca*	*Medicago laciniata*	*Conyza bonariensis*
Conyza bonariensis		*Medicago laciniata*	*Medicago minima*	*Salvia verbenaca*	*Reichardia tingitana*
Chondrilla juncea		*Reichardia tingitana*	*Conyza bonariensis*	*Sisymbrium erysimoides*	*Spergularia diandra*
Cirsium vulgare		*Spergularia diandra*	*Sonchus oleraceus*	*Conyza bonariensis*	*Medicago minima*
Medicago minima		*Conyza bonariensis*	*Centaurea melitensis*	*Sonchus oleraceus*	*Centaurea melitensis*
Medicago polymorpha		*Medicago polymorpha*	*Medicago polymorpha*	*Cucumis myriocarpus subsp. leptodermis*	*Salvia verbenaca*
Onopordum acaulon		*Salvia verbenaca*	*Cucumis myriocarpus subsp. leptodermis*	*Carthamus lanatus*	*Heliotropium supinum*
Solanum nigrum		*Sisymbrium erysimoides*	*Marrubium vulgare*	*Reichardia tingitana*	*Juncus bufonius*
Sonchus oleraceus		*Marrubium vulgare*	*Hordeum leporinum*	*Marrubium vulgare*	*Sonchus oleraceus*
		Centaurea melitensis	*Chondrilla juncea*	*Hordeum leporinum*	*Bromus rubens*
		Cirsium vulgare	*Citrullus colocynthis*	*Centaurea calcitrapa*	*Chondrilla juncea*
		Citrullus colocynthis	*Lycium ferocissimum*	*Lactuca serriola*	*Cirsium vulgare*
		Hypochaeris glabra	*Medicago laciniata*	*Malva parviflora*	*Gamochaeta coarctata*
		Malva parviflora	*Spergularia diandra*	*Schismus barbatus*	*Lactuca serriola*
		Silene apetala	*Asphodelus fistulosus*	*Arctotheca calendula*	*Lolium perenne*
		Solanum nigrum	*Bromus rubens*	*Avena barbata*	*Medicago laciniata*
		Sonchus asper	*Cirsium vulgare*	*Hypochaeris glabra*	*Medicago polymorpha*
		Sonchus oleraceus	*Cuscuta campestris*	*Citrullus colocynthis*	*Psilocaulon tenue*
		Verbesina encelioides	*Lolium perenne*	*Medicago polymorpha*	*Amsinckia intermedia*

Sandplain Woodland	Linear Dune Mallee	Belah-Rosewood Woodland	Disturbed Area Shrubland Complex	Yarran Shrubland	Black Box Woodland
		Xanthium spinosum	*Psilocaulon tenue*	*Centaurea melitensis*	*Aster subulatus*
			Reichardia tingitana	*Medicago minima*	*Conyza sumatrensis*
			Sonchus asper	*Xanthium orientale*	*Marrubium vulgare*
			Xanthium orientale		*Onopordum acaulon*
			Arctotheca calendula		*Picris hieracioides*
			Aster subulatus		*Rapistrum rugosum*
			Avena barbata		*Rorippa palustris*
			Calendula arvensis		*Silene vulgaris*
			Nicotiana glauca		*Sisymbrium erysimoides*
			Citrullus lanatus var. lanatus		*Sonchus asper*
			Fumaria indica		*Spergularia rubra*
			Hedypnois rhagadioloides		*Verbena supina*
			Hypochaeris glabra		
			Onopordum acaulon		
			Poa annua		
			Spergularia rubra		
			Taraxacum officinale		
			Tetragonia decumbens		

Appendix H: Dendrogram




Group 6
Black Box
Woodland
Group 7
Chenopod
Shrubland
Depressions
Group 8
Saltbush
Shrubland
Group 9
Black Bluebush
Shrubland
Group 10

Appendix I: Comparison of Yarran Shrubland Map Unit to the *Acacia melvillei* Shrubland EEC

The map unit Yarran Shrubland was determined to form part of *Acacia melvillei* Shrubland of the Riverina and Murray-Darling Depression Bioregions Endangered Ecological Community (EEC). The Final Determination for *Acacia melvillei* Shrubland of the Riverina and Murray-Darling Depression bioregions EEC describes the key diagnostic features of this community. The floristic features of Yarran Shrubland recorded in the study area are discussed below. Only paragraphs from the Final Determination relevant to the description of this EEC are included in the discussion below.

Key Features listed in the Final Determination	Key Features of Yarran Shrubland
1. Acacia melvillei Shrubland typically: • *... occupies sandhills and undulating sandplains...* • *...occurs on red-brown, sandy loam soils as scattered patches grading into surrounding woodlands of Belah and Rosewood, White Cypress Pine or sandplain mallee.*	Areas of Yarran Shrubland within the study area: • Occupied sandplains of sandy loam and alluvial plains of clay loam soils. • Occurred adjacent to Belah-Rosewood Woodland, Black Box Woodland and Sandplain Mallee Woodland. In some locations White Cypress Pine (*Callitris glaucophylla*) occurred in the canopy layer of Belah-Rosewood Woodland.
2. Characteristic species present.	The following 18 characteristic species were recorded within areas of Yarran Shrubland within the study area: *Acacia melvillei, Atriplex stipitata, Austrostipa nitida, Casuarina pauper, Dissocarpus paradoxus, Einadia nutans, Enchylaena tomentosa, Eremophila sturtii, Erodium crinitum, Eucalyptus socialis, Maireana pyramidata, Maireana sclerolaenoides, Myoporum platycarpum, Nitraria billardierei, Rhagodia spinescens, Sclerolaena diacantha, Sclerolaena obliquicuspis, Sida corrugata.*
4. *Acacia melvillei* Shrubland is characterised by: • *...an open stratum of large shrubs or small trees, which may be reduced to isolated individuals or may be absent as a result of past clearing.* • *...shrub/tree layer is dominated by Acacia melvillei (Yarran)...* • *A scattered small shrub layer is sometimes present and may include Enchylaena tomentosa (Ruby Saltbush), Eremophila sturtii, Nitraria billardierei (Dillon bush), Rhagodia spinescens (Thorny Saltbush) and/or Maireana pyramidata (Black bluebush).*	Areas of Yarran Shrubland within the study area: • Were severely disturbed and did not have a well-developed canopy *of Acacia melvillei.* • In many locations *Acacia melvillei* was re-sprouting or had large isolated individuals in the late stages of senescence. • Had a small shrub and ground layer that varied from a shrub layer of dense small shrubs with a sparse ground layer to open areas dominated by grasses and *Sclerolaena* species. After recent rainfall many sites had a dense cover of the grass species including *Austrostipa nitida. Enchylaena tomentosa Eremophila sturtii, Nitraria billardierei, Rhagodia spinescens* and *Maireana pyramidata*.

Key Features listed in the Final Determination	Key Features of Yarran Shrubland
• *...groundcover is highly variable in structure and composition. It may be sparse or more continuous, depending on the history of disturbance, grazing and rainfall events. It comprises chenopod subshrubs such as Atriplex stipitata, Dissocarpus paradoxus (Cannonball Burr), Maireana spp., Sclerolaena spp. (Copperburrs), Einadia nutans subsp. nutans (Climbing Saltbush) and grasses and forbs including Austrostipa nitida, Crassula colorata, Erodium crinitum (Blue Storksbill), Tetragonia tetragonioides. Triraphis mollis and Zygophyllum ammophilum (Sand Twinleaf).*	• Had a ground cover that included species such as Atriplex stipitata, Dissocarpus paradoxus, Maireana spp., Sclerolaena spp., *Einadia nutans subsp. nutans* and grasses and forbs including *Austrostipa nitida*, *Crassula colorata* and *Erodium crinitum*.
5. *Acacia melvillei* Shrubland may be confused with: • *Acacia loderi Shrublands, another ecological community currently listed as Endangered under the Threatened Species Conservation Act 1995.* • *...the closely related species Acacia homalophylla.*	• The species *Acacia loderi* was not recorded in the study area. • At time of survey seed pods were present on many *Acacia melvillei* plants. Acacia species within survey sites were confirmed as *Acacia melvillei* using fruits and/or leaf dimensions. Only two individuals of *Acacia homalophylla* were recorded during the surveys.
6. The community includes: *...'Acacia melvillei Woodland' (Map unit 17) of Scott (1992), Porteners (1993) and Porteners et al. (1997); 'Acacia melvillei Yarran tall open-shrubland' (Community 3b) of Westbrooke & Miller (1995); 'Acacia melvillei /Acacia homalophylla woodlands on sandy rises' of Horner et al. (2002); and 'Yarran shrubland of the sandplains and plains of the semi-arid (warm) and arid climate zones' (Veg. Comm. ID 23) of Benson et al. (2006)...*	Areas of Yarran Shrubland within the study area conform to those described by: • Benson et al (2006) ID 23 Yarran shrubland of the sandplains and plains of the semi-arid (warm) and arid climate zones. • Scott (1992): ID 17 *Acacia melvillei* woodland. • Westbrooke and Miller (1995): ID 3b *Acacia melvillei* tall open shrubland. • Porteners et al. (1997): ID 17 *Acacia melvillei* woodland.
6. *Acacia melvillei Shrubland is currently recorded from south-western portion of NSW in the Riverina and Murray-Darling Depression bioregions....*	The study area is located within the Murray-Darling Depression bioregion.
8. *Acacia melvillei Shrubland is generally not found on soils of high suitability for agriculture.*	Yarran Shrubland within the study area has been extensively cleared. A large area of cropping land may have been the *Acacia melvillei*

Key Features listed in the Final Determination	Key Features of Yarran Shrubland
	shrubland prior to clearing.
9. *Most of the remaining stands of Acacia melvillei Shrubland are heavily degraded by overgrazing....*	Yarran Shrubland in the study area is represented by degraded stands with little or no canopy layer. Large individual trees of *Acacia melvillei* occur rarely and are in the late stages of senescence. In a few locations small shrubs of *Acacia melvillei* occur but in most locations the species exists as heavily grazed re-sprouting root stock.
10. *Fragmentation, grazing and small-scale physical disturbance have resulted in weed invasion...*	Weeds occur within most remnants of Yarran Shrubland. The following weed species have been recorded in areas of Yarran Shrubland in the study area: *Asphodelus fistulosus, Bromus rubens, Hordeum leporinum, Medicago minima, Medicago polymorpha* and *Sisymbrium erysimoides.*

Appendix B: Full floristic survey sites location and vegetation community

Site	Zone	Easting (GDA)	Northing (GDA)	Vegetation Community
CS01	54	718800	6247085	Belah-Rosewood Woodland
CS02	54	718662	6247137	Belah-Rosewood Woodland
CS03	54	718735	6246908	Linear Dune Mallee
CS04	54	719699	6245279	Belah-Rosewood Woodland
CS05	54	719699	6245279	Belah-Rosewood Woodland
CS06	54	719884	6245406	Sandplain Mallee
CS07	54	719642	6245118	Belah-Rosewood Woodland
CS08	54	720380	6244906	Belah-Rosewood Woodland
CS09	54	720957	6244991	Sandplain Mallee
CS10	54	721794	6244669	Belah-Rosewood Woodland
CS11	54	720358	6244190	Sandplain Mallee
CS12	54	720754	6245576	Belah-Rosewood Woodland
CS13	54	720787	6243703	Belah-Rosewood Woodland
CS14	54	720839	6243900	Disturbed Area Shrubland Complex A
CS15	54	720977	6244341	Belah-Rosewood Woodland
CS16	54	722206	6244315	Belah-Rosewood Woodland
CS17	54	721900	6243754	Disturbed Area Shrubland Complex A
CS18	54	722003	6243339	Belah-Rosewood Woodland
CS19	54	721716	6243008	Belah-Rosewood Woodland
CS20	54	722154	6242618	Belah-Rosewood Woodland
CS21	54	721595	6253070	Linear Dune Mallee
CS22	54	721794	6252367	Linear Dune Mallee
CS23	54	721731	6252532	Linear Dune Mallee
CS24	54	721223	6252715	Belah-Rosewood Woodland
CS25	54	720923	6253025	Belah-Rosewood Woodland
CS26	54	721107	6253229	Belah-Rosewood Woodland
CS27	54	720845	6253498	Belah-Rosewood Woodland
CS28	54	720499	6253622	Belah-Rosewood Woodland
CS29	54	720667	6254347	Belah-Rosewood Woodland
CS30	54	720365	6254071	Linear Dune Mallee
CS31	54	719826	6254403	Linear Dune Mallee
CS32	54	719637	6254640	Sandplain Mallee
CS33	54	719863	6255201	Yarran Shrubland
CS34	54	719557	6255067	Yarran Shrubland
CS35	54	719613	6255534	Belah-Rosewood Woodland
CS36	54	719431	6255419	Yarran Shrubland
CS37	54	719097	6255387	Yarran Shrubland
CS38	54	718936	6256063	Disturbed Area Shrubland Complex A
CS39	54	718874	6255757	Disturbed Area Shrubland Complex A
CS40	54	718441	6255682	Sandplain Mallee

Site	Zone	Easting (GDA)	Northing (GDA)	Vegetation Community
CS47	54	712856	6253599	Disturbed Area Shrubland Complex A
CS48	54	713480	6253479	Sandplain Mallee
CS49	54	713894	6253325	Belah-Rosewood Woodland
CS50	54	715415	6251523	Yarran Shrubland
CS51	54	715155	6251632	Linear Dune Mallee
CS52	54	715014	6251693	Sandplain Mallee
CS53	54	714868	6251548	Belah-Rosewood Woodland
CS54	54	714741	6252255	Linear Dune Mallee
CS55	54	716095	6251039	Black Box Woodland
CS56	54	715959	6250505	Sandplain Mallee
CS57	54	715927	6250430	Linear Dune Mallee
CS58	54	715872	6250627	Belah-Rosewood Woodland
CS59	54	715516	6250967	Yarran Shrubland
CS60	54	717844	6256633	Black Box Woodland
CS62	54	713532	6263439	Belah-Rosewood Woodland
CS63	54	713388	6263245	Linear Dune Mallee
CS64	54	712911	6262940	Linear Dune Mallee
CS65	54	713212	6262702	Linear Dune Mallee
CS66	54	712796	6262177	Linear Dune Mallee
CS67	54	714662	6260489	Linear Dune Mallee
CS68	54	714887	6260457	Belah-Rosewood Woodland
CS69	54	715442	6260722	Linear Dune Mallee
CS72	54	716538	6259350	Yarran Shrubland
CS73	54	716324	6258808	Belah-Rosewood Woodland
CS74	54	716315	6257616	Belah-Rosewood Woodland
CS75	54	716882	6258526	Belah-Rosewood Woodland
CS76	54	717097	6258425	Sandplain Mallee
CS77	54	717375	6257882	Cleared Land
CS78	54	717431	6257592	Sandplain Mallee
CS79	54	717450	6257153	Black Box Woodland
CS80	54	717814	6257130	Black Box Woodland
CSA02	54	718367	6256798	Yarran Shrubland
CSA03	54	716603	6257782	Yarran Shrubland
CSA05	54	715382	6251465	Yarran Shrubland
CSA06	54	715231	6251043	Yarran Shrubland
CSA07	54	715837	6250948	Yarran Shrubland
CSB00	54	713504	6262261	Linear Dune Mallee
CSB01	54	714380	6260787	Linear Dune Mallee
CSB02	54	715603	6259716	Sandplain Mallee
CSB03	54	718231	6255981	Linear Dune Mallee
CSB04	54	722519	6252597	Linear Dune Mallee
CSB05	54	719193	6247295	Sandplain Mallee
CSB06	54	719448	6246988	Linear Dune Mallee
CSB07	54	718866	6246229	Linear Dune Mallee

Site	Zone	Easting (GDA)	Northing (GDA)	Vegetation Community
CSB08	54	718393	6247517	Linear Dune Mallee
CSB09	54	713199	6253925	Linear Dune Mallee
CSB10	54	722184	6253131	Linear Dune Mallee
CSB11	54	721701	6252091	Linear Dune Mallee
CSB12	54	715361	6260772	Linear Dune Mallee
CSB13	54	713745	6262012	Linear Dune Mallee
CSB14	54	712105	6254560	Linear Dune Mallee
CSB15	54	715507	6250582	Sandplain Mallee
CSB16	54	717756	6248547	Linear Dune Mallee
CSB17	54	713056	6262672	Linear Dune Mallee
CSB18	54	721641	6243370	Belah-Rosewood Woodland
CSB19	0	722848	6243014	Belah-Rosewood Woodland
CSB20	54	716451	6249731	Belah-Rosewood Woodland
CSB21	54	719206	6245335	Belah-Rosewood Woodland
CSB22	54	713488	6253065	Belah-Rosewood Woodland
CSB23	0	712078	6254417	Belah-Rosewood Woodland
CSB24	0	711741	6254794	Belah-Rosewood Woodland
CSB25	54	720843	6252663	Belah-Rosewood Woodland
CSB26	54	716343	6258516	Belah-Rosewood Woodland
CSB27	54	715357	6260155	Belah-Rosewood Woodland
CSB28	54	718950	6254288	Cleared Land
CSB29	54	718069	6257688	Cleared Land
CSB30	54	719229	6254675	Cleared Land
CSB31	54	720504	6244251	Disturbed Area Shrubland Complex A
CSB32	54	720692	6243955	Disturbed Area Shrubland Complex A
CSB33	0	723118	6242778	Belah-Rosewood Woodland
CSB34	0	722347	6243460	Disturbed Area Shrubland Complex A
CSB35	54	719904	6255793	Belah-Rosewood Woodland
CSB36	54	719114	6256117	Belah-Rosewood Woodland
CSB37	0	716713	6259792	Belah-Rosewood Woodland
CSB38	54	717067	6257837	Cleared Land
CSB39	54	716556	6257248	Cleared Land
CSB40	54	718623	6255188	Cleared Land
CSB41	54	713787	6252686	Sandplain Mallee
CSB42	54	714983	6251191	Linear Dune Mallee
CSB43	54	716977	6249606	Sandplain Mallee
CSB44	54	716144	6251109	Black Box Woodland
CSB45	54	717699	6257151	Black Box Woodland
CSB46	54	717468	6257118	Black Box Woodland
CSB47	54	717143	6256564	Black Box Woodland
CSB48	54	717617	6256737	Black Box Woodland
CSB49	54	714676	6251352	Yarran Shrubland
CSB49	0	714676	6251352	Yarran Shrubland
CSB50	54	719251	6246545	Belah-Rosewood Woodland

Site	Zone	Easting (GDA)	Northing (GDA)	Vegetation Community
CSB51	54	717616	6248388	Disturbed Area Shrubland Complex A
CSB52	0	715995	6250897	Yarran Shrubland
CSB53	54	715758	6250964	Yarran Shrubland
CSB54	54	715374	6251511	Yarran Shrubland
CSB55	54	714027	6252658	Disturbed Area Shrubland Complex A
CSB56	54	713390	6253376	Disturbed Area Shrubland Complex A
CSB57	54	712878	6253310	Disturbed Area Shrubland Complex A
CSB58	54	713260	6254037	Disturbed Area Shrubland Complex A
CSB59	54	716707	6256722	Belah-Rosewood Woodland
CSB60	54	715257	6259510	Mulga Woodland
CSB61	54	718244	6258261	Yarran Shrubland
CSB62	54	718301	6256012	Belah-Rosewood Woodland
CSB63	54	721289	6252068	Belah-Rosewood Woodland
CSB64	54	715202	6259338	Mulga Woodland
CSB65	54	716620	6256910	Black Box Woodland
CSB66	54	720821	6244232	Disturbed Area Shrubland Complex A
CSB67	54	720420	6244105	Disturbed Area Shrubland Complex A
CSB68	54	720694	6243729	Disturbed Area Shrubland Complex A
CSB70	54	717368	6256232	Black Box Woodland
CSB71	54	717432	6256141	Yarran Shrubland
CSB72	54	715219	6259264	Mulga Woodland
CSB73	54	715628	6259695	Sandplain Mallee
CSB74	54	719795	6254795	Sandplain Mallee
CSB75	54	720131	6254787	Sandplain Mallee
CSB76	54	719879	6253931	Sandplain Mallee
CSB77	54	718337	6255945	Sandplain Mallee
CSB78	54	719031	6255598	Sandplain Mallee
CSC01	54	720098	6245319	Belah-Rosewood Woodland
CSE01	54	722329	6246385	Belah-Rosewood Woodland
CSE02	54	722187	6246604	Belah-Rosewood Woodland
CSE03	0	721776	6247743	Belah-Rosewood Woodland
CSE04	54	721379	6248686	Linear Dune Mallee
CSE05	0	720070	6248006	Linear Dune Mallee
CSE06	54	720188	6248868	Linear Dune Mallee
CSE07	0	720292	6249194	Linear Dune Mallee
CSE08	54	720263	6249434	Linear Dune Mallee
CSE09	54	720410	6249417	Linear Dune Mallee
CSE10	54	722061	6243118	Belah-Rosewood Woodland
CSE11	54	722160	6244078	Belah-Rosewood Woodland
CSE12	54	722116	6244717	Belah-Rosewood Woodland
CSH01	54	751137	6246939	Bluebush Shrubland
CSH02	54	751039	6247223	Bluebush Shrubland
CSH03	54	750670	6247876	Bluebush Shrubland
CSH04	54	750572	6248180	Bluebush Shrubland

Site	Zone	Easting (GDA)	Northing (GDA)	Vegetation Community
CSH05	54	750125	6248651	Sandhill Pine Woodland
CSH06	54	749976	6248859	Bluebush Shrubland
CSH07	54	749388	6249312	Sandhill Pine Woodland
CSH08	54	749119	6249449	Sandhill Pine Woodland
CSH09	54	748424	6249510	Bluebush Shrubland
CSH10	54	748113	6249512	Bluebush Shrubland
CSH102	54	721954	6242717	Belah-Rosewood Woodland
CSH11	54	747475	6249261	Bluebush Shrubland
CSH12	54	747195	6249238	Bluebush Shrubland
CSH13	54	746438	6249249	Bluebush Shrubland
CSH14	54	746115	6249336	Bluebush Shrubland
CSH15	54	745484	6249322	Bluebush Shrubland
CSH16	0	745153	6349358	Bluebush Shrubland
CSH17	54	744525	6249234	Bluebush Shrubland
CSH18	54	744234	6249251	Bluebush Shrubland
CSH19	54	743515	6249108	Bluebush Shrubland
CSH20	54	743235	6249209	Bluebush Shrubland
CSH21	54	742491	6249283	Bluebush Shrubland
CSH22	54	742216	6249355	Bluebush Shrubland
CSH23	54	741434	6249439	Bluebush Shrubland
CSH24	54	741145	6249526	Bluebush Shrubland
CSH25	54	741308	6249510	Chenopod Shrubland Depressions
CSH26	54	740468	6249599	Bluebush Shrubland
CSH27	54	740177	6249667	Bluebush Shrubland
CSH28	54	739385	6249735	Chenopod Shrubland Depressions
CSH29	54	739108	6249834	Chenopod Shrubland Depressions
CSH30	54	739248	6249813	Chenopod Shrubland Depressions
CSH31	54	738458	6249883	Chenopod Shrubland Depressions
CSH32	54	738163	6249972	Chenopod Shrubland Depressions
CSH33	54	736450	6250211	Bluebush Shrubland
CSH34	54	736725	6250633	Bluebush Shrubland
CSH35	54	736264	6250834	Bluebush Shrubland
CSH36	54	735952	6250827	Bluebush Shrubland
CSH37	54	736898	6250328	Bluebush Shrubland
CSH38	54	725343	6253422	Bluebush Shrubland
CSH39	54	725698	6253393	Sandplain Mallee
CSH40	54	726350	6253267	Sandplain Mallee
CSH41	54	726684	6253245	Sandplain Mallee
CSH42	54	727338	6253113	Sandplain Mallee
CSH43	54	727644	6253093	Sandhill Pine Woodland
CSH44	54	728284	6252947	Sandhill Pine Woodland
CSH45	54	728601	6252953	Bluebush Shrubland
CSH46	54	729208	6252833	Sandhill Pine Woodland
CSH47	54	729523	6252805	Sandhill Pine Woodland

Site	Zone	Easting (GDA)	Northing (GDA)	Vegetation Community
CSH48	54	730257	6252706	Bluebush Shrubland
CSH49	54	730510	6252668	Bluebush Shrubland
CSH50	54	730934	6252567	Bluebush Shrubland
CSH51	54	731121	6252551	Chenopod Shrubland Depressions
CSH52	54	731715	6252406	Bluebush Shrubland
CSH53	54	732110	6252318	Bluebush Shrubland
CSH54	54	732621	6252206	Bluebush Shrubland
CSH55	54	733029	6252136	Chenopod Shrubland Depressions
CSH56	54	733312	6252018	Bluebush Shrubland
CSH57	54	722695	6242207	Belah-Rosewood Woodland
CSH64	54	725703	6242777	Bluebush Shrubland
CSH65	54	726658	6242961	Saltbush Shrubland
CSH66	54	727150	6243011	Saltbush Shrubland
CHS69	54	728028	6243390	Bluebush Shrubland
CSH70	54	729512	6243736	Bluebush Shrubland
CSH71	54	729647	6243866	Bluebush Shrubland
CSH73	54	730433	6243688	Bluebush Shrubland
CSH75	54	731711	6243534	Bluebush Shrubland
CSH76	54	733465	6243319	Bluebush Shrubland
CSH79	54	734764	6243024	Bluebush Shrubland
CSH80	54	735756	6242623	Chenopod Shrubland Depressions
CSH81	54	736328	6242847	Bluebush Shrubland
CSH82	54	736221	6242395	Bluebush Shrubland
CSH85	54	736018	6242752	Bluebush Shrubland
CSH87	54	736884	6244022	Chenopod Shrubland Depressions
CSH88	54	736905	6244242	Bluebush Shrubland
CSH90	54	737471	6245008	Bluebush Shrubland
CSH91	54	737279	6246614	Chenopod Shrubland Depressions
CSH93	54	737180	6248176	Bluebush Shrubland
CSHRE-D	54	737799	6248438	Bluebush Shrubland
CSHRE-E	54	738381	6248928	Saltbush Shrubland
CSHRE-E (canegrass)	54	738431	6249027	Chenopod Shrubland Depressions
CSHRE-G	54	739644	6249424	Saltbush Shrubland
CSHRE-I	54	737347	6247630	Bluebush Shrubland
IV1	55	242445	6355420	Belah-Rosewood/Acacia Woodland
IV2	55	242730	6355129	Belah-Rosewood/Acacia Woodland
IV3	55	243265	6354956	Belah-Rosewood/Acacia Woodland
IV4	55	243861	6355207	Belah-Rosewood/Acacia Woodland
IV5	55	244241	6355147	Native Grassland/Sparse Acacia/Chenopod Shrubs
IV6	55	243304	6355213	Native Grassland/Sparse Acacia/Chenopod Shrubs
IV7	55	243302	6354560	Native Grassland/Sparse Acacia/Chenopod Shrubs
IV8	55	243402	6354142	Native Grassland/Sparse Acacia/Chenopod Shrubs

Site	Zone	Easting (GDA)	Northing (GDA)	Vegetation Community
IV9	55	243556	6353687	Native Grassland/Sparse Acacia/Chenopod Shrubs
IV10	55	243688	6353200	Native Grassland/Sparse Acacia/Chenopod Shrubs

Appendix C: Electronic dataset – full floristic surveys

Data Matrix from Analysis

Scientific Name	CS1	CS10	CS11	CS12	CS13	CS14	CS15	CS16	CS17	CS18	CS19	CS2	CS20	CS21	CS22	CS23	CS24	CS25	CS26	CS27	CS28	CS29	CS3	CS30	CS31	CS32	CS33	CS34	CS35	CS36
Abutilon otocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aneura	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia colletioides	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
Acacia ligulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia melvillei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	1
Acacia oswaldii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia rigens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia sclerophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia wilhelmiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Actinobole uliginosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alectryon oleifolius	0	3	0	0	4	0	4	0	0	0	1	1	3	0	0	0	3	1	0	0	3	0	0	0	0	0	0	0	0	3
Alternanthera denticulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alternanthera sp. A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amphipogon caricinus var. caricinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema cambagei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema miraculosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema preissii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Angianthus brachypappus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apophyllum anomalum	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arabidella nasturtium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arabidella trisecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aristida leichhardtiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asperula conferta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex acutibractea subsp. acutibractea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	0	1
Atriplex angulata	2	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	2	1	2	0	0	0	0	0	0	0	0
Atriplex eardleyae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex holocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex leptocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex limbata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex lindleyi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex nummularia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex pseudocampanulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex semibaccata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex spinibractea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex stipitata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex vesicaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrodanthonia setacea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa elegantissima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa eremophila	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa nitida	3	4	5	0	0	1	0	2	6	2	3	3	5	1	0	0	3	3	2	3	3	3	2	2	0	2	2	0	3	0
Austrostipa platychaeta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	3	5	0	4
Austrostipa puberula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa scabra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa tuckeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bergia trimera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boerhavia dominii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bossiaea walkeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Brachyscome ciliaris	0	0	0	0	1	0	0	0	0	0	0	1	0	0	2	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0
Brachyscome papillosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyscome trachycarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulbine alata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulbine semibarbata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Calandrinia eremaea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Callitris glaucophylla	0	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callitris verrucosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis erinacea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis hispidula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis scapigera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassytha melantha	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassytha pubescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Casuarina pauper	0	1	0	0	0	0	4	3	0	4	4	4	3	0	0	0	3	4	0	4	4	4	0	0	0	0	0	0	0	0
Centipeda crateriformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centipeda cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centipeda thespidioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chamaesyce drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Cheilanthes sieberi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium cristatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CS1	CS10	CS11	CS12	CS13	CS14	CS15	CS16	CS17	CS18	CS19	CS2	CS20	CS21	CS22	CS23	CS24	CS25	CS26	CS27	CS28	CS29	CS3	CS30	CS31	CS32	CS33	CS34	CS35	CS36
Chenopodium curvispicatum	2	0	0	0	1	0	1	0	0	1	2	0	1	0	0	0	0	0	0	1	2	3	1	0	0	0	0	1	0	0
Chenopodium desertorum	0	1	2	0	0	0	0	2	0	0	1	2	1	1	0	2	0	0	2	2	0	2	2	1	1	0	0	0	1	0
Chenopodium melanocarpum	0	0	2	1	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Chenopodium nitrariaceum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium truncatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chloris divaricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chloris truncata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chrysocephalum apiculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chthonocephalus pseudevax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus clementii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus graminetinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus remotus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crassula colorata	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crassula sieberiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cryptandra propinqua	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperus difformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dactyloctenium radulans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daucus glochidiatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dianella revoluta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diplachne fusca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disphyma crassifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dissocarpus paradoxus	0	1	1	2	1	0	0	2	2	2	0	3	2	0	0	0	2	0	0	0	0	2	0	0	0	0	2	2	0	0
Dodonaea bursariifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea lobulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea viscosa	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	2	0	0	0	1	0	1	0	0	0	0	1	1
Dysphania littoralis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eclipta platyglossa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Einadia nutans subsp. nutans	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Einadia polygonoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Einadia trigonos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis acuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis pallens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis plana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis pusilla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Elymus scaber	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enchylaena tomentosa	2	3	2	1	2	0	0	3	0	2	4	3	3	0	0	0	3	2	0	1	2	2	2	0	0	0	0	2	0	2
Enneapogon avenaceus	1	0	0	2	0	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	2	1	0	1	0	0
Enteropogon acicularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enteropogon ramosus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Epaltes australis	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis australasica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis dielsii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis elongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis eriopoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis falcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis lacunaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis parviflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila deserti	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila glabra	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	1	0	2
Eremophila longifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila oppositifolia subsp. rubra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila sturtii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
Erodium crinitum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Erodium cygnorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0
Eucalyptus costata	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	1	0	0	0	0	0
Eucalyptus dumosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus gracilis	3	0	0	0	0	0	0	0	0	0	0	0	0	3	1	3	0	0	0	0	0	0	0	0	0	1	3	0	1	0
Eucalyptus largiflorens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus leptophylla	3	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Eucalyptus oleosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus socialis	3	0	3	3	0	0	0	0	0	0	0	1	0	3	3	3	0	0	4	0	0	0	0	4	4	4	0	1	3	0
Euchiton involucratus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euchiton sphaericus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euphorbia eremophila	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eutaxia microphylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exocarpos aphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Fimbristylis dichotoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CS1	CS10	CS11	CS12	CS13	CS14	CS15	CS16	CS17	CS18	CS19	CS2	CS20	CS21	CS22	CS23	CS24	CS25	CS26	CS27	CS28	CS29	CS3	CS30	CS31	CS32	CS33	CS34	CS35	CS36
Geijera parviflora	0	1	0	0	0	0	0	1	0	0	1	1	4	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia cycloptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Goodenia fascicularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia havilandii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia pinnatifida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia willisiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	1	0	0	0	0
Grevillea huegelii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Hakea leucoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Halgania cyanea	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	1	1	3	0	0	0	0	0
Haloragis glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haloragis odontocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harmsiodoxa blennodioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harmsiodoxa brevipes var. brevipes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heliotropium europaeum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hibiscus sturtii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isoetes muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isoetopsis graminifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isolepis australiensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus aridicola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus flavidus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus subsecundus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lachnagrostis filiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa leptolepis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa semicalva	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa websteri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lemooria burkittii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium fasciculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium leptopetalum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium monoplocoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium papillosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium phlebopetalum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium pseudohyssopifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0
Leptorhynchos baileyi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptospermum coriaceum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra collina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra effusa	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra leucocephala	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Lotus cruentus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lycium australe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lysiana exocarpi	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lythrum hyssopifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lythrum wilsonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana appressa	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Maireana brevifolia	0	0	0	2	2	2	2	0	0	1	0	2	1	2	0	0	2	1	3	0	0	0	0	0	0	0	2	0	1	0
Maireana coronata	0	0	0	0	0	0	1	3	2	0	0	0	0	0	0	0	0	2	0	2	0	2	0	0	0	0	2	0	2	2
Maireana decalvans	3	0	3	2	2	4	2	3	0	1	1	3	2	0	0	0	3	2	0	0	2	3	0	2	1	2	2	2	3	2
Maireana enchylaenoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana georgei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana pentatropis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana pyramidata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana radiata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana sclerolaenoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana sedifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana trichoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana triptera	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana turbinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacocera tricornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marsdenia australis	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	2	0	1	0	0	0	1	0	0	0	1	0
Marsilea drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marsilea hirsuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Millotia tenuifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria denticulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria integerrima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mollugo cerviana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Muehlenbeckia florulenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CS1	CS10	CS11	CS12	CS13	CS14	CS15	CS16	CS17	CS18	CS19	CS2	CS20	CS21	CS22	CS23	CS24	CS25	CS26	CS27	CS28	CS29	CS3	CS30	CS31	CS32	CS33	CS34	CS35	CS36
Myoporum platycarpum	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	3	0	0
Myriophyllum verrucosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nicotiana goodspeedii	0	0	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1
Nicotiana simulans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitraria billardierei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olearia calcerea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	2	0	1	1	0	0	0	0	0
Olearia pimeleoides	0	0	0	0	0	0	0	1	0	0	0	2	1	0	0	0	1	1	0	1	0	2	0	0	0	1	0	0	1	0
Olearia rudis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Omphalolappula concava	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Osteocarpum acropterum var. diminuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxalis chnoodes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxalis perennans	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panicum effusum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
Parsonsia eucalyptophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paspalidium constrictum	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Paspalidium jubiflorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pelargonium australe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Persicaria lapathifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllanthus lacunellus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pimelea microcephala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pimelea trichostachya	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	2	0	1	0	0	0	0	0
Plantago cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago debilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago turrifera	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa fax	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis canescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis capillaris	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	1	2	0	0	0	0	0
Podolepis neglecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0
Polygonum plebeium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portulaca bicolor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portulaca oleracea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pratia purpurascens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudognaphalium luteoalbum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pterostylis cobarensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus exaltatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Ptilotus gaudichaudii	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus obovatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Ptilotus polystachyus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus sessilifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pycnosorus thompsonianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Radyera farragei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ranunculus sessiliflorus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia candolleana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia spinescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia ulicina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe corymbiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe floribunda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhyncharrhena linearis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex crystallinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex tenax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rutidosis helichrysoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salsola kali	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Scaevola spinescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schenkia spicata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schoenus subaphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Scleranthus minisculus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scleranthus pungens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena brachyptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena decurrens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena diacantha	2	3	3	3	0	2	0	0	0	2	3	0	0	0	0	0	3	2	2	3	1	0	2	2	2	2	0	0	2	0
Sclerolaena divaricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena eriacantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena intricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena lanicuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena muricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena obliquicuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena parviflora	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	2	2	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CS1	CS10	CS11	CS12	CS13	CS14	CS15	CS16	CS17	CS18	CS19	CS2	CS20	CS21	CS22	CS23	CS24	CS25	CS26	CS27	CS28	CS29	CS3	CS30	CS31	CS32	CS33	CS34	CS35	CS36
Sclerolaena patenticuspis	2	2	0	0	5	0	0	3	3	4	0	0	3	0	0	0	0	1	0	0	0	2	2	0	0	0	3	2	0	3
Sclerolaena stelligera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio glossanthus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio productus subsp. productus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio runcinifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna form taxon 'coriacea'	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	1	0
Senna form taxon 'filifolia'	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna form taxon 'petiolaris'	1	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0	0	0	0
Sida corrugata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida filiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida intricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida sp. C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida trichopoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum coactiliferum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum esuriale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum simile	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spergularia marina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sporobolus caroli	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stackhousia muricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stemodia florulenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenopetalum lineare	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenopetalum sphaerocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Taraxacum officinale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia pergranulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia tenuis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tetragonia tetragonioides	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teucrium albicaule	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teucrium racemosum	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Thysanotus baueri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tragus australianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triodia scariosa	4	0	0	0	0	0	0	0	0	0	0	0	0	4	4	0	0	0	1	0	0	0	0	0	4	1	0	0	0	0
Tripogon loliiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triptilodiscus pygmaeus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triraphis mollis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Velleia arguta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Verbena gaudichaudii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia blackii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia cervicularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0
Vittadinia condyloides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia cuneata	0	0	2	1	2	0	0	0	2	0	1	0	1	1	1	0	0	1	2	0	0	2	0	0	0	2	2	0	0	2
Vittadinia dissecta	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Vittadinia eremaea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia gracilis	2	0	0	0	0	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Vittadinia muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia pterochaeta	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia sulcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia communis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia fluminalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia gracilenta	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia tumidifructa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walwhalleya proluta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Westringia rigida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Xerochrysum bracteatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Xerochrysum viscosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1
Zygophyllum ammophilum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Zygophyllum apiculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum aurantiacum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum confluens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Zygophyllum eremaeum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum glaucum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	2	0	2	0
Zygophyllum iodocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CS37	CS38	CS39	CS4	CS40	CS41	CS42	CS43	CS44	CS45	CS46	CS47	CS48	CS49	CS5	CS50	CS51	CS52	CS53	CS54	CS55	CS56	CS57	CS58	CS59	CS6	CS60	CS61	CS62	CS63
Abutilon otocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aneura	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia colletioides	0	0	0	2	1	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Acacia ligulata	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Acacia melvillei	1	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0
Acacia oswaldii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia rigens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia sclerophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia wilhelmiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Actinobole uliginosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alectryon oleifolius	0	1	0	1	0	0	3	0	3	0	1	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Alternanthera denticulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alternanthera sp. A	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amphipogon caricinus var. caricinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema cambagei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema miraculosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema preissii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Angianthus brachypappus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apophyllum anomalum	0	0	0	1	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arabidella nasturtium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arabidella trisecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aristida leichhardtiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asperula conferta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex acutibractea subsp. acutibractea	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex angulata	0	0	1	2	0	0	1	2	2	0	2	0	2	1	0	2	0	0	0	0	0	2	0	0	0	0	1	0	0	0
Atriplex eardleyae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex holocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex leptocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex limbata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex lindleyi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex nummularia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex pseudocampanulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex semibaccata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex spinibractea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex stipitata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex vesicaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrodanthonia setacea	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa elegantissima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa eremophila	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa nitida	4	5	5	3	3	1	2	3	3	0	2	2	4	2	5	3	3	2	2	1	0	0	2	2	0	0	0	0	2	2
Austrostipa platychaeta	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	3	0	0	0	0	0	0	0	3	0	5	0	0	0
Austrostipa puberula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa scabra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa tuckeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bergia trimera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boerhavia dominii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bossiaea walkeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
Brachyscome ciliaris	0	0	2	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
Brachyscome papillosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyscome trachycarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulbine alata	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	1	0	0	0
Bulbine semibarbata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calandrinia eremaea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callitris glaucophylla	0	0	3	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callitris verrucosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis erinacea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis hispidula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis scapigera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassytha melantha	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassytha pubescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Casuarina pauper	0	0	0	0	0	0	4	0	0	0	4	0	0	0	0	4	0	0	0	5	0	0	0	0	0	0	0	0	3	0
Centipeda crateriformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centipeda cunninghamii	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Centipeda thespidioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chamaesyce drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cheilanthes sieberi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium cristatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CS37	CS38	CS39	CS4	CS40	CS41	CS42	CS43	CS44	CS45	CS46	CS47	CS48	CS49	CS5	CS50	CS51	CS52	CS53	CS54	CS55	CS56	CS57	CS58	CS59	CS6	CS60	CS61	CS62	CS63
Chenopodium curvispicatum	0	0	0	0	0	0	1	0	0	0	1	0	2	2	0	1	0	0	0	0	0	2	0	0	0	1	0	0	3	0
Chenopodium desertorum	0	0	0	0	1	1	1	1	0	0	1	0	2	2	0	0	0	2	1	0	2	0	0	1	2	3	0	2	1	2
Chenopodium melanocarpum	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Chenopodium nitrariaceum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium truncatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chloris divaricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chloris truncata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chrysocephalum apiculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chthonocephalus pseudevax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus clementii	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus graminetinus	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0
Convolvulus remotus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crassula colorata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crassula sieberiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cryptandra propinqua	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperus difformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dactyloctenium radulans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daucus glochidiatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dianella revoluta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diplachne fusca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disphyma crassifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dissocarpus paradoxus	1	2	0	2	0	0	2	0	2	0	1	2	0	0	0	2	0	0	0	2	0	0	0	0	2	0	0	0	1	0
Dodonaea bursariifolia	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Dodonaea lobulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea viscosa	0	1	0	0	0	1	1	0	1	0	0	0	4	1	0	0	0	0	0	0	1	0	0	0	3	0	0	0	0	1
Dysphania littoralis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eclipta platyglossa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Einadia nutans subsp. nutans	0	0	0	2	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Einadia polygonoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Einadia trigonos	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis acuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis pallens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis plana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis pusilla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Elymus scaber	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enchylaena tomentosa	0	0	0	2	0	0	2	2	1	0	0	1	0	0	2	2	0	0	0	2	0	0	0	0	0	0	0	0	2	0
Enneapogon avenaceus	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1
Enteropogon acicularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enteropogon ramosus	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epaltes australis	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis australasica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis dielsii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis elongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis eriopoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis falcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis lacunaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis parviflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila deserti	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila glabra	0	3	1	1	1	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0
Eremophila longifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila oppositifolia subsp. rubra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila sturtii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Erodium crinitum	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Erodium cygnorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus costata	0	0	0	0	0	1	0	0	0	4	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	4
Eucalyptus dumosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus gracilis	0	0	0	0	0	3	0	3	0	0	1	0	0	4	0	0	0	0	4	0	0	0	3	3	0	0	0	0	0	0
Eucalyptus largiflorens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0
Eucalyptus leptophylla	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
Eucalyptus oleosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
Eucalyptus socialis	0	0	1	0	4	1	0	3	0	1	0	0	0	1	0	0	0	4	1	0	1	0	3	3	1	0	0	0	1	3
Euchiton involucratus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euchiton sphaericus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euphorbia eremophila	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eutaxia microphylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exocarpos aphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fimbristylis dichotoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CS37	CS38	CS39	CS4	CS40	CS41	CS42	CS43	CS44	CS45	CS46	CS47	CS48	CS49	CS5	CS50	CS51	CS52	CS53	CS54	CS55	CS56	CS57	CS58	CS59	CS6	CS60	CS61	CS62	CS63
Geijera parviflora	0	0	0	3	0	0	0	1	1	0	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0	0	0	1	0	0
Goodenia cycloptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia fascicularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia havilandii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia pinnatifida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia willisiana	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea huegelii	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Hakea leucoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Halgania cyanea	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	0	0	2	0	0	0	0	0	1
Haloragis glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haloragis odontocarpa	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	2
Harmsiodoxa blennodioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harmsiodoxa brevipes var. brevipes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heliotropium europaeum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hibiscus sturtii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isoetes muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isoetopsis graminifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isolepis australiensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus aridicola	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus flavidus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus subsecundus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lachnagrostis filiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa leptolepis	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Leiocarpa semicalva	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa websteri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lemooria burkittii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium fasciculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium leptopetalum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium monoplocoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium papillosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium phlebopetalum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium pseudohyssopifolium	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
Leptorhynchos baileyi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptospermum coriaceum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra collina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra effusa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra leucocephala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0
Lotus cruentus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lycium australe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lysiana exocarpi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lythrum hyssopifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lythrum wilsonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana appressa	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	2	0
Maireana brevifolia	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Maireana coronata	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	2	0	0	2	0	2	0	0	0	0	0
Maireana decalvans	2	3	2	3	2	1	2	2	2	0	3	2	2	2	2	2	2	2	3	1	2	0	3	2	2	2	1	0	2	1
Maireana enchylaenoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana georgei	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana pentatropis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana pyramidata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana radiata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana sclerolaenoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana sedifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana trichoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana triptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana turbinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacocera tricornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marsdenia australis	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Marsilea drummondii	2	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Marsilea hirsuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Millotia tenuifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria denticulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria integerrima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mollugo cerviana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Muehlenbeckia florulenta	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CS37	CS38	CS39	CS4	CS40	CS41	CS42	CS43	CS44	CS45	CS46	CS47	CS48	CS49	CS5	CS50	CS51	CS52	CS53	CS54	CS55	CS56	CS57	CS58	CS59	CS6	CS60	CS61	CS62	CS63
Myoporum platycarpum	0	0	0	0	1	2	0	0	0	3	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Myriophyllum verrucosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nicotiana goodspeedii	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	1	0	0	0	0	0
Nicotiana simulans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitraria billardierei	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olearia calcerea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olearia pimeleoides	0	0	0	3	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1
Olearia rudis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Omphalolappula concava	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Osteocarpum acropterum var. diminuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxalis chnoodes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxalis perennans	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Panicum effusum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Parsonsia eucalyptophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paspalidium constrictum	0	0	0	0	1	0	1	2	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Paspalidium jubiflorum	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pelargonium australe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Persicaria lapathifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Phyllanthus lacunellus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pimelea microcephala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pimelea trichostachya	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	1
Plantago cunninghamii	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago debilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago turrifera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa fax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis canescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis capillaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Podolepis neglecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polygonum plebeium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portulaca bicolor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portulaca oleracea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pratia purpurascens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Pseudognaphalium luteoalbum	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0
Pterostylis cobarensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus exaltatus	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Ptilotus gaudichaudii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus obovatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Ptilotus polystachyus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus sessilifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pycnosorus thompsonianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Radyera farragei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ranunculus sessiliflorus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia candolleana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia spinescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia ulicina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe corymbiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe floribunda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhyncharrhena linearis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex crystallinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex tenax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rutidosis helichrysoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salsola kali	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Scaevola spinescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schenkia spicata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schoenus subaphyllus	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scleranthus minisculus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scleranthus pungens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena brachyptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena decurrens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena diacantha	0	0	0	0	2	2	3	2	3	2	3	0	3	2	3	2	0	2	2	0	0	0	2	1	2	3	2	1	0	0
Sclerolaena divaricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena eriacantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena intricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena lanicuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena muricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena obliquicuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena parviflora	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	2	0	0	2	0	2	2	0	0	0	1	0	2

Data Matrix from Analysis

Scientific Name	CS37	CS38	CS39	CS4	CS40	CS41	CS42	CS43	CS44	CS45	CS46	CS47	CS48	CS49	CS5	CS50	CS51	CS52	CS53	CS54	CS55	CS56	CS57	CS58	CS59	CS6	CS60	CS61	CS62	CS63
Sclerolaena patenticuspis	2	0	2	0	0	0	0	1	3	0	1	3	0	2	0	0	4	0	0	4	0	0	0	0	3	0	2	0	0	0
Sclerolaena stelligera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio glossanthus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio productus subsp. productus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio runcinifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna form taxon 'coriacea'	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0
Senna form taxon 'filifolia'	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna form taxon 'petiolaris'	0	0	0	1	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
Sida corrugata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida filiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida intricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida sp. C	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
Sida trichopoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum coactiliferum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum esuriale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum simile	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spergularia marina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sporobolus caroli	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
Stackhousia muricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stemodia florulenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenopetalum lineare	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenopetalum sphaerocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Taraxacum officinale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia pergranulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia tenuis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tetragonia tetragonioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teucrium albicaule	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teucrium racemosum	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	3	0	0	1	0	0	0	0	0
Thysanotus baueri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tragus australianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triodia scariosa	0	0	0	0	0	4	0	0	0	4	0	0	0	0	2	0	0	4	0	0	5	0	1	4	0	0	0	0	0	5
Tripogon loliiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triptilodiscus pygmaeus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triraphis mollis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Velleia arguta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Verbena gaudichaudii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia blackii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia cervicularis	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Vittadinia condyloides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia cuneata	2	0	0	0	0	0	0	1	0	2	0	0	2	1	0	0	2	0	0	0	0	0	0	0	0	0	2	1	1	0
Vittadinia dissecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0
Vittadinia eremaea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia pterochaeta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
Vittadinia sulcata	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia communis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Wahlenbergia fluminalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia gracilenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia tumidifructa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walwhalleya proluta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Westringia rigida	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Xerochrysum bracteatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Xerochrysum viscosum	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum ammophilum	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Zygophyllum apiculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum aurantiacum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum confluens	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	1	0	0	2	0	0	0	1	0	0	0	0	0	0	0
Zygophyllum eremaeum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum glaucum	1	1	1	0	3	0	2	2	2	0	0	0	0	0	0	0	0	2	0	1	0	0	2	0	2	0	0	0	3	0
Zygophyllum iodocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CS64	CS65	CS66	CS67	CS68	CS69	CS7	CS70	CS71	CS72	CS73	CS74	CS75	CS76	CS77	CS78	CS79	CS8	CS80	CS9	CSA1	CSA2	CSA3	CSA5	CSA6	CSA7	CSA8	CSA9	CSB0	CSB1
Abutilon otocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aneura	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia colletioides	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Acacia ligulata	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia melvillei	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	0	0	0	1	0	2	2	3	0	1	1	0	0	0	0
Acacia oswaldii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia rigens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia sclerophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia wilhelmiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Actinobole uliginosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alectryon oleifolius	0	0	0	0	1	0	1	3	0	0	1	1	3	0	1	0	0	3	0	3	0	0	0	0	0	0	0	0	0	0
Alternanthera denticulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alternanthera sp. A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amphipogon caricinus var. caricinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1
Amyema cambagei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema miraculosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema preissii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Angianthus brachypappus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apophyllum anomalum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0
Arabidella nasturtium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arabidella trisecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Aristida leichhardtiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asperula conferta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Atriplex acutibractea subsp. acutibractea	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Atriplex angulata	0	0	1	0	0	0	0	0	0	0	2	2	2	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex eardleyae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex holocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex leptocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex limbata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex lindleyi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex nummularia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex pseudocampanulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex semibaccata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Atriplex spinibractea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex stipitata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	1	1	0	0	0
Atriplex vesicaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrodanthonia setacea	0	0	0	0	0	0	2	0	0	0	1	0	2	0	0	0	0	0	0	1	3	2	2	3	2	2	2	0	1	0
Austrostipa drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa elegantissima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa eremophila	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
Austrostipa nitida	2	2	4	2	4	1	0	2	4	5	4	2	3	3	3	0	0	3	3	4	4	4	4	3	4	3	4	0	4	3
Austrostipa platychaeta	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa puberula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa scabra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa tuckeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bergia trimera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boerhavia dominii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bossiaea walkeri	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Brachyscome ciliaris	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	1	0	0	0	0	0	0	1	2	0	2	0	0	0	2
Brachyscome papillosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyscome trachycarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulbine alata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulbine semibarbata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	0	0
Calandrinia eremaea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callitris glaucophylla	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	4	0	0
Callitris verrucosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis erinacea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis hispidula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis scapigera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassytha melantha	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Cassytha pubescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Casuarina pauper	0	0	0	0	4	0	1	4	1	0	3	4	4	0	0	0	0	4	0	1	0	0	0	0	0	0	0	0	0	0
Centipeda crateriformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centipeda cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
Centipeda thespidioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Chamaesyce drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Cheilanthes sieberi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium cristatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CS64	CS65	CS66	CS67	CS68	CS69	CS7	CS70	CS71	CS72	CS73	CS74	CS75	CS76	CS77	CS78	CS79	CS8	CS80	CS9	CSA1	CSA2	CSA3	CSA5	CSA6	CSA7	CSA8	CSA9	CSB0	CSB1
Chenopodium curvispicatum	0	0	0	0	1	0	1	0	0	0	2	2	2	1	0	0	0	1	0	0	1	2	1	0	0	0	0	0	0	0
Chenopodium desertorum	0	2	2	2	2	1	1	2	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	3
Chenopodium melanocarpum	2	1	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Chenopodium nitrariaceum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium truncatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chloris divaricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chloris truncata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chrysocephalum apiculatum	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chthonocephalus pseudevax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus clementii	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3	2	0	0	3	0	0	1	1	0
Convolvulus graminetinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus remotus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	0	0	0
Crassula colorata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Crassula sieberiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cryptandra propinqua	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperus difformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dactyloctenium radulans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daucus glochidiatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dianella revoluta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diplachne fusca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disphyma crassifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dissocarpus paradoxus	0	0	0	0	2	0	0	2	2	0	2	3	2	0	0	0	1	2	0	1	2	2	1	2	1	1	2	1	0	0
Dodonaea bursariifolia	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea lobulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea viscosa	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	4	2	3	0	0	0	0
Dysphania littoralis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eclipta platyglossa	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Einadia nutans subsp. nutans	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	2	1	0	0	2	0	0	0	0
Einadia polygonoides	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Einadia trigonos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis acuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis pallens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis plana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis pusilla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Elymus scaber	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enchylaena tomentosa	1	1	1	0	3	0	2	3	0	0	2	3	3	0	0	3	0	2	1	2	2	2	1	0	0	3	1	2	0	1
Enneapogon avenaceus	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0
Enteropogon acicularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enteropogon ramosus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epaltes australis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	0	0	0	0	0	0	0	0	0	0	0
Eragrostis australasica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis dielsii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis elongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis eriopoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis falcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis lacunaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis parviflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila deserti	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila glabra	1	0	0	0	0	0	0	3	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Eremophila longifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila oppositifolia subsp. rubra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila sturtii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	2	0	0	1	0	0	0
Erodium crinitum	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Erodium cygnorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus costata	0	3	0	4	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Eucalyptus dumosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
Eucalyptus gracilis	1	0	0	0	0	0	0	0	3	0	0	0	0	0	0	1	0	0	0	0	3	0	0	0	0	0	0	0	0	5
Eucalyptus largiflorens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus leptophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus oleosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus socialis	4	1	4	3	0	1	0	0	3	0	0	0	0	4	0	4	0	0	0	0	1	0	2	0	0	0	0	0	4	3
Euchiton involucratus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euchiton sphaericus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euphorbia eremophila	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eutaxia microphylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exocarpos aphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fimbristylis dichotoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CS64	CS65	CS66	CS67	CS68	CS69	CS7	CS70	CS71	CS72	CS73	CS74	CS75	CS76	CS77	CS78	CS79	CS8	CS80	CS9	CSA1	CSA2	CSA3	CSA5	CSA6	CSA7	CSA8	CSA9	CSB0	CSB1
Geijera parviflora	0	0	0	1	1	0	1	0	1	0	0	1	0	0	0	1	0	3	0	0	0	0	0	0	0	0	1	1	0	0
Goodenia cycloptera	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia fascicularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	0	0	0
Goodenia glauca	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia havilandii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia pinnatifida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia willisiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea huegelii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hakea leucoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Halgania cyanea	0	1	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haloragis glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haloragis odontocarpa	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harmsiodoxa blennodioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harmsiodoxa brevipes var. brevipes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heliotropium europaeum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hibiscus sturtii	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isoetes muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isoetopsis graminifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isolepis australiensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus aridicola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus flavidus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus subsecundus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lachnagrostis filiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa leptolepis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa semicalva	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa websteri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lemooria burkittii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium fasciculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium leptopetalum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium monoplocoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium papillosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium phlebopetalum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Lepidium pseudohyssopifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptorhynchos baileyi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptospermum coriaceum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra collina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra effusa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Lomandra leucocephala	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lotus cruentus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Lycium australe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lysiana exocarpi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lythrum hyssopifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lythrum wilsonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana appressa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana brevifolia	0	0	0	0	0	0	1	0	0	0	0	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0
Maireana coronata	0	0	0	0	0	0	0	2	0	3	0	3	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Maireana decalvans	2	0	1	1	2	0	3	2	2	1	2	2	1	2	0	1	0	2	0	3	1	1	1	0	0	0	0	0	1	0
Maireana enchylaenoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Maireana georgei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	1	0	0	0	0
Maireana pentatropis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana pyramidata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana radiata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2	3	0	2	0	1	1
Maireana sclerolaenoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2	1	0	0	0	0	0
Maireana sedifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana trichoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	4	0	2	0	0	0	0	0
Maireana triptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	0	2	0	2	0	0	0
Maireana turbinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacocera tricornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marsdenia australis	1	1	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Marsilea drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0
Marsilea hirsuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Millotia tenuifolia	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Minuria denticulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria integerrima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mollugo cerviana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Muehlenbeckia florulenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CS64	CS65	CS66	CS67	CS68	CS69	CS7	CS70	CS71	CS72	CS73	CS74	CS75	CS76	CS77	CS78	CS79	CS8	CS80	CS9	CSA1	CSA2	CSA3	CSA5	CSA6	CSA7	CSA8	CSA9	CSB0	CSB1
Myoporum platycarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	2	0	0	0	0	0	0	0
Myriophyllum verrucosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Nicotiana goodspeedii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	1	0	0	0	0
Nicotiana simulans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Nitraria billardierei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Olearia calcerea	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olearia pimeleoides	0	0	2	1	0	0	1	0	0	0	0	0	1	1	0	0	0	2	0	3	0	1	1	0	1	0	0	0	1	0
Olearia rudis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Omphalolappula concava	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Osteocarpum acropterum var. diminuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxalis chnoodes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxalis perennans	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0
Panicum effusum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Parsonsia eucalyptophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paspalidium constrictum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Paspalidium jubiflorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pelargonium australe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Persicaria lapathifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllanthus lacunellus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pimelea microcephala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pimelea trichostachya	1	1	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago debilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago turrifera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa fax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis canescens	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis capillaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis neglecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polygonum plebeium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portulaca bicolor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portulaca oleracea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pratia purpurascens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudognaphalium luteoalbum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
Pterostylis cobarensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus exaltatus	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Ptilotus gaudichaudii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus obovatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus polystachyus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus sessilifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pycnosorus thompsonianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Radyera farragei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ranunculus sessiliflorus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia candolleana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia spinescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1	0	0	0	0
Rhagodia ulicina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe corymbiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe floribunda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0
Rhyncharrhena linearis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex crystallinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex tenax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rutidosis helichrysoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salsola kali	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Scaevola spinescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schenkia spicata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schoenus subaphyllus	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scleranthus minisculus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Scleranthus pungens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena brachyptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena decurrens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena diacantha	2	1	2	2	2	0	3	1	2	0	0	0	2	2	0	0	0	3	0	2	0	0	0	0	4	4	2	0	1	2
Sclerolaena divaricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena eriacantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena intricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Sclerolaena lanicuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena muricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena obliquicuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	4	4	1	0	2	2	0	0
Sclerolaena parviflora	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2

Data Matrix from Analysis

Scientific Name	CS64	CS65	CS66	CS67	CS68	CS69	CS7	CS70	CS71	CS72	CS73	CS74	CS75	CS76	CS77	CS78	CS79	CS8	CS80	CS9	CSA1	CSA2	CSA3	CSA5	CSA6	CSA7	CSA8	CSA9	CSB0	CSB1
Sclerolaena patenticuspis	0	0	0	0	2	0	0	0	3	3	2	4	3	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Sclerolaena stelligera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio glossanthus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio productus subsp. productus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio runcinifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna form taxon 'coriacea'	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Senna form taxon 'filifolia'	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Senna form taxon 'petiolaris'	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Sida corrugata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida filiformis	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida intricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	0	1	0	2	0	0	0
Sida sp. C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida trichopoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum coactiliferum	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum esuriale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum simile	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spergularia marina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sporobolus caroli	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0
Stackhousia muricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stemodia florulenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenopetalum lineare	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenopetalum sphaerocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Taraxacum officinale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia pergranulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia tenuis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tetragonia tetragonioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teucrium albicaule	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0
Teucrium racemosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0
Thysanotus baueri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	1	1
Tragus australianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triodia scariosa	4	4	1	4	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tripogon loliiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triptilodiscus pygmaeus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triraphis mollis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Velleia arguta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Verbena gaudichaudii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia blackii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia cervicularis	2	1	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	0	0	2	4	3	3	3	3	2	0	1	2
Vittadinia condyloides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia cuneata	0	0	0	0	2	0	2	0	0	0	0	0	2	2	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Vittadinia dissecta	1	0	3	2	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Vittadinia eremaea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Vittadinia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Vittadinia muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia pterochaeta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia sulcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia communis	0	1	1	0	0	2	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Wahlenbergia fluminalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia gracilenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia tumidifructa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walwhalleya proluta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Westringia rigida	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Xerochrysum bracteatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Xerochrysum viscosum	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum ammophilum	0	0	0	0	0	0	0	0	0	3	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum apiculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Zygophyllum aurantiacum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum confluens	0	0	0	0	0	0	0	1	0	0	0	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum eremaeum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
Zygophyllum glaucum	0	0	2	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum iodocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	0	0	0	0	1	0	0

Data Matrix from Analysis

Scientific Name	CSB10	CSB11	CSB12	CSB13	CSB14	CSB15	CSB16	CSB17	CSB18	CSB19	CSB2	CSB20	CSB21	CSB22	CSB23	CSB24	CSB25	CSB26	CSB27	CSB28	CSB29	CSB3	CSB30	CSB31	CSB32	CSB33	CSB34	CSB35
Abutilon otocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aneura	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia colletioides	0	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Acacia ligulata	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia melvillei	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	1
Acacia oswaldii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Acacia rigens	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia sclerophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia wilhelmiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Actinobole uliginosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alectryon oleifolius	0	0	0	0	0	0	0	0	3	3	0	4	3	3	3	0	2	1	3	0	0	0	0	0	0	1	0	2
Alternanthera denticulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alternanthera sp. A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amphipogon caricinus var. caricinus	0	1	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema cambagei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema miraculosum	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Amyema preissii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Angianthus brachypappus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apophyllum anomalum	0	2	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Arabidella nasturtium	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Arabidella trisecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aristida leichhardtiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asperula conferta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex acutibractea subsp. acutibractea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Atriplex angulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Atriplex eardleyae	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex holocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex leptocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex limbata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex lindleyi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex nummularia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex pseudocampanulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex semibaccata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Atriplex spinibractea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex stipitata	0	0	0	0	0	1	0	0	1	2	0	2	1	0	2	0	0	2	2	0	0	0	0	0	0	0	0	1
Atriplex vesicaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrodanthonia setacea	0	0	0	1	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Austrostipa drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa elegantissima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa eremophila	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Austrostipa nitida	1	2	2	4	3	1	2	2	3	4	3	3	3	4	0	4	3	2	2	1	1	0	2	3	4	3	5	3
Austrostipa platychaeta	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	3	0	0	0	0	5	3	1	0	0
Austrostipa puberula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Austrostipa scabra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	4	0	0	0	0	0	1	1	0	0
Austrostipa tuckeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bergia trimera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boerhavia dominii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bossiaea walkeri	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyscome ciliaris	0	0	0	2	0	0	0	0	0	2	0	0	0	1	1	0	0	0	2	0	0	0	0	0	1	0	0	0
Brachyscome papillosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyscome trachycarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulbine alata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulbine semibarbata	0	0	2	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	2	0	0	0	1	0	0	1	0	1
Calandrinia eremaea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Callitris glaucophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callitris verrucosa	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis erinacea	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis hispidula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis scapigera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassytha melantha	0	0	1	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassytha pubescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Casuarina pauper	0	0	0	0	0	0	0	0	4	3	0	5	4	3	3	3	2	4	3	0	0	0	0	0	0	0	0	3
Centipeda crateriformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centipeda cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centipeda thespidioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chamaesyce drummondii	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cheilanthes sieberi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium cristatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSB10	CSB11	CSB12	CSB13	CSB14	CSB15	CSB16	CSB17	CSB18	CSB19	CSB2	CSB20	CSB21	CSB22	CSB23	CSB24	CSB25	CSB26	CSB27	CSB28	CSB29	CSB3	CSB30	CSB31	CSB32	CSB33	CSB34	CSB35
Chenopodium curvispicatum	0	0	0	0	0	0	2	0	1	1	0	2	2	2	0	0	1	1	1	0	0	0	0	0	1	0	0	1
Chenopodium desertorum	2	2	1	2	2	0	0	3	2	2	2	0	1	1	2	0	1	2	2	0	0	2	0	0	1	1	0	0
Chenopodium melanocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium nitrariaceum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium truncatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chloris divaricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chloris truncata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chrysocephalum apiculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chthonocephalus pseudevax	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus clementii	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0
Convolvulus graminetinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Convolvulus remotus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crassula colorata	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	1	0
Crassula sieberiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Cryptandra propinqua	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperus difformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dactyloctenium radulans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daucus glochidiatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dianella revoluta	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diplachne fusca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disphyma crassifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dissocarpus paradoxus	0	0	0	0	0	0	0	0	3	0	1	1	0	2	3	2	1	3	3	2	0	0	0	0	3	3	0	2
Dodonaea bursariifolia	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea lobulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea viscosa	1	3	1	0	0	0	1	1	0	0	0	0	0	0	0	1	3	0	1	0	0	0	2	0	0	0	0	0
Dysphania littoralis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eclipta platyglossa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Einadia nutans subsp. nutans	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0
Einadia polygonoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Einadia trigonos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis acuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis pallens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis plana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis pusilla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Elymus scaber	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enchylaena tomentosa	0	0	0	0	0	0	0	0	2	2	0	3	3	0	0	2	2	1	1	1	0	0	0	0	0	1	1	2
Enneapogon avenaceus	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	2	0	0	0	0	0	0	0	1	0	0	0
Enteropogon acicularis	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Enteropogon ramosus	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Epaltes australis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis australasica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis dielsii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis elongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis eriopoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis falcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis lacunaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis parviflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila deserti	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila glabra	0	1	0	0	0	2	0	0	0	0	1	0	0	0	0	3	1	0	1	0	0	0	0	0	0	0	0	0
Eremophila longifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila oppositifolia subsp. rubra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Eremophila sturtii	0	0	0	0	0	0	0	0	1	0	0	1	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Erodium crinitum	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0
Erodium cygnorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus costata	0	3	3	0	0	0	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0
Eucalyptus dumosa	0	0	0	4	3	3	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Eucalyptus gracilis	3	5	1	0	0	0	4	0	0	0	3	0	0	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0
Eucalyptus largiflorens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus leptophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus oleosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus socialis	3	3	3	3	3	4	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	4
Euchiton involucratus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euchiton sphaericus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euphorbia eremophila	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eutaxia microphylla	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exocarpos aphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fimbristylis dichotoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSB10	CSB11	CSB12	CSB13	CSB14	CSB15	CSB16	CSB17	CSB18	CSB19	CSB2	CSB20	CSB21	CSB22	CSB23	CSB24	CSB25	CSB26	CSB27	CSB28	CSB29	CSB3	CSB30	CSB31	CSB32	CSB33	CSB34	CSB35
Geijera parviflora	0	0	0	0	0	0	0	0	3	3	1	0	3	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
Goodenia cycloptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia fascicularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia havilandii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia pinnatifida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia willisiana	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea huegelii	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hakea leucoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Halgania cyanea	0	1	2	0	2	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Haloragis glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haloragis odontocarpa	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harmsiodoxa blennodioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harmsiodoxa brevipes var. brevipes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heliotropium europaeum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hibiscus sturtii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isoetes muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isoetopsis graminifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isolepis australiensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus aridicola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus flavidus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus subsecundus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lachnagrostis filiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa leptolepis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa semicalva	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa websteri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lemooria burkittii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium fasciculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium leptopetalum	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium monoplocoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium papillosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium phlebopetalum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0
Lepidium pseudohyssopifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptorhynchos baileyi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptospermum coriaceum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra collina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra effusa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Lomandra leucocephala	2	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lotus cruentus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lycium australe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lysiana exocarpi	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Lythrum hyssopifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lythrum wilsonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana appressa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Maireana brevifolia	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	3	0	3	0	1	0	0	0	0	0	2	2	0
Maireana coronata	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana decalvans	0	1	0	2	1	2	2	0	1	2	3	0	3	3	2	3	1	3	0	0	0	3	0	3	1	2	0	1
Maireana enchylaenoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana georgei	0	0	0	2	0	0	0	2	0	0	1	0	2	0	0	0	0	0	0	0	0	1	0	0	0	1	0	3
Maireana pentatropis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana pyramidata	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana radiata	1	0	0	1	0	2	2	0	1	0	1	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Maireana sclerolaenoides	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
Maireana sedifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana trichoptera	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana triptera	0	0	0	0	0	3	0	0	3	0	3	2	2	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
Maireana turbinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacocera tricornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marsdenia australis	0	0	1	2	0	0	0	2	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Marsilea drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marsilea hirsuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Millotia tenuifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria cunninghamii	0	0	0	0	0	1	0	0	0	0	0	0	0	1	2	0	0	0	0	1	0	0	0	0	1	0	0	1
Minuria denticulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria integerrima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mollugo cerviana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Muehlenbeckia florulenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSB10	CSB11	CSB12	CSB13	CSB14	CSB15	CSB16	CSB17	CSB18	CSB19	CSB2	CSB20	CSB21	CSB22	CSB23	CSB24	CSB25	CSB26	CSB27	CSB28	CSB29	CSB3	CSB30	CSB31	CSB32	CSB33	CSB34	CSB35
Myoporum platycarpum	0	1	0	0	1	0	0	0	0	0	0	0	3	0	0	3	0	1	1	0	0	0	0	0	0	0	0	0
Myriophyllum verrucosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nicotiana goodspeedii	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	2	1	0
Nicotiana simulans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitraria billardierei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Olearia calcerea	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Olearia pimeleoides	0	0	0	2	0	1	1	0	1	2	1	0	4	1	0	0	4	0	0	0	0	0	0	0	0	0	0	0
Olearia rudis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Omphalolappula concava	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Osteocarpum acropterum var. diminuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxalis chnoodes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxalis perennans	0	0	0	1	0	0	0	0	0	1	1	0	0	0	2	0	0	0	0	0	0	0	0	1	1	0	1	0
Panicum effusum	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parsonsia eucalyptophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paspalidium constrictum	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paspalidium jubiflorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pelargonium australe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Persicaria lapathifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllanthus lacunellus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pimelea microcephala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pimelea trichostachya	2	1	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Plantago cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago debilis	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago turrifera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Poa fax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
Podolepis canescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis capillaris	1	1	2	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Podolepis neglecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polygonum plebeium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portulaca bicolor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portulaca oleracea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pratia purpurascens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudognaphalium luteoalbum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pterostylis cobarensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus exaltatus	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Ptilotus gaudichaudii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus obovatus	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Ptilotus polystachyus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus sessilifolius	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pycnosorus thompsonianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Radyera farragei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ranunculus sessiliflorus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia candolleana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia spinescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia ulicina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe corymbiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe floribunda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhyncharrhena linearis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex crystallinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex tenax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rutidosis helichrysoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salsola kali	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scaevola spinescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schenkia spicata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schoenus subaphyllus	2	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scleranthus minisculus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scleranthus pungens	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Sclerolaena brachyptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena decurrens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena diacantha	2	0	3	1	2	2	2	2	0	2	3	3	2	3	3	0	4	0	3	0	0	2	0	0	2	0	0	2
Sclerolaena divaricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena eriacantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena intricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena lanicuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena muricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena obliquicuspis	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	1	0	0	0	1	0	2	1	0
Sclerolaena parviflora	2	2	2	0	2	0	2	2	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSB10	CSB11	CSB12	CSB13	CSB14	CSB15	CSB16	CSB17	CSB18	CSB19	CSB2	CSB20	CSB21	CSB22	CSB23	CSB24	CSB25	CSB26	CSB27	CSB28	CSB29	CSB3	CSB30	CSB31	CSB32	CSB33	CSB34	CSB35
Sclerolaena patenticuspis	1	0	0	0	0	0	0	0	2	0	0	0	3	0	0	3	0	3	2	1	0	0	0	3	0	3	3	0
Sclerolaena stelligera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio glossanthus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio productus subsp. productus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio runcinifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna form taxon 'coriacea'	0	0	0	2	0	0	0	0	0	0	0	0	1	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Senna form taxon 'filifolia'	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Senna form taxon 'petiolaris'	0	0	0	0	0	3	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida corrugata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1`	0	1	0
Sida cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida filiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida intricata	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida sp. C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida trichopoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum coactiliferum	0	0	2	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Solanum esuriale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum simile	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spergularia marina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sporobolus caroli	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stackhousia muricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stemodia florulenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenopetalum lineare	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenopetalum sphaerocarpum	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Taraxacum officinale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia pergranulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Tecticornia tenuis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tetragonia tetragonioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teucrium albicaule	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teucrium racemosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thysanotus baueri	1	1	1	3	0	0	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tragus australianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triodia scariosa	5	4	4	0	4	2	4	4	0	0	2	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0
Tripogon loliiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triptilodiscus pygmaeus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triraphis mollis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Velleia arguta	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Verbena gaudichaudii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia blackii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia cervicularis	0	0	0	0	1	0	0	0	1	1	2	0	2	2	0	0	1	0	2	0	0	2	0	0	1	1	2	1
Vittadinia condyloides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia cuneata	1	0	0	0	2	0	0	0	0	1	0	0	0	1	2	1	0	2	0	0	0	0	0	0	0	1	0	0
Vittadinia dissecta	1	0	0	4	0	0	0	2	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia eremaea	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia gracilis	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0
Vittadinia muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia pterochaeta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia sulcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia communis	1	0	0	1	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia fluminalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia gracilenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia tumidifructa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Walwhalleya proluta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Westringia rigida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Xerochrysum bracteatum	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Xerochrysum viscosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum ammophilum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum apiculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum aurantiacum	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Zygophyllum confluens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum eremaeum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
Zygophyllum glaucum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum iodocarpum	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSB36	CSB37	CSB38	CSB39	CSB4	CSB40	CSB41	CSB42	CSB43	CSB44	CSB45	CSB46	CSB47	CSB48	CSB49	CSB5	CSB50	CSB51	CSB52	CSB53	CSB54	CSB55	CSB56	CSB57	CSB58	CSB59	CSB6	CSB60
Abutilon otocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aneura	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia colletioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
Acacia ligulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia melvillei	0	0	0	0	0	1	0	0	0	0	1	0	1	1	0	0	0	0	0	0	1	0	3	0	0	1	0	0
Acacia oswaldii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia rigens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia sclerophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia wilhelmiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Actinobole uliginosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alectryon oleifolius	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0
Alternanthera denticulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alternanthera sp. A	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amphipogon caricinus var. caricinus	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0
Amyema cambagei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
Amyema miraculosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema preissii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Angianthus brachypappus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apophyllum anomalum	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Arabidella nasturtium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arabidella trisecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aristida leichhardtiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asperula conferta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex acutibractea subsp. acutibractea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex angulata	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex eardleyae	0	0	0	0	0	0	0	0	0	0	2	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex holocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex leptocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	0	0	0	1	0	0	0	1
Atriplex limbata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex lindleyi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex nummularia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex pseudocampanulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex semibaccata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex spinibractea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Atriplex stipitata	1	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0
Atriplex vesicaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrodanthonia setacea	1	2	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa elegantissima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa eremophila	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa nitida	4	3	2	0	2	0	3	0	4	2	2	0	0	2	3	3	3	4	3	4	1	4	4	4	5	0	2	0
Austrostipa platychaeta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	3	0	0	0	0
Austrostipa puberula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa scabra	0	1	0	0	0	0	0	0	0	0	0	1	2	0	0	0	1	0	0	2	0	0	0	0	0	0	0	3
Austrostipa tuckeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bergia trimera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boerhavia dominii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Bossiaea walkeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyscome ciliaris	2	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	1
Brachyscome papillosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyscome trachycarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulbine alata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulbine semibarbata	0	0	0	0	0	0	0	0	0	2	2	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Calandrinia eremaea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callitris glaucophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callitris verrucosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis erinacea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis hispidula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis scapigera	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Cassytha melantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassytha pubescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Casuarina pauper	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	1	0	0	0	0	0
Centipeda crateriformis	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centipeda cunninghamii	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centipeda thespidioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chamaesyce drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1
Cheilanthes sieberi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Chenopodium cristatum	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSB36	CSB37	CSB38	CSB39	CSB4	CSB40	CSB41	CSB42	CSB43	CSB44	CSB45	CSB46	CSB47	CSB48	CSB49	CSB5	CSB50	CSB51	CSB52	CSB53	CSB54	CSB55	CSB56	CSB57	CSB58	CSB59	CSB6	CSB60
Chenopodium curvispicatum	1	0	0	0	0	0	1	2	1	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Chenopodium desertorum	1	0	0	0	0	0	1	0	2	0	0	0	0	2	0	2	1	1	0	0	0	2	0	0	1	0	2	0
Chenopodium melanocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium nitrariaceum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium truncatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chloris divaricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chloris truncata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Chrysocephalum apiculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chthonocephalus pseudevax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus clementii	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus graminetinus	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Convolvulus remotus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Crassula colorata	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
Crassula sieberiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cryptandra propinqua	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperus difformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dactyloctenium radulans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daucus glochidiatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dianella revoluta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diplachne fusca	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disphyma crassifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dissocarpus paradoxus	1	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	0	1	0	0	2	0	0	0
Dodonaea bursariifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Dodonaea lobulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea viscosa	3	3	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	4	3	2	0	2	2	3	4	0	0	4
Dysphania littoralis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eclipta platyglossa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Einadia nutans subsp. nutans	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	2
Einadia polygonoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Einadia trigonos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis acuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis pallens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis plana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis pusilla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Elymus scaber	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enchylaena tomentosa	3	0	0	0	1	0	2	0	1	0	0	0	0	0	0	2	2	0	0	0	0	0	1	0	0	0	0	1
Enneapogon avenaceus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	2	2	2	0	0	1
Enteropogon acicularis	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enteropogon ramosus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epaltes australis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis australasica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis dielsii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Eragrostis elongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Eragrostis eriopoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis falcata	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis lacunaria	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis parviflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila deserti	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	1	5	0	0	0	0	0	0
Eremophila glabra	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	1	3
Eremophila longifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila oppositifolia subsp. rubra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila sturtii	0	3	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1
Erodium crinitum	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Erodium cygnorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus costata	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus dumosa	0	0	0	0	1	0	0	4	4	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	5	0
Eucalyptus gracilis	0	0	0	0	3	0	3	0	3	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus largiflorens	0	0	0	0	0	0	0	0	0	5	3	4	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus leptophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus oleosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus socialis	0	0	0	0	3	0	3	3	3	0	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	4	0
Euchiton involucratus	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euchiton sphaericus	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euphorbia eremophila	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Eutaxia microphylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exocarpos aphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fimbristylis dichotoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSB36	CSB37	CSB38	CSB39	CSB4	CSB40	CSB41	CSB42	CSB43	CSB44	CSB45	CSB46	CSB47	CSB48	CSB49	CSB5	CSB50	CSB51	CSB52	CSB53	CSB54	CSB55	CSB56	CSB57	CSB58	CSB59	CSB6	CSB60
Geijera parviflora	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4	1	0	0	0	0	0	0	0	0	0	1
Goodenia cycloptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia fascicularis	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia havilandii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia pinnatifida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia willisiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0
Grevillea huegelii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hakea leucoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Halgania cyanea	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haloragis glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haloragis odontocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harmsiodoxa blennodioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harmsiodoxa brevipes var. brevipes	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heliotropium europaeum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Hibiscus sturtii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isoetes muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isoetopsis graminifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isolepis australiensis	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus aridicola	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus flavidus	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus subsecundus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lachnagrostis filiformis	0	0	0	0	0	0	0	0	0	0	2	4	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa leptolepis	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa semicalva	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa websteri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lemooria burkittii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium fasciculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium leptopetalum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Lepidium monoplocoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium papillosum	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium phlebopetalum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium pseudohyssopifolium	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptorhynchos baileyi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptospermum coriaceum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra collina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra effusa	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra leucocephala	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lotus cruentus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lycium australe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lysiana exocarpi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lythrum hyssopifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lythrum wilsonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana appressa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana brevifolia	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana coronata	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1	0	0	0	0
Maireana decalvans	2	2	0	0	0	0	3	2	2	0	0	0	0	0	0	1	2	2	2	3	2	3	2	0	3	0	0	1
Maireana enchylaenoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana georgei	0	0	0	0	0	0	0	1	0	0	0	0	0	0	4	3	0	0	0	0	0	0	0	0	1	0	1	0
Maireana pentatropis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana pyramidata	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Maireana radiata	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0
Maireana sclerolaenoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Maireana sedifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana trichoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana triptera	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	1	0
Maireana turbinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacocera tricornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marsdenia australis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0
Marsilea drummondii	0	0	0	0	0	0	0	0	0	0	3	0	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marsilea hirsuta	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Millotia tenuifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria denticulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria integerrima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mollugo cerviana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Muehlenbeckia florulenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSB36	CSB37	CSB38	CSB39	CSB4	CSB40	CSB41	CSB42	CSB43	CSB44	CSB45	CSB46	CSB47	CSB48	CSB49	CSB5	CSB50	CSB51	CSB52	CSB53	CSB54	CSB55	CSB56	CSB57	CSB58	CSB59	CSB6	CSB60
Myoporum platycarpum	0	1	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Myriophyllum verrucosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nicotiana goodspeedii	0	0	1	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nicotiana simulans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitraria billardierei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olearia calcerea	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olearia pimeleoides	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	1
Olearia rudis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Omphalolappula concava	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Osteocarpum acropterum var. diminuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxalis chnoodes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxalis perennans	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	1	0	1	0	0	2	0	0	1
Panicum effusum	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parsonsia eucalyptophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paspalidium constrictum	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Paspalidium jubiflorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pelargonium australe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Persicaria lapathifolia	0	0	0	0	0	0	0	0	0	0	0	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllanthus lacunellus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pimelea microcephala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pimelea trichostachya	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago debilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago turrifera	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa fax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis canescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis capillaris	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis neglecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polygonum plebeium	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portulaca bicolor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portulaca oleracea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pratia purpurascens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudognaphalium luteoalbum	0	0	1	0	0	0	0	0	0	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pterostylis cobarensis	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus exaltatus	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus gaudichaudii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus obovatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus polystachyus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus sessilifolius	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pycnosorus thompsonianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Radyera farragei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ranunculus sessiliflorus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia candolleana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia spinescens	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia ulicina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe corymbiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe floribunda	0	0	0	0	0	0	0	0	0	5	2	1	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhyncharrhena linearis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex crystallinus	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex tenax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rutidosis helichrysoides	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salsola kali	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scaevola spinescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schenkia spicata	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schoenus subaphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scleranthus minisculus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Scleranthus pungens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena brachyptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena decurrens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena diacantha	0	1	0	0	2	0	2	2	3	0	0	0	0	0	4	3	0	3	2	3	2	2	3	2	3	0	2	2
Sclerolaena divaricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena eriacantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena intricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena lanicuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena muricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena obliquicuspis	3	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	2	0	0	0	0
Sclerolaena parviflora	0	0	0	0	2	0	1	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0

Data Matrix from Analysis

Scientific Name	CSB36	CSB37	CSB38	CSB39	CSB4	CSB40	CSB41	CSB42	CSB43	CSB44	CSB45	CSB46	CSB47	CSB48	CSB49	CSB5	CSB50	CSB51	CSB52	CSB53	CSB54	CSB55	CSB56	CSB57	CSB58	CSB59	CSB6	CSB60
Sclerolaena patenticuspis	0	3	0	0	2	0	2	0	0	0	1	0	0	0	0	0	0	2	2	2	0	2	2	2	2	0	0	2
Sclerolaena stelligera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio glossanthus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio productus subsp. productus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio runcinifolius	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna form taxon 'coriacea'	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Senna form taxon 'filifolia'	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna form taxon 'petiolaris'	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	0	0	0
Sida corrugata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	1	0	0
Sida cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Sida filiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Sida intricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	1	0	0	0	0	0	0	0	1	0	1
Sida sp. C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida trichopoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum coactiliferum	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum esuriale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum simile	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spergularia marina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sporobolus caroli	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	2	0	0
Stackhousia muricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stemodia florulenta	0	2	0	0	0	0	0	0	0	2	1	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0	0	1
Stenopetalum lineare	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenopetalum sphaerocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Taraxacum officinale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia pergranulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia tenuis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tetragonia tetragonioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teucrium albicaule	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teucrium racemosum	0	0	0	0	0	0	0	0	0	4	1	1	1	1	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Thysanotus baueri	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0
Tragus australianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triodia scariosa	0	0	0	0	3	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Tripogon loliiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Triptilodiscus pygmaeus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triraphis mollis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Velleia arguta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Verbena gaudichaudii	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia blackii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia cervicularis	2	0	2	0	0	0	0	1	2	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	1	0
Vittadinia condyloides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia cuneata	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
Vittadinia dissecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia eremaea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Vittadinia muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Vittadinia pterochaeta	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2	1	2	2	2	2	2	2	0	0	2
Vittadinia sulcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia communis	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia fluminalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia gracilenta	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia tumidifructa	0	0	0	0	0	0	0	0	0	2	1	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walwhalleya proluta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Westringia rigida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Xerochrysum bracteatum	0	0	1	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Xerochrysum viscosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum ammophilum	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Zygophyllum apiculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum aurantiacum	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum confluens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum eremaeum	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum glaucum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Zygophyllum iodocarpum	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSB61	CSB62	CSB63	CSB64	CSB65	CSB66	CSB67	CSB68	CSB7	CSB70	CSB71	CSB72	CSB73	CSB74	CSB75	CSB76	CSB77	CSB78	CSB8	CSB9	CSC1	CSE1	CSE10	CSE11	CSE12	CSE2	CSE3
Abutilon otocarpum	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aneura	0	0	0	3	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia colletioides	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
Acacia ligulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia melvillei	3	1	0	0	1	0	0	1	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia oswaldii	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia rigens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia sclerophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia wilhelmiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Actinobole uliginosum	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alectryon oleifolius	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	3	3	3	3
Alternanthera denticulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alternanthera sp. A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amphipogon caricinus var. caricinus	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema cambagei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema miraculosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Amyema preissii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Angianthus brachypappus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apophyllum anomalum	0	0	0	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	1	1	0	4	0	1	2
Arabidella nasturtium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arabidella trisecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aristida leichhardtiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asperula conferta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex acutibractea subsp. acutibractea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex angulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Atriplex eardleyae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex holocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex leptocarpa	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex limbata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex lindleyi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex nummularia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex pseudocampanulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex semibaccata	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex spinibractea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex stipitata	0	0	0	0	0	0	1	1	0	2	1	0	1	0	0	0	0	0	0	0	0	1	2	1	2	1	0
Atriplex vesicaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrodanthonia setacea	0	2	0	0	0	0	0	0	0	1	0	2	1	0	0	0	0	0	0	0	1	1	1	1	2	1	0
Austrostipa drummondii	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa elegantissima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa eremophila	0	0	0	1	0	1	0	1	0	0	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0
Austrostipa nitida	4	5	0	0	2	4	2	3	3	4	0	3	4	2	2	2	3	3	2	3	2	2	3	2	2	5	3
Austrostipa platychaeta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa puberula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa scabra	0	0	3	2	2	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa tuckeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bergia trimera	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boerhavia dominii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bossiaea walkeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Brachyscome ciliaris	0	2	0	0	0	0	0	0	0	0	0	2	0	1	1	0	1	0	1	0	0	0	0	0	1	1	0
Brachyscome papillosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyscome trachycarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulbine alata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulbine semibarbata	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calandrinia eremaea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callitris glaucophylla	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	0	0	3	0	0
Callitris verrucosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis erinacea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis hispidula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis scapigera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassytha melantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0
Cassytha pubescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Casuarina pauper	0	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	5	3	5	5	5
Centipeda crateriformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centipeda cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centipeda thespidioides	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chamaesyce drummondii	1	1	0	0	0	1	1	2	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0
Cheilanthes sieberi	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium cristatum	1	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSB61	CSB62	CSB63	CSB64	CSB65	CSB66	CSB67	CSB68	CSB7	CSB70	CSB71	CSB72	CSB73	CSB74	CSB75	CSB76	CSB77	CSB78	CSB8	CSB9	CSC1	CSE1	CSE10	CSE11	CSE12	CSE2	CSE3
Chenopodium curvispicatum	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1	1	2	3	1	2	2
Chenopodium desertorum	0	0	0	0	2	0	0	0	0	0	0	1	2	2	2	2	2	0	2	1	1	1	2	0	1	1	1
Chenopodium melanocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium nitrariaceum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium truncatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chloris divaricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chloris truncata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chrysocephalum apiculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chthonocephalus pseudevax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus clementii	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus graminetinus	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus remotus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crassula colorata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crassula sieberiana	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cryptandra propinqua	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperus difformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dactyloctenium radulans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daucus glochidiatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dianella revoluta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diplachne fusca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disphyma crassifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dissocarpus paradoxus	2	2	0	0	3	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	2	0	1	1	0	0
Dodonaea bursariifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Dodonaea lobulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea viscosa	3	1	4	2	0	0	0	0	0	0	1	4	0	1	2	1	1	1	2	1	0	0	0	0	0	0	0
Dysphania littoralis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eclipta platyglossa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Einadia nutans subsp. nutans	0	0	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	0	2	0	0	2	2	1
Einadia polygonoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Einadia trigonos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis acuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis pallens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis plana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis pusilla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Elymus scaber	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enchylaena tomentosa	0	2	0	0	2	0	0	0	2	1	1	1	2	1	0	0	2	0	0	0	4	3	4	3	3	4	0
Enneapogon avenaceus	0	2	2	0	0	1	3	2	0	0	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0
Enteropogon acicularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enteropogon ramosus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Epaltes australis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis australasica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis dielsii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis elongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis eriopoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis falcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis lacunaria	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis parviflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila deserti	0	3	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila glabra	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Eremophila longifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila maculata	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila oppositifolia subsp. rubra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila sturtii	0	0	0	0	0	0	0	0	0	2	3	4	3	0	0	0	0	0	0	0	0	1	0	0	0	1	0
Erodium crinitum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Erodium cygnorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus costata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0	0	0	0	0	0	0	0
Eucalyptus dumosa	0	0	0	0	0	0	0	0	4	0	0	0	0	3	4	4	4	4	3	3	0	0	0	0	0	0	0
Eucalyptus gracilis	0	0	0	0	0	0	0	0	3	0	0	0	4	4	0	2	0	3	4	0	0	0	0	0	0	0	0
Eucalyptus largiflorens	0	0	0	0	4	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus leptophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus oleosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus socialis	1	0	0	0	0	0	0	0	4	0	0	3	4	5	5	5	5	5	0	1	0	0	0	0	0	0	0
Euchiton involucratus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euchiton sphaericus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euphorbia eremophila	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eutaxia microphylla	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0
Exocarpos aphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fimbristylis dichotoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSB61	CSB62	CSB63	CSB64	CSB65	CSB66	CSB67	CSB68	CSB7	CSB70	CSB71	CSB72	CSB73	CSB74	CSB75	CSB76	CSB77	CSB78	CSB8	CSB9	CSC1	CSE1	CSE10	CSE11	CSE12	CSE2	CSE3
Geijera parviflora	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	3	3	0	3	0	3	4	0
Goodenia cycloptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia fascicularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia havilandii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia pinnatifida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia willisiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea huegelii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hakea leucoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Halgania cyanea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0
Haloragis glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haloragis odontocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harmsiodoxa blennodioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harmsiodoxa brevipes var. brevipes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heliotropium europaeum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hibiscus sturtii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isoetes muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isoetopsis graminifolia	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isolepis australiensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus aridicola	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus flavidus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus subsecundus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lachnagrostis filiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa leptolepis	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa semicalva	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa websteri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Lemooria burkittii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium fasciculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium leptopetalum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium monoplocoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium papillosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium phlebopetalum	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium pseudohyssopifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptorhynchos baileyi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptospermum coriaceum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra collina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra effusa	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra leucocephala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Lotus cruentus	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lycium australe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lysiana exocarpi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lythrum hyssopifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lythrum wilsonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana appressa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana brevifolia	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana coronata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana decalvans	2	2	0	0	0	2	2	0	3	0	0	0	1	1	0	1	2	2	0	3	1	2	0	1	0	1	1
Maireana enchylaenoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana georgei	0	0	0	0	0	0	1	0	2	0	0	1	1	2	0	2	0	1	1	0	4	2	0	0	0	0	0
Maireana pentatropis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana pyramidata	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1
Maireana radiata	1	0	0	0	2	0	0	0	2	0	3	0	1	0	0	1	2	3	0	0	1	2	0	1	0	0	0
Maireana sclerolaenoides	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	2	2	2	2	0	2	0
Maireana sedifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana trichoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana triptera	0	0	0	0	0	0	1	0	2	2	0	1	3	1	0	1	2	0	0	0	1	2	1	0	1	2	0
Maireana turbinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacocera tricornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marsdenia australis	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	2	0	0	0	1	0	2	0	1	0	2	2
Marsilea drummondii	0	0	0	4	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marsilea hirsuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Millotia tenuifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria cunninghamii	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria denticulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria integerrima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mollugo cerviana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Muehlenbeckia florulenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSB61	CSB62	CSB63	CSB64	CSB65	CSB66	CSB67	CSB68	CSB7	CSB70	CSB71	CSB72	CSB73	CSB74	CSB75	CSB76	CSB77	CSB78	CSB8	CSB9	CSC1	CSE1	CSE10	CSE11	CSE12	CSE2	CSE3
Myoporum platycarpum	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0
Myriophyllum verrucosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nicotiana goodspeedii	0	0	0	0	1	1	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nicotiana simulans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitraria billardierei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olearia calcerea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Olearia pimeleoides	0	1	3	0	0	0	0	0	1	1	0	1	0	0	1	1	1	0	0	0	2	4	2	2	2	3	2
Olearia rudis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Omphalolappula concava	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Osteocarpum acropterum var. diminuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxalis chnoodes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxalis perennans	0	1	0	2	1	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panicum effusum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	1	0	0	0	0	0	0	0
Parsonsia eucalyptophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paspalidium constrictum	0	1	1	0	0	0	0	0	0	0	0	2	0	1	1	2	1	0	0	0	0	0	0	0	0	0	0
Paspalidium jubiflorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pelargonium australe	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Persicaria lapathifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllanthus lacunellus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pimelea microcephala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pimelea trichostachya	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Plantago cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago debilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago turrifera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa fax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis canescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis capillaris	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	1	0	0	0	0	0	0	0
Podolepis neglecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polygonum plebeium	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portulaca bicolor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portulaca oleracea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pratia purpurascens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudognaphalium luteoalbum	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pterostylis cobarensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Ptilotus exaltatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus gaudichaudii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus obovatus	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	1	0
Ptilotus polystachyus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus sessilifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Pycnosorus thompsonianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Radyera farragei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ranunculus sessiliflorus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia candolleana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia spinescens	0	0	0	0	1	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	2	2	2	0	0
Rhagodia ulicina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe corymbiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe floribunda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhyncharrhena linearis	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
Rumex crystallinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex tenax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rutidosis helichrysoides	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salsola kali	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scaevola spinescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schenkia spicata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schoenus subaphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scleranthus minisculus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scleranthus pungens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena brachyptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena decurrens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena diacantha	0	2	0	1	0	2	2	0	3	3	0	3	4	1	1	3	3	3	3	3	3	1	2	2	2	2	2
Sclerolaena divaricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena eriacantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena intricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena lanicuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena muricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena obliquicuspis	2	0	0	0	2	2	2	1	0	3	2	0	0	0	0	0	0	1	0	0	1	3	4	3	2	3	3
Sclerolaena parviflora	0	0	0	0	0	0	0	0	1	0	0	0	0	2	2	0	1	0	2	2	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSB61	CSB62	CSB63	CSB64	CSB65	CSB66	CSB67	CSB68	CSB7	CSB70	CSB71	CSB72	CSB73	CSB74	CSB75	CSB76	CSB77	CSB78	CSB8	CSB9	CSC1	CSE1	CSE10	CSE11	CSE12	CSE2	CSE3
Sclerolaena patenticuspis	3	2	2	0	3	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
Sclerolaena stelligera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio glossanthus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Senecio productus subsp. productus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio runcinifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna form taxon 'coriacea'	0	1	0	0	0	0	0	0	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1
Senna form taxon 'filifolia'	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna form taxon 'petiolaris'	0	0	1	0	0	0	0	0	3	0	0	0	0	1	4	0	1	0	0	0	0	0	0	0	0	0	0
Sida corrugata	0	0	0	0	0	0	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida filiformis	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida intricata	3	0	0	0	1	0	1	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida sp. C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida trichopoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum coactiliferum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum esuriale	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum simile	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spergularia marina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sporobolus caroli	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stackhousia muricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Stemodia florulenta	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenopetalum lineare	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenopetalum sphaerocarpum	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Taraxacum officinale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia pergranulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia tenuis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tetragonia tetragonioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teucrium albicaule	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teucrium racemosum	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thysanotus baueri	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0	0	1	2	0	0	0	0	0	0	0
Tragus australianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triodia scariosa	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	4	4	0	0	0	0	0	0	0
Tripogon loliiformis	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triptilodiscus pygmaeus	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triraphis mollis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Velleia arguta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Verbena gaudichaudii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia blackii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia cervicularis	0	0	0	0	0	0	0	0	2	2	0	0	0	2	2	2	2	0	1	0	0	2	2	1	1	3	0
Vittadinia condyloides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia cuneata	3	1	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Vittadinia dissecta	0	2	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	1	1	1
Vittadinia eremaea	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia gracilis	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia muelleri	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia pterochaeta	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia sulcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia communis	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia fluminalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia gracilenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia tumidifructa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walwhalleya proluta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Westringia rigida	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Xerochrysum bracteatum	0	0	0	4	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Xerochrysum viscosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum ammophilum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Zygophyllum apiculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum aurantiacum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum confluens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum eremaeum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
Zygophyllum glaucum	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum iodocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSE4	CSE5	CSE6	CSE7	CSE8	CSE9	CSH1	CSH10	CSH11	CSH12	CSH13	CSH14	CSH15	CSH16	CSH17	CSH18	CSH19	CSH2	CSH20	CSH21	CSH22	CSH23	CSH24	CSH25	CSH26	CSH27	CSH28	CSH29
Abutilon otocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aneura	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia colletioides	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia ligulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia melvillei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia oswaldii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia rigens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia sclerophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia wilhelmiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Actinobole uliginosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alectryon oleifolius	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
Alternanthera denticulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Alternanthera sp. A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amphipogon caricinus var. caricinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema cambagei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema miraculosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema preissii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Angianthus brachypappus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apophyllum anomalum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Arabidella nasturtium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arabidella trisecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aristida leichhardtiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asperula conferta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex acutibractea subsp. acutibractea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex angulata	0	0	0	0	0	0	0	0	2	0	0	0	1	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0
Atriplex eardleyae	0	0	0	0	0	0	2	0	0	0	2	2	0	2	0	2	0	0	0	0	0	0	0	0	2	0	0	0
Atriplex holocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex leptocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex limbata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex lindleyi	0	0	0	0	0	0	1	0	2	0	2	2	3	2	0	2	0	0	0	0	0	2	2	2	0	0	3	2
Atriplex nummularia	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Atriplex pseudocampanulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex semibaccata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex spinibractea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	2	0	0
Atriplex stipitata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex vesicaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	2	2	3	3
Austrodanthonia setacea	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	2	0	0	1	1	0	0	0	1	0
Austrostipa drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa elegantissima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa eremophila	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa nitida	4	2	2	3	3	2	4	1	0	3	2	3	2	3	0	1	2	4	2	0	0	2	0	0	2	2	0	0
Austrostipa platychaeta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa puberula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa scabra	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	3	3	1	4	4	4	3	2	0	3	2	0	0
Austrostipa tuckeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bergia trimera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boerhavia dominii	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bossiaea walkeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyscome ciliaris	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyscome papillosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyscome trachycarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulbine alata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulbine semibarbata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calandrinia eremaea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callitris glaucophylla	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callitris verrucosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis erinacea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis hispidula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis scapigera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassytha melantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassytha pubescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Casuarina pauper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centipeda crateriformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centipeda cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centipeda thespidioides	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Chamaesyce drummondii	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Cheilanthes sieberi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium cristatum	0	0	0	0	0	0	1	0	0	2	2	2	0	0	0	0	0	1	0	0	0	0	0	0	1	2	0	0

Data Matrix from Analysis

Scientific Name	CSE4	CSE5	CSE6	CSE7	CSE8	CSE9	CSH1	CSH10	CSH11	CSH12	CSH13	CSH14	CSH15	CSH16	CSH17	CSH18	CSH19	CSH2	CSH20	CSH21	CSH22	CSH23	CSH24	CSH25	CSH26	CSH27	CSH28	CSH29
Chenopodium curvispicatum	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Chenopodium desertorum	2	1	2	2	2	1	0	1	0	1	0	0	0	0	1	1	0	0	3	0	0	1	0	0	0	1	4	0
Chenopodium melanocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium nitrariaceum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
Chenopodium truncatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chloris divaricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0
Chloris truncata	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0
Chrysocephalum apiculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chthonocephalus pseudevax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus clementii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus graminetinus	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	1	0	0	0	0	0
Convolvulus remotus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crassula colorata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crassula sieberiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Cryptandra propinqua	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperus difformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dactyloctenium radulans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0
Daucus glochidiatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dianella revoluta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diplachne fusca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disphyma crassifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Dissocarpus paradoxus	0	0	0	0	0	0	2	0	0	1	1	1	2	2	2	0	2	2	2	2	2	3	0	0	1	0	0	0
Dodonaea bursariifolia	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea lobulata	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea viscosa	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dysphania littoralis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eclipta platyglossa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
Einadia nutans subsp. nutans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
Einadia polygonoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Einadia trigonos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis acuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis pallens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	2
Eleocharis plana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis pusilla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Elymus scaber	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enchylaena tomentosa	2	1	2	1	0	0	0	1	0	3	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Enneapogon avenaceus	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	1	0	1	0	0	2	0	0	0	2	2	0	0
Enteropogon acicularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enteropogon ramosus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epaltes australis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis australasica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2
Eragrostis dielsii	0	0	0	0	0	0	0	0	1	0	0	2	2	2	2	2	3	0	1	1	2	3	2	0	2	2	0	1
Eragrostis elongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis eriopoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis falcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis lacunaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis parviflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Eremophila deserti	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila glabra	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila longifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila oppositifolia subsp. rubra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila sturtii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Erodium crinitum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Erodium cygnorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus costata	4	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus dumosa	4	3	2	3	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus gracilis	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus largiflorens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus leptophylla	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus oleosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus socialis	0	3	4	4	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euchiton involucratus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euchiton sphaericus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euphorbia eremophila	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eutaxia microphylla	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exocarpos aphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fimbristylis dichotoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSE4	CSE5	CSE6	CSE7	CSE8	CSE9	CSH1	CSH10	CSH11	CSH12	CSH13	CSH14	CSH15	CSH16	CSH17	CSH18	CSH19	CSH2	CSH20	CSH21	CSH22	CSH23	CSH24	CSH25	CSH26	CSH27	CSH28	CSH29
Geijera parviflora	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia cycloptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia fascicularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia havilandii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia pinnatifida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia willisiana	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea huegelii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hakea leucoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Halgania cyanea	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haloragis glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Haloragis odontocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harmsiodoxa blennodioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harmsiodoxa brevipes var. brevipes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heliotropium europaeum	0	0	0	0	0	0	0	2	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Hibiscus sturtii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isoetes muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isoetopsis graminifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isolepis australiensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus aridicola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1
Juncus flavidus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus subsecundus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lachnagrostis filiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Leiocarpa leptolepis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa semicalva	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa websteri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lemooria burkittii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium fasciculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2
Lepidium leptopetalum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium monoplocoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium papillosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium phlebopetalum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium pseudohyssopifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptorhynchos baileyi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptospermum coriaceum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra collina	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra effusa	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra leucocephala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lotus cruentus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lycium australe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lysiana exocarpi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Lythrum hyssopifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lythrum wilsonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana appressa	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana brevifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana coronata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana decalvans	3	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana enchylaenoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana georgei	0	0	1	2	1	0	0	2	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Maireana pentatropis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana pyramidata	0	0	0	0	0	0	4	4	3	4	3	3	4	4	4	4	4	4	3	3	3	4	3	0	4	4	1	0
Maireana radiata	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Maireana sclerolaenoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana sedifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0	3	3	3	0	0	0	0	0	0
Maireana trichoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana triptera	2	0	1	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana turbinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacocera tricornis	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	2	0	0	2	0	0	0
Marsdenia australis	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marsilea drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	5	0	0	1	4
Marsilea hirsuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Millotia tenuifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria denticulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria integerrima	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	1	1	0	0	1	2	0	0
Mollugo cerviana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Muehlenbeckia florulenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSE4	CSE5	CSE6	CSE7	CSE8	CSE9	CSH1	CSH10	CSH11	CSH12	CSH13	CSH14	CSH15	CSH16	CSH17	CSH18	CSH19	CSH2	CSH20	CSH21	CSH22	CSH23	CSH24	CSH25	CSH26	CSH27	CSH28	CSH29
Myoporum platycarpum	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Myriophyllum verrucosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nicotiana goodspeedii	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Nicotiana simulans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitraria billardierei	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	3
Olearia calcerea	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olearia pimeleoides	2	0	2	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olearia rudis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Omphalolappula concava	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Osteocarpum acropterum var. diminuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	2	0
Oxalis chnoodes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxalis perennans	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panicum effusum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parsonsia eucalyptophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paspalidium constrictum	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paspalidium jubiflorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pelargonium australe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Persicaria lapathifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllanthus lacunellus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pimelea microcephala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pimelea trichostachya	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago debilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago turrifera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Poa fax	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	2	2	2	2	2	0	2	2	0	0
Podolepis canescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis capillaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis neglecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polygonum plebeium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portulaca bicolor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Portulaca oleracea	0	0	0	0	0	0	0	0	2	0	1	1	0	0	0	0	0	0	0	0	0	1	1	0	2	2	0	1
Pratia purpurascens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudognaphalium luteoalbum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pterostylis cobarensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus exaltatus	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus gaudichaudii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus obovatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus polystachyus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus sessilifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pycnosorus thompsonianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Radyera farragei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ranunculus sessiliflorus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia candolleana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Rhagodia spinescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Rhagodia ulicina	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe corymbiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe floribunda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhyncharrhena linearis	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex crystallinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex tenax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Rutidosis helichrysoides	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salsola kali	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scaevola spinescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schenkia spicata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schoenus subaphyllus	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scleranthus minisculus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scleranthus pungens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena brachyptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena decurrens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena diacantha	2	3	3	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	0	0	0	0	0	0	0
Sclerolaena divaricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena eriacantha	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena intricata	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena lanicuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena muricata	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	3
Sclerolaena obliquicuspis	2	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Sclerolaena parviflora	2	2	1	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSE4	CSE5	CSE6	CSE7	CSE8	CSE9	CSH1	CSH10	CSH11	CSH12	CSH13	CSH14	CSH15	CSH16	CSH17	CSH18	CSH19	CSH2	CSH20	CSH21	CSH22	CSH23	CSH24	CSH25	CSH26	CSH27	CSH28	CSH29
Sclerolaena patenticuspis	0	0	0	0	0	0	0	0	2	2	2	3	0	0	2	2	2	0	2	0	0	0	0	0	0	0	0	0
Sclerolaena stelligera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena tricuspis	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	3	2	0	0	0	2	2	2
Senecio glossanthus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio productus subsp. productus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio runcinifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	3
Senna form taxon 'coriacea'	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna form taxon 'filifolia'	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna form taxon 'petiolaris'	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida corrugata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida filiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida intricata	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	2	0	0
Sida sp. C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida trichopoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum coactiliferum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum esuriale	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum simile	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spergularia marina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sporobolus caroli	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	2	2	0	0	2	0	2
Stackhousia muricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stemodia florulenta	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3	0	0	0	0	0	0	2	0	0	0	0
Stenopetalum lineare	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenopetalum sphaerocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Taraxacum officinale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia pergranulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia tenuis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Tetragonia tetragonioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teucrium albicaule	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teucrium racemosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Thysanotus baueri	1	1	2	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tragus australianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triodia scariosa	5	4	4	5	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tripogon loliiformis	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Triptilodiscus pygmaeus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triraphis mollis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Velleia arguta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Verbena gaudichaudii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0
Vittadinia blackii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia cervicularis	2	2	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia condyloides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia cuneata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia dissecta	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia eremaea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia gracilis	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia pterochaeta	0	0	0	0	0	0	2	0	0	0	0	2	0	0	3	2	2	2	2	2	2	2	0	0	1	1	1	0
Vittadinia sulcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia communis	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia fluminalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia gracilenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia tumidifructa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walwhalleya proluta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
Westringia rigida	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Xerochrysum bracteatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Xerochrysum viscosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum ammophilum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum apiculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum aurantiacum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum confluens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum eremaeum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum glaucum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum iodocarpum	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSH3	CSH30	CSH31	CSH32	CSH33	CSH34	CSH35	CSH36	CSH37	CSH38	CSH39	CSH4	CSH40	CSH41	CSH42	CSH43	CSH44	CSH45	CSH46	CSH47	CSH48	CSH49	CSH5	CSH50	CSH51	CSH52	CSH53
Abutilon otocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aneura	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia colletioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia ligulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia melvillei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia oswaldii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia rigens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia sclerophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia wilhelmiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Actinobole uliginosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alectryon oleifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Alternanthera denticulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alternanthera sp. A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amphipogon caricinus var. caricinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema cambagei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema miraculosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema preissii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Angianthus brachypappus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apophyllum anomalum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arabidella nasturtium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arabidella trisecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aristida leichhardtiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asperula conferta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex acutibractea subsp. acutibractea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex angulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex eardleyae	0	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Atriplex holocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex leptocarpa	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex limbata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex lindleyi	0	0	2	2	2	1	1	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Atriplex nummularia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex pseudocampanulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex semibaccata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex spinibractea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Atriplex stipitata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex vesicaria	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrodanthonia setacea	0	0	0	1	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3
Austrostipa drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa elegantissima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa eremophila	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa nitida	1	0	0	0	1	1	0	0	1	1	1	3	1	3	3	4	2	1	2	0	2	4	3	0	0	2	3
Austrostipa platychaeta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa puberula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa scabra	0	0	0	0	1	2	0	2	4	1	3	0	1	1	0	1	0	2	0	0	3	0	0	4	0	0	1
Austrostipa tuckeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bergia trimera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boerhavia dominii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Bossiaea walkeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyscome ciliaris	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0
Brachyscome papillosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyscome trachycarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulbine alata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulbine semibarbata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	2	0	0	0	0	1	2
Calandrinia eremaea	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callitris glaucophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	0	0
Callitris verrucosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis erinacea	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Calotis hispidula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis scapigera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassytha melantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassytha pubescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Casuarina pauper	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centipeda crateriformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centipeda cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centipeda thespidioides	0	0	2	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Chamaesyce drummondii	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Cheilanthes sieberi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium cristatum	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSH3	CSH30	CSH31	CSH32	CSH33	CSH34	CSH35	CSH36	CSH37	CSH38	CSH39	CSH4	CSH40	CSH41	CSH42	CSH43	CSH44	CSH45	CSH46	CSH47	CSH48	CSH49	CSH5	CSH50	CSH51	CSH52	CSH53
Chenopodium curvispicatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium desertorum	0	1	0	0	0	0	0	0	0	2	1	0	2	2	2	0	0	0	0	0	0	0	1	0	0	1	0
Chenopodium melanocarpum	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium nitrariaceum	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
Chenopodium truncatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chloris divaricata	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chloris truncata	0	0	0	0	1	0	3	3	3	0	0	0	0	0	0	0	0	1	0	0	1	2	0	0	0	0	2
Chrysocephalum apiculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chthonocephalus pseudevax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus clementii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus graminetinus	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	1	2	0	0	0	0	0
Convolvulus remotus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crassula colorata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crassula sieberiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cryptandra propinqua	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperus difformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dactyloctenium radulans	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daucus glochidiatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dianella revoluta	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Diplachne fusca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disphyma crassifolium	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dissocarpus paradoxus	3	0	0	0	0	1	0	0	0	2	0	3	1	1	1	2	1	1	2	2	2	2	0	2	0	2	1
Dodonaea bursariifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea lobulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea viscosa	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dysphania littoralis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eclipta platyglossa	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Einadia nutans subsp. nutans	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Einadia polygonoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Einadia trigonos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis acuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis pallens	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0
Eleocharis plana	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Eleocharis pusilla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Elymus scaber	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enchylaena tomentosa	0	0	0	0	0	0	0	0	0	1	1	0	1	2	2	2	0	0	2	0	0	0	0	0	0	0	0
Enneapogon avenaceus	0	0	0	0	0	1	0	0	2	0	2	0	0	1	0	0	0	1	0	0	2	2	2	0	0	2	0
Enteropogon acicularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enteropogon ramosus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epaltes australis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis australasica	0	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Eragrostis dielsii	0	0	0	3	0	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
Eragrostis elongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis eriopoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis falcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis lacunaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis parviflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Eremophila deserti	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila glabra	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila longifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila oppositifolia subsp. rubra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila sturtii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Erodium crinitum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Erodium cygnorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus costata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus dumosa	0	0	0	0	0	0	0	0	0	4	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus gracilis	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus largiflorens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus leptophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus oleosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus socialis	0	0	0	0	0	0	0	0	0	3	3	0	0	4	3	0	0	0	0	0	0	0	0	0	0	0	0
Euchiton involucratus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euchiton sphaericus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euphorbia eremophila	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eutaxia microphylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exocarpos aphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fimbristylis dichotoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSH3	CSH30	CSH31	CSH32	CSH33	CSH34	CSH35	CSH36	CSH37	CSH38	CSH39	CSH4	CSH40	CSH41	CSH42	CSH43	CSH44	CSH45	CSH46	CSH47	CSH48	CSH49	CSH5	CSH50	CSH51	CSH52	CSH53
Geijera parviflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Goodenia cycloptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia fascicularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia havilandii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia pinnatifida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia willisiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea huegelii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hakea leucoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Halgania cyanea	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haloragis glauca	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
Haloragis odontocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harmsiodoxa blennodioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harmsiodoxa brevipes var. brevipes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heliotropium europaeum	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	2	4	0	1	0	0	0	0	0
Hibiscus sturtii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isoetes muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isoetopsis graminifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isolepis australiensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus aridicola	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
Juncus flavidus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus subsecundus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lachnagrostis filiformis	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Leiocarpa leptolepis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Leiocarpa semicalva	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa websteri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lemooria burkittii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium fasciculatum	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium leptopetalum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium monoplocoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium papillosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium phlebopetalum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium pseudohyssopifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptorhynchos baileyi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptospermum coriaceum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra collina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra effusa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra leucocephala	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lotus cruentus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lycium australe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lysiana exocarpi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lythrum hyssopifolia	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lythrum wilsonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana appressa	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana brevifolia	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana coronata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana decalvans	0	0	0	0	0	0	0	0	0	1	1	0	0	2	2	0	1	0	0	0	0	0	0	0	0	0	0
Maireana enchylaenoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana georgei	0	0	0	0	0	0	0	2	1	1	1	2	0	2	1	0	0	0	0	0	0	0	2	0	0	0	3
Maireana pentatropis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana pyramidata	5	0	0	1	3	4	4	3	3	0	0	4	0	0	0	1	1	2	1	1	4	3	5	3	0	3	4
Maireana radiata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana sclerolaenoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana sedifolia	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
Maireana trichoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana triptera	0	0	0	0	0	0	0	0	0	0	2	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0
Maireana turbinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacocera tricornis	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	1	0
Marsdenia australis	0	0	0	0	0	0	0	0	0	1	1	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0
Marsilea drummondii	0	3	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0
Marsilea hirsuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Millotia tenuifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria denticulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria integerrima	0	0	0	2	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
Mollugo cerviana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Muehlenbeckia florulenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSH3	CSH30	CSH31	CSH32	CSH33	CSH34	CSH35	CSH36	CSH37	CSH38	CSH39	CSH4	CSH40	CSH41	CSH42	CSH43	CSH44	CSH45	CSH46	CSH47	CSH48	CSH49	CSH5	CSH50	CSH51	CSH52	CSH53
Myoporum platycarpum	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Myriophyllum verrucosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nicotiana goodspeedii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	2	0
Nicotiana simulans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitraria billardierei	0	2	0	2	3	0	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
Olearia calcerea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olearia pimeleoides	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Olearia rudis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Omphalolappula concava	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Osteocarpum acropterum var. diminuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Oxalis chnoodes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxalis perennans	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Panicum effusum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parsonsia eucalyptophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paspalidium constrictum	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paspalidium jubiflorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pelargonium australe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Persicaria lapathifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllanthus lacunellus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Pimelea microcephala	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Pimelea trichostachya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago debilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago turrifera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa fax	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	2	0	2	0	0	2	0
Podolepis canescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis capillaris	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis neglecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polygonum plebeium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portulaca bicolor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portulaca oleracea	0	0	0	1	3	2	0	0	0	0	0	0	0	0	1	0	0	2	0	0	2	0	0	2	0	1	1
Pratia purpurascens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudognaphalium luteoalbum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pterostylis cobarensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus exaltatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus gaudichaudii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus obovatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus polystachyus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus sessilifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pycnosorus thompsonianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Radyera farragei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ranunculus sessiliflorus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia candolleana	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia spinescens	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia ulicina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe corymbiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe floribunda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhyncharrhena linearis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex crystallinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex tenax	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rutidosis helichrysoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salsola kali	0	0	0	0	3	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0
Scaevola spinescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schenkia spicata	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schoenus subaphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scleranthus minisculus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scleranthus pungens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena brachyptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena decurrens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	3	3
Sclerolaena diacantha	0	0	0	0	0	0	0	2	0	2	2	0	2	0	2	2	1	1	2	2	0	0	0	2	0	2	0
Sclerolaena divaricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena eriacantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena intricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena lanicuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena muricata	1	2	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Sclerolaena obliquicuspis	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena parviflora	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSH3	CSH30	CSH31	CSH32	CSH33	CSH34	CSH35	CSH36	CSH37	CSH38	CSH39	CSH4	CSH40	CSH41	CSH42	CSH43	CSH44	CSH45	CSH46	CSH47	CSH48	CSH49	CSH5	CSH50	CSH51	CSH52	CSH53
Sclerolaena patenticuspis	2	0	0	0	1	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	2	4	2	3	0	0	2
Sclerolaena stelligera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena tricuspis	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	1
Senecio glossanthus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio productus subsp. productus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio runcinifolius	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Senna form taxon 'coriacea'	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna form taxon 'filifolia'	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna form taxon 'petiolaris'	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida corrugata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida filiformis	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Sida intricata	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	1	0	0	2	1	1	0	0	0	1
Sida sp. C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida trichopoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Solanum coactiliferum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum esuriale	1	1	0	0	2	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0
Solanum simile	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spergularia marina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sporobolus caroli	0	0	0	3	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	1	2	0	0	3	0	2	3
Stackhousia muricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stemodia florulenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
Stenopetalum lineare	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenopetalum sphaerocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Taraxacum officinale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia pergranulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia tenuis	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tetragonia tetragonioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teucrium albicaule	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teucrium racemosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Thysanotus baueri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tragus australianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triodia scariosa	0	0	0	0	0	0	0	0	0	4	4	0	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0
Tripogon loliiformis	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	2	0
Triptilodiscus pygmaeus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triraphis mollis	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
Velleia arguta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Verbena gaudichaudii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia blackii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia cervicularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia condyloides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia cuneata	0	0	0	0	0	0	0	0	0	0	2	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia dissecta	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia eremaea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia pterochaeta	0	0	0	0	0	2	2	0	2	0	1	0	0	0	0	0	0	0	0	0	2	2	0	3	1	0	1
Vittadinia sulcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia communis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia fluminalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia gracilenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Wahlenbergia tumidifructa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walwhalleya proluta	0	6	1	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Westringia rigida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Xerochrysum bracteatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Xerochrysum viscosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum ammophilum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum apiculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum aurantiacum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum confluens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum eremaeum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum glaucum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Zygophyllum iodocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSH54	CSH55	CSH56	CSH6	CSH7	CSH8	CSH9	CSO1-2	CSO1-21	CSO1-27	CSO1-35	CSO2-1	CSO2-13	CSO3-12	CSO3-3	CSO4-1	CSO4-16	CSO4-24	CSO6-50	CSO8-12	CSO8-18	CSO8-6	CSO9-T	CSO9-5	CSO1-6
Abutilon otocarpum	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	2	0	0	0	0	0	0	0
Acacia aneura	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0
Acacia colletioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
Acacia ligulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia melvillei	0	0	0	0	0	0	0	3	2	5	0	2	0	0	0	1	0	0	0	0	0	0	0	1	3
Acacia oswaldii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia rigens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia sclerophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Acacia wilhelmiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Actinobole uliginosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alectryon oleifolius	0	0	0	0	0	0	0	0	0	0	0	0	3	3	4	1	0	0	0	0	0	3	1	0	0
Alternanthera denticulata	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alternanthera sp. A	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amphipogon caricinus var. caricinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema cambagei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema miraculosum	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Amyema preissii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Angianthus brachypappus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apophyllum anomalum	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Arabidella nasturtium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arabidella trisecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aristida leichhardtiana	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asperula conferta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex acutibractea subsp. acutibractea	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Atriplex angulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex eardleyae	2	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Atriplex holocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex leptocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex limbata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex lindleyi	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex nummularia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex pseudocampanulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex semibaccata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex spinibractea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex stipitata	0	0	0	0	0	0	0	0	0	0	1	0	0	2	2	2	2	0	0	0	0	1	1	1	0
Atriplex vesicaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrodanthonia setacea	2	0	2	0	0	0	0	2	1	2	2	1	1	1	0	2	0	0	0	2	0	1	1	0	3
Austrostipa drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
Austrostipa elegantissima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0
Austrostipa eremophila	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0
Austrostipa nitida	1	0	0	3	3	3	3	2	2	4	4	2	5	3	4	3	2	4	3	4	2	4	4	4	3
Austrostipa platychaeta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa puberula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa scabra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa tuckeri	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	3	0	0	0	0	0	0	0
Bergia trimera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boerhavia dominii	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bossiaea walkeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyscome ciliaris	0	1	0	0	0	0	0	0	1	0	3	1	2	2	2	1	2	0	0	0	0	3	0	0	0
Brachyscome papillosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyscome trachycarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Bulbine alata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulbine semibarbata	0	0	0	0	0	0	0	2	0	1	2	0	0	0	1	2	0	0	0	0	0	0	0	2	2
Calandrinia eremaea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callitris glaucophylla	0	0	0	0	0	1	0	0	0	0	3	0	0	0	0	4	0	0	0	4	0	0	0	0	0
Callitris verrucosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis erinacea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Calotis hispidula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis scapigera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassytha melantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassytha pubescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Casuarina pauper	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	2	5	0	0	0	0	4	4	0	0
Centipeda crateriformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centipeda cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centipeda thespidioides	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Chamaesyce drummondii	0	0	1	1	0	0	1	0	0	0	0	0	1	0	0	1	0	0	1	1	0	1	0	0	1
Cheilanthes sieberi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Chenopodium cristatum	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSH54	CSH55	CSH56	CSH6	CSH7	CSH8	CSH9	CSO1-2	CSO1-21	CSO1-27	CSO1-35	CSO2-1	CSO2-13	CSO3-12	CSO3-3	CSO4-1	CSO4-16	CSO4-24	CSO6-50	CSO8-12	CSO8-18	CSO8-6	CSO9-T	CSO9-5	CSO1-6
Chenopodium curvispicatum	0	0	0	0	0	0	0	0	2	0	0	3	2	2	2	0	2	0	0	0	0	2	2	2	0
Chenopodium desertorum	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	2	1	2	3	0	0	0
Chenopodium melanocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium nitrariaceum	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium truncatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chloris divaricata	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chloris truncata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chrysocephalum apiculatum	0	0	0	0	0	0	0	1	1	1	3	0	1	0	1	2	0	0	0	0	0	0	0	0	0
Chthonocephalus pseudevax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus clementii	0	0	0	0	0	0	0	2	2	2	2	0	1	0	0	1	0	0	0	0	0	0	0	2	2
Convolvulus graminetinus	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus remotus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crassula colorata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Crassula sieberiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cryptandra propinqua	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperus difformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dactyloctenium radulans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daucus glochidiatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dianella revoluta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diplachne fusca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disphyma crassifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dissocarpus paradoxus	1	0	1	2	2	2	2	3	3	3	0	0	3	3	2	1	3	0	0	2	0	1	0	2	2
Dodonaea bursariifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea lobulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea viscosa	0	0	0	0	1	0	0	0	0	0	2	1	2	1	0	3	0	2	2	0	0	0	1	0	0
Dysphania littoralis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eclipta platyglossa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Einadia nutans subsp. nutans	0	0	0	0	0	0	0	0	1	2	2	0	0	0	0	2	2	3	0	1	0	0	0	1	0
Einadia polygonoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Einadia trigonos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis acuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis pallens	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis plana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis pusilla	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Elymus scaber	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enchylaena tomentosa	0	0	0	0	0	1	0	0	1	2	0	0	2	3	2	2	4	3	1	3	1	2	1	2	0
Enneapogon avenaceus	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	1	0	1	0	2	1	2	0	0	0
Enteropogon acicularis	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enteropogon ramosus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epaltes australis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis australasica	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis dielsii	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis elongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis eriopoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis falcata	0	0	0	0	0	0	0	4	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis lacunaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis parviflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila deserti	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Eremophila glabra	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	2	0	0	0	0	1	1	0
Eremophila longifolia	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0
Eremophila maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila oppositifolia subsp. rubra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Eremophila sturtii	0	0	0	0	0	0	0	2	4	1	4	1	4	0	3	3	0	0	0	0	0	0	0	4	1
Erodium crinitum	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0
Erodium cygnorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus costata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus dumosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	0	4	0	0	0	0
Eucalyptus gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	3	0	0
Eucalyptus largiflorens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus leptophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Eucalyptus oleosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	5	0	0	0	0
Euchiton involucratus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euchiton sphaericus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euphorbia eremophila	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eutaxia microphylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exocarpos aphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fimbristylis dichotoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSH54	CSH55	CSH56	CSH6	CSH7	CSH8	CSH9	CSO1-2	CSO1-21	CSO1-27	CSO1-35	CSO2-1	CSO2-13	CSO3-12	CSO3-3	CSO4-1	CSO4-16	CSO4-24	CSO6-50	CSO8-12	CSO8-18	CSO8-6	CSO9-T	CSO9-5	CSO1-6
Geijera parviflora	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	1	3	0	1	0	0	0	0	0	0
Goodenia cycloptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia fascicularis	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Goodenia glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia havilandii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0
Goodenia pinnatifida	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Goodenia willisiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea huegelii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hakea leucoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Halgania cyanea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0
Haloragis glauca	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haloragis odontocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harmsiodoxa blennodioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harmsiodoxa brevipes var. brevipes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heliotropium europaeum	0	0	1	2	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hibiscus sturtii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isoetes muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isoetopsis graminifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isolepis australiensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus aridicola	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus flavidus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus subsecundus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lachnagrostis filiformis	0	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa leptolepis	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Leiocarpa semicalva	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa websteri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lemooria burkittii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium fasciculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium leptopetalum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium monoplocoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium papillosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium phlebopetalum	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	1
Lepidium pseudohyssopifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptorhynchos baileyi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptospermum coriaceum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra collina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra effusa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra leucocephala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lotus cruentus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lycium australe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lysiana exocarpi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lythrum hyssopifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lythrum wilsonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana appressa	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana brevifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0
Maireana coronata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana decalvans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	2	0	2	0	0
Maireana enchylaenoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana georgei	0	0	0	0	0	3	1	0	0	2	1	3	0	2	1	1	1	0	2	0	3	1	2	2	0
Maireana pentatropis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Maireana pyramidata	2	0	4	4	0	4	4	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0
Maireana radiata	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	1	3	0	1	0	2	0	4	0	0
Maireana sclerolaenoides	0	0	0	0	0	0	0	2	0	2	0	0	0	2	3	0	3	0	0	0	0	0	3	0	0
Maireana sedifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Maireana trichoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana triptera	0	0	0	0	0	0	0	2	3	0	0	0	3	2	2	2	2	2	1	0	0	1	3	2	2
Maireana turbinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Malacocera tricornis	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marsdenia australis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	0	0	0
Marsilea drummondii	0	4	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marsilea hirsuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Millotia tenuifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Minuria denticulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria integerrima	2	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mollugo cerviana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Muehlenbeckia florulenta	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSH54	CSH55	CSH56	CSH6	CSH7	CSH8	CSH9	CSO1-2	CSO1-21	CSO1-27	CSO1-35	CSO2-1	CSO2-13	CSO3-12	CSO3-3	CSO4-1	CSO4-16	CSO4-24	CSO6-50	CSO8-12	CSO8-18	CSO8-6	CSO9-T	CSO9-5	CSO1-6
Myoporum platycarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	0	0	0	3	1	0
Myriophyllum verrucosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nicotiana goodspeedii	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	1
Nicotiana simulans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitraria billardierei	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	1
Olearia calcerea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	3	0	0
Olearia pimeleoides	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	1	0	0	0	0	1	1	0	0	0
Olearia rudis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Omphalolappula concava	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Osteocarpum acropterum var. diminuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxalis chnoodes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Oxalis perennans	0	0	1	0	0	0	0	2	2	1	2	0	1	2	0	2	0	0	0	0	0	0	0	2	2
Panicum effusum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parsonsia eucalyptophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paspalidium constrictum	0	0	0	0	0	0	0	0	2	0	2	3	1	0	0	1	0	0	0	0	0	0	0	0	0
Paspalidium jubiflorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pelargonium australe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Persicaria lapathifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllanthus lacunellus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pimelea microcephala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0
Pimelea trichostachya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Plantago cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago debilis	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago turrifera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa fax	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis canescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Podolepis capillaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Podolepis neglecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polygonum plebeium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portulaca bicolor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portulaca oleracea	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Pratia purpurascens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudognaphalium luteoalbum	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Pterostylis cobarensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus exaltatus	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	1	0	0
Ptilotus gaudichaudii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus obovatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Ptilotus polystachyus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus sessilifolius	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	1	0	0	0	1	0	0	0	0	0
Pycnosorus thompsonianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Radyera farragei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ranunculus sessiliflorus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia candolleana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia spinescens	0	0	0	0	0	0	0	2	0	2	0	0	0	1	1	1	1	0	0	2	0	1	0	0	1
Rhagodia ulicina	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe corymbiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe floribunda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhyncharrhena linearis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex crystallinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex tenax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rutidosis helichrysoides	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	1	0	0	0	0	0	0	0	0	0
Salsola kali	0	0	0	2	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scaevola spinescens	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	1	0	0
Schenkia spicata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schoenus subaphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scleranthus minisculus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scleranthus pungens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena brachyptera	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena decurrens	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena diacantha	0	0	0	0	0	0	0	3	3	3	2	0	2	1	2	2	2	2	2	5	2	3	0	3	3
Sclerolaena divaricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena eriacantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena intricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena lanicuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena muricata	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena obliquicuspis	0	0	0	1	0	1	2	0	0	3	2	2	3	3	3	0	3	0	0	4	0	5	2	3	2
Sclerolaena parviflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSH54	CSH55	CSH56	CSH6	CSH7	CSH8	CSH9	CSO1-2	CSO1-21	CSO1-27	CSO1-35	CSO2-1	CSO2-13	CSO3-12	CSO3-3	CSO4-1	CSO4-16	CSO4-24	CSO6-50	CSO8-12	CSO8-18	CSO8-6	CSO9-T	CSO9-5	CSO1-6
Sclerolaena patenticuspis	0	0	0	1	0	1	0	0	2	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	1
Sclerolaena stelligera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena tricuspis	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio glossanthus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio productus subsp. productus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio runcinifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna form taxon 'coriacea'	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3	1	0	0	0
Senna form taxon 'filifolia'	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0
Senna form taxon 'petiolaris'	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	2	0	0
Sida corrugata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Sida cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida filiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida intricata	1	0	1	0	0	1	1	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Sida sp. C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida trichopoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum coactiliferum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum esuriale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum simile	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spergularia marina	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1
Sporobolus caroli	3	0	0	0	0	0	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Stackhousia muricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stemodia florulenta	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Stenopetalum lineare	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenopetalum sphaerocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Taraxacum officinale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia pergranulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia tenuis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tetragonia tetragonioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teucrium albicaule	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teucrium racemosum	0	0	0	0	0	0	0	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Thysanotus baueri	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	2	0	2	0	0	0	0
Tragus australianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triodia scariosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0
Tripogon loliiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triptilodiscus pygmaeus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Triraphis mollis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Velleia arguta	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Verbena gaudichaudii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia blackii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Vittadinia cervicularis	0	0	0	0	0	0	0	1	2	2	3	2	3	2	2	2	2	0	1	0	2	0	1	0	2
Vittadinia condyloides	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Vittadinia cuneata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia dissecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	0	0	2	0	0	0
Vittadinia eremaea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	0	1	0
Vittadinia muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia pterochaeta	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia sulcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Wahlenbergia communis	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Wahlenbergia fluminalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia gracilenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Wahlenbergia gracilis	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia tumidifructa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walwhalleya proluta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Westringia rigida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Xerochrysum bracteatum	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	2	0	0	0	0	0	0	0
Xerochrysum viscosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum ammophilum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum apiculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum aurantiacum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum confluens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum eremaeum	0	0	0	0	0	0	0	0	1	0	0	1	0	2	2	0	3	0	0	0	0	0	2	0	0
Zygophyllum glaucum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum iodocarpum	0	0	0	0	0	0	0	0	0	2	0	0	1	0	1	0	2	0	0	0	0	0	0	1	1

Data Matrix from Analysis

Scientific Name	CSP1	CSP10	CSP11	CSP12	CSP13	CSP14	CSP15	CSP16	CSP17	CSP18	CSP19	CSP2	CSP20	CSP21	CSP22	CSP23	CSP24	CSP25	CSP26	CSP27	CSP28	CSP29	CSP3	CSP30	CSP31	CSP32	CSP33
Abutilon otocarpum	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aneura	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia colletioides	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	3	3	1	3	0	0	0	0	0	0	0	0
Acacia ligulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia melvillei	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0
Acacia oswaldii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia rigens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia sclerophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia wilhelmiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Actinobole uliginosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alectryon oleifolius	0	0	0	0	0	3	0	3	3	3	0	0	1	1	1	3	3	3	1	3	0	0	0	0	1	0	0
Alternanthera denticulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alternanthera sp. A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amphipogon caricinus var. caricinus	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Amyema cambagei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema miraculosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema preissii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Angianthus brachypappus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apophyllum anomalum	0	0	0	0	0	0	0	1	0	1	1	0	1	0	1	1	0	1	0	1	0	0	0	0	0	0	0
Arabidella nasturtium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Arabidella trisecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aristida leichhardtiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asperula conferta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Atriplex acutibractea subsp. acutibractea	0	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex angulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Atriplex eardleyae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Atriplex holocarpa	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Atriplex leptocarpa	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
Atriplex limbata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex lindleyi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex nummularia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex pseudocampanulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex semibaccata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex spinibractea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex stipitata	0	1	0	0	2	2	2	1	2	2	2	0	2	2	2	2	2	0	2	2	0	0	0	2	0	1	0
Atriplex vesicaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrodanthonia setacea	0	2	3	0	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0
Austrostipa drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa elegantissima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Austrostipa eremophila	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa nitida	0	5	2	3	3	4	4	3	0	1	1	1	3	2	3	2	0	3	4	3	3	4	0	4	3	4	1
Austrostipa platychaeta	0	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa puberula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa scabra	0	2	0	0	2	1	0	0	3	2	3	0	2	0	2	0	0	2	2	2	1	2	0	2	2	1	2
Austrostipa tuckeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bergia trimera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boerhavia dominii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bossiaea walkeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyscome ciliaris	0	0	0	0	0	2	0	2	2	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	2	0	0
Brachyscome papillosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyscome trachycarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulbine alata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulbine semibarbata	0	2	0	0	1	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0
Calandrinia eremaea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callitris glaucophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callitris verrucosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis erinacea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Calotis hispidula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis scapigera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassytha melantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Cassytha pubescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Casuarina pauper	0	0	0	3	4	0	4	4	3	3	3	0	3	4	3	3	4	3	4	4	1	0	0	3	3	0	1
Centipeda crateriformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Centipeda cunninghamii	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	2	0
Centipeda thespidioides	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Chamaesyce drummondii	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	0	0	1	1	0	0
Cheilanthes sieberi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium cristatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSP1	CSP10	CSP11	CSP12	CSP13	CSP14	CSP15	CSP16	CSP17	CSP18	CSP19	CSP2	CSP20	CSP21	CSP22	CSP23	CSP24	CSP25	CSP26	CSP27	CSP28	CSP29	CSP3	CSP30	CSP31	CSP32	CSP33
Chenopodium curvispicatum	0	0	0	0	0	0	0	0	1	0	3	0	2	1	2	0	3	0	0	0	0	0	0	0	1	1	1
Chenopodium desertorum	0	2	0	0	2	1	1	1	2	0	1	1	1	2	2	3	3	0	1	1	0	2	0	0	1	0	0
Chenopodium melanocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium nitrariaceum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium truncatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chloris divaricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chloris truncata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chrysocephalum apiculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chthonocephalus pseudevax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus clementii	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Convolvulus graminetinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Convolvulus remotus	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crassula colorata	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Crassula sieberiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cryptandra propinqua	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperus difformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dactyloctenium radulans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daucus glochidiatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dianella revoluta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diplachne fusca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Disphyma crassifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dissocarpus paradoxus	3	0	4	3	3	2	2	3	0	0	2	3	3	0	3	0	2	1	2	2	2	0	0	3	3	3	0
Dodonaea bursariifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea lobulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea viscosa	0	1	0	0	0	3	0	0	1	1	0	0	1	1	1	0	0	1	0	0	0	2	0	0	0	4	4
Dysphania littoralis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eclipta platyglossa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Einadia nutans subsp. nutans	1	0	0	0	0	1	0	1	0	0	1	1	0	0	0	0	0	1	1	1	0	2	1	2	0	0	2
Einadia polygonoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0
Einadia trigonos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Eleocharis acuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis pallens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis plana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis pusilla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Elymus scaber	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enchylaena tomentosa	0	2	0	2	2	2	2	2	2	2	2	1	3	3	2	0	3	2	2	1	0	0	0	0	2	0	2
Enneapogon avenaceus	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	1	0
Enteropogon acicularis	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enteropogon ramosus	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Epaltes australis	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis australasica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis dielsii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis elongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis eriopoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis falcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis lacunaria	0	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis parviflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila deserti	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila glabra	0	0	1	0	2	0	0	0	0	1	0	1	0	0	0	1	0	1	0	0	0	0	0	1	1	0	1
Eremophila longifolia	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila oppositifolia subsp. rubra	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila sturtii	0	4	0	0	3	0	0	1	0	0	0	0	1	1	1	2	0	0	0	1	1	4	0	0	0	0	0
Erodium crinitum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Erodium cygnorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus costata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus dumosa	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Eucalyptus gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus largiflorens	3	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
Eucalyptus leptophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus oleosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus socialis	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0
Euchiton involucratus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euchiton sphaericus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Euphorbia eremophila	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eutaxia microphylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exocarpos aphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fimbristylis dichotoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSP1	CSP10	CSP11	CSP12	CSP13	CSP14	CSP15	CSP16	CSP17	CSP18	CSP19	CSP2	CSP20	CSP21	CSP22	CSP23	CSP24	CSP25	CSP26	CSP27	CSP28	CSP29	CSP3	CSP30	CSP31	CSP32	CSP33
Geijera parviflora	0	0	0	0	0	0	0	1	0	0	1	0	3	0	0	0	0	3	3	3	0	0	0	1	0	0	0
Goodenia cycloptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia fascicularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Goodenia glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia havilandii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia pinnatifida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia willisiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea huegelii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hakea leucoptera	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Halgania cyanea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haloragis glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haloragis odontocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harmsiodoxa blennodioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harmsiodoxa brevipes var. brevipes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heliotropium europaeum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hibiscus sturtii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Isoetes muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isoetopsis graminifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isolepis australiensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Juncus aridicola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus flavidus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus subsecundus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lachnagrostis filiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0
Leiocarpa leptolepis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa semicalva	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa websteri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lemooria burkittii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium fasciculatum	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Lepidium leptopetalum	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0
Lepidium monoplocoides	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium papillosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium phlebopetalum	0	2	1	0	0	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	1	0	0	0
Lepidium pseudohyssopifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptorhynchos baileyi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptospermum coriaceum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra collina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra effusa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra leucocephala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lotus cruentus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lycium australe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lysiana exocarpi	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Lythrum hyssopifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lythrum wilsonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana appressa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Maireana brevifolia	0	0	3	0	0	2	0	0	3	3	0	1	0	3	3	3	3	0	1	0	0	0	0	2	0	0	1
Maireana coronata	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	1	0	0	0	0	0	0	0
Maireana decalvans	0	2	2	3	3	0	2	2	2	0	2	2	3	3	2	2	2	0	2	2	2	3	0	2	2	2	0
Maireana enchylaenoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana georgei	0	0	1	0	2	0	1	0	1	0	0	0	0	2	1	0	0	0	0	0	0	0	0	2	0	1	0
Maireana pentatropis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana pyramidata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana radiata	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	1	0
Maireana sclerolaenoides	0	0	0	1	1	2	0	0	2	0	0	0	1	0	1	0	0	0	2	0	0	0	0	0	0	0	0
Maireana sedifolia	0	0	2	0	0	0	1	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana trichoptera	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana triptera	0	0	0	0	2	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0
Maireana turbinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacocera tricornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marsdenia australis	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	2	0	0
Marsilea drummondii	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
Marsilea hirsuta	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Millotia tenuifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria cunninghamii	0	0	1	0	2	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
Minuria denticulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria integerrima	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Mollugo cerviana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Muehlenbeckia florulenta	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSP1	CSP10	CSP11	CSP12	CSP13	CSP14	CSP15	CSP16	CSP17	CSP18	CSP19	CSP2	CSP20	CSP21	CSP22	CSP23	CSP24	CSP25	CSP26	CSP27	CSP28	CSP29	CSP3	CSP30	CSP31	CSP32	CSP33
Myoporum platycarpum	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Myriophyllum verrucosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Nicotiana goodspeedii	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Nicotiana simulans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitraria billardierei	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0
Olearia calcerea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0	0	0	0	0	0	0
Olearia pimeleoides	0	0	0	0	1	1	0	0	2	2	0	0	1	1	1	2	0	1	1	0	0	2	0	0	1	0	0
Olearia rudis	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Omphalolappula concava	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Osteocarpum acropterum var. diminuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxalis chnoodes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Oxalis perennans	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	1
Panicum effusum	0	0	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parsonsia eucalyptophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paspalidium constrictum	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0
Paspalidium jubiflorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pelargonium australe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Persicaria lapathifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllanthus lacunellus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pimelea microcephala	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Pimelea trichostachya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago debilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago turrifera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Poa fax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis canescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis capillaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis neglecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polygonum plebeium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Portulaca bicolor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portulaca oleracea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pratia purpurascens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudognaphalium luteoalbum	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Pterostylis cobarensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus exaltatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Ptilotus gaudichaudii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus obovatus	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus polystachyus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus sessilifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pycnosorus thompsonianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Radyera farragei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ranunculus sessiliflorus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia candolleana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia spinescens	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia ulicina	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe corymbiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe floribunda	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Rhyncharrhena linearis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex crystallinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex tenax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Rutidosis helichrysoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salsola kali	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scaevola spinescens	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schenkia spicata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0
Schoenus subaphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scleranthus minisculus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scleranthus pungens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena brachyptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena decurrens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena diacantha	0	3	1	3	1	3	3	3	2	3	3	0	3	3	3	3	3	3	3	3	0	0	0	3	2	2	2
Sclerolaena divaricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena eriacantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena intricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena lanicuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena muricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena obliquicuspis	0	2	0	2	2	1	0	2	0	0	2	0	0	0	2	2	2	0	2	0	3	0	0	2	0	0	0
Sclerolaena parviflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSP1	CSP10	CSP11	CSP12	CSP13	CSP14	CSP15	CSP16	CSP17	CSP18	CSP19	CSP2	CSP20	CSP21	CSP22	CSP23	CSP24	CSP25	CSP26	CSP27	CSP28	CSP29	CSP3	CSP30	CSP31	CSP32	CSP33
Sclerolaena patenticuspis	0	3	0	2	3	0	0	0	2	3	0	3	0	0	0	3	0	0	0	0	4	1	0	0	0	0	0
Sclerolaena stelligera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena tricuspis	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
Senecio glossanthus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Senecio productus subsp. productus	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio runcinifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna form taxon 'coriacea'	0	0	0	0	0	1	0	0	0	1	2	0	0	1	0	0	0	0	1	0	1	0	0	0	1	0	0
Senna form taxon 'filifolia'	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	0	0	0	0	0	1	0	0
Senna form taxon 'petiolaris'	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0
Sida corrugata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida filiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida intricata	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	2	0	0	0
Sida sp. C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida trichopoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum coactiliferum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum esuriale	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum simile	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spergularia marina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Sporobolus caroli	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
Stackhousia muricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stemodia florulenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0
Stenopetalum lineare	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenopetalum sphaerocarpum	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Taraxacum officinale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia pergranulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia tenuis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tetragonia tetragonioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teucrium albicaule	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Teucrium racemosum	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	2	0	0	0	2	3
Thysanotus baueri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tragus australianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triodia scariosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tripogon loliiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triptilodiscus pygmaeus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triraphis mollis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Velleia arguta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Verbena gaudichaudii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia blackii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia cervicularis	0	1	0	1	0	0	0	0	1	0	2	0	0	1	0	0	0	0	0	1	1	2	0	0	2	0	1
Vittadinia condyloides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia cuneata	0	2	0	2	0	2	2	2	2	0	2	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	3
Vittadinia dissecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	1	0	0
Vittadinia eremaea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0	2	2	2	0	0	0	0	0
Vittadinia pterochaeta	0	2	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Vittadinia sulcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia communis	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia fluminalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia gracilenta	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia tumidifructa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Walwhalleya proluta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Westringia rigida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Xerochrysum bracteatum	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Xerochrysum viscosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum ammophilum	0	0	0	0	0	0	2	0	1	1	0	0	3	0	1	0	0	0	0	0	2	0	0	0	1	0	0
Zygophyllum apiculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum aurantiacum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum confluens	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum eremaeum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Zygophyllum glaucum	0	1	2	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum iodocarpum	0	0	0	1	2	1	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0

Data Matrix from Analysis

Scientific Name	CSP34	CSP35	CSP36	CSP37	CSP38	CSP4	CSP5	CSP6	CSP7	CSP8	CSP9	CSW1	CAL1_OFF	CHS69	CSH102	CSH57	CSH64	CSH65	CSH66	CSH70	CSH71	CSH73	CSH75	CSH76	CSH79	CSH80
Abutilon otocarpum	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aneura	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia colletioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia ligulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia melvillei	0	1	0	3	0	0	0	1	0	1	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia oswaldii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia rigens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia sclerophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia wilhelmiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Actinobole uliginosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alectryon oleifolius	0	0	0	3	0	0	0	0	0	0	1	0	3	0	3	0	0	0	0	3	0	0	0	0	0	0
Alternanthera denticulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Alternanthera sp. A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amphipogon caricinus var. caricinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema cambagei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema miraculosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema preissii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Angianthus brachypappus	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apophyllum anomalum	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arabidella nasturtium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arabidella trisecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aristida leichhardtiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asperula conferta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex acutibractea subsp. acutibractea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex angulata	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex eardleyae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Atriplex holocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex leptocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex limbata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex lindleyi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0
Atriplex nummularia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Atriplex pseudocampanulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Atriplex semibaccata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex spinibractea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex stipitata	0	2	2	0	2	0	0	0	0	2	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Atriplex vesicaria	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	2	3	5	0	0	0	0	0	0	0
Austrodanthonia setacea	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Austrostipa drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa elegantissima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa eremophila	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa nitida	0	2	3	1	0	0	0	0	0	3	3	3	5	3	2	2	4	0	1	2	2	4	2	2	1	0
Austrostipa platychaeta	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa puberula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa scabra	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa tuckeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bergia trimera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boerhavia dominii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	2	0	0	0
Bossiaea walkeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyscome ciliaris	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0
Brachyscome papillosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyscome trachycarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulbine alata	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	2	1	0	0	2	2	1	0	0
Bulbine semibarbata	2	2	0	2	2	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calandrinia eremaea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callitris glaucophylla	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	3	0	0	0	0
Callitris verrucosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis erinacea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis hispidula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Calotis scapigera	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassytha melantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassytha pubescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Casuarina pauper	0	3	3	3	1	0	0	0	0	1	4	0	0	0	5	4	0	0	0	0	0	0	0	0	0	0
Centipeda crateriformis	1	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centipeda cunninghamii	2	0	0	3	2	0	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centipeda thespidioides	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	3
Chamaesyce drummondii	0	0	1	1	0	0	0	0	0	0	0	0	1	2	0	0	2	0	0	1	0	1	2	1	1	0
Cheilanthes sieberi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium cristatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	2	2	3	0

Data Matrix from Analysis

Scientific Name	CSP34	CSP35	CSP36	CSP37	CSP38	CSP4	CSP5	CSP6	CSP7	CSP8	CSP9	CSW1	CAL1_OFF	CHS69	CSH102	CSH57	CSH64	CSH65	CSH66	CSH70	CSH71	CSH73	CSH75	CSH76	CSH79	CSH80
Chenopodium curvispicatum	0	0	3	1	2	0	0	1	0	1	0	0	1	0	3	3	0	0	0	0	0	0	0	0	0	0
Chenopodium desertorum	0	0	0	0	0	0	0	0	0	1	1	0	2	0	1	1	0	0	0	0	0	0	0	0	0	0
Chenopodium melanocarpum	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium nitrariaceum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Chenopodium truncatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0
Chloris divaricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chloris truncata	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	1	1
Chrysocephalum apiculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chthonocephalus pseudevax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Convolvulus clementii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus graminetinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus remotus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Crassula colorata	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crassula sieberiana	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cryptandra propinqua	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperus difformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dactyloctenium radulans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Daucus glochidiatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	1	0	0
Dianella revoluta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diplachne fusca	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disphyma crassifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	2	1	0	0	0	0	0	0
Dissocarpus paradoxus	0	3	2	0	0	0	0	1	0	3	2	0	0	0	0	2	1	0	0	0	0	1	1	2	1	0
Dodonaea bursariifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea lobulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea viscosa	0	0	3	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Dysphania littoralis	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eclipta platyglossa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Einadia nutans subsp. nutans	0	1	0	1	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Einadia polygonoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Einadia trigonos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis acuta	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis pallens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
Eleocharis plana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis pusilla	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Elymus scaber	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enchylaena tomentosa	0	2	2	0	0	0	0	0	0	0	2	2	3	1	4	4	0	0	0	2	0	3	1	1	0	1
Enneapogon avenaceus	0	0	0	0	0	0	0	0	0	0	0	0	3	3	2	0	3	0	0	0	2	2	2	4	3	0
Enteropogon acicularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enteropogon ramosus	0	2	0	0	0	0	0	1	1	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epaltes australis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis australasica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis dielsii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis elongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis eriopoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis falcata	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	1	1	2	2
Eragrostis lacunaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis parviflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0
Eremophila deserti	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila glabra	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila longifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila oppositifolia subsp. rubra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila sturtii	0	4	0	3	4	0	0	0	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Erodium crinitum	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	1	2	0
Erodium cygnorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus costata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus dumosa	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus largiflorens	3	0	0	0	0	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus leptophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus oleosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus socialis	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euchiton involucratus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euchiton sphaericus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euphorbia eremophila	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eutaxia microphylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exocarpos aphyllus	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fimbristylis dichotoma	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSP34	CSP35	CSP36	CSP37	CSP38	CSP4	CSP5	CSP6	CSP7	CSP8	CSP9	CSW1	CAL1_OFF	CHS69	CSH102	CSH57	CSH64	CSH65	CSH66	CSH70	CSH71	CSH73	CSH75	CSH76	CSH79	CSH80
Geijera parviflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Goodenia cycloptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia fascicularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	1	1	0	2
Goodenia glauca	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia havilandii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia pinnatifida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia willisiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea huegelii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hakea leucoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Halgania cyanea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haloragis glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haloragis odontocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harmsiodoxa blennodioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harmsiodoxa brevipes var. brevipes	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heliotropium europaeum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hibiscus sturtii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isoetes muelleri	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isoetopsis graminifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isolepis australiensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus aridicola	1	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus flavidus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus subsecundus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lachnagrostis filiformis	1	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa leptolepis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa semicalva	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa websteri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lemooria burkittii	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium fasciculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium leptopetalum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium monoplocoides	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium papillosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium phlebopetalum	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium pseudohyssopifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptorhynchos baileyi	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptospermum coriaceum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra collina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra effusa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra leucocephala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lotus cruentus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lycium australe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Lysiana exocarpi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lythrum hyssopifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lythrum wilsonii	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana appressa	0	0	0	0	1	0	0	0	0	0	0	0	0	5	0	0	5	0	1	0	0	0	0	0	0	0
Maireana brevifolia	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Maireana coronata	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana decalvans	0	0	0	2	3	0	0	0	0	1	2	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0
Maireana enchylaenoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana georgei	0	0	1	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana pentatropis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana pyramidata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	4	5	5	5	5	4	0
Maireana radiata	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana sclerolaenoides	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	3	0	0	0	0	1	0	0	0	0	0
Maireana sedifolia	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana trichoptera	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana triptera	0	2	0	0	0	0	0	0	0	1	2	4	1	0	0	1	0	0	0	0	0	0	0	0	0	0
Maireana turbinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacocera tricornis	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	1	2	0	0	0	0	0	0	0
Marsdenia australis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Marsilea drummondii	3	0	0	2	0	0	3	0	0	0	0	0	0	0	0	0	0	4	3	0	0	0	0	0	0	6
Marsilea hirsuta	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Millotia tenuifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria cunninghamii	0	2	0	0	0	0	0	0	0	1	3	0	0	2	0	0	1	2	3	0	0	0	0	0	0	0
Minuria denticulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria integerrima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mollugo cerviana	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0
Muehlenbeckia florulenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSP34	CSP35	CSP36	CSP37	CSP38	CSP4	CSP5	CSP6	CSP7	CSP8	CSP9	CSW1	CAL1_OFF	CHS69	CSH102	CSH57	CSH64	CSH65	CSH66	CSH70	CSH71	CSH73	CSH75	CSH76	CSH79	CSH80
Myoporum platycarpum	0	0	1	0	0	0	0	0	0	0	0	0	1	0	3	3	0	0	0	0	0	0	0	0	0	0
Myriophyllum verrucosum	0	0	0	0	0	1	4	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nicotiana goodspeedii	0	0	0	2	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nicotiana simulans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitraria billardierei	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Olearia calcerea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olearia pimeleoides	0	1	0	0	0	0	0	0	0	0	0	2	2	0	1	0	0	0	0	0	0	0	0	0	0	0
Olearia rudis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Omphalolappula concava	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Osteocarpum acropterum var. diminuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Oxalis chnoodes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxalis perennans	0	0	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0
Panicum effusum	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parsonsia eucalyptophylla	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Paspalidium constrictum	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paspalidium jubiflorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pelargonium australe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Persicaria lapathifolia	0	0	0	0	0	1	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllanthus lacunellus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pimelea microcephala	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Pimelea trichostachya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
Plantago debilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Plantago turrifera	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa fax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis canescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis capillaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis neglecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polygonum plebeium	1	0	0	0	0	3	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portulaca bicolor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portulaca oleracea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0
Pratia purpurascens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudognaphalium luteoalbum	1	1	0	1	0	2	3	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pterostylis cobarensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus exaltatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus gaudichaudii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus obovatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus polystachyus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus sessilifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pycnosorus thompsonianus	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Radyera farragei	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ranunculus sessiliflorus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia candolleana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia spinescens	0	0	0	0	0	0	0	0	0	3	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	3
Rhagodia ulicina	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe corymbiflora	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe floribunda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhyncharrhena linearis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex crystallinus	2	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex tenax	1	0	0	0	0	2	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rutidosis helichrysoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salsola kali	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Scaevola spinescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schenkia spicata	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schoenus subaphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scleranthus minisculus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scleranthus pungens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena brachyptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena decurrens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena diacantha	0	2	3	2	3	0	0	0	0	2	3	5	2	0	1	2	0	0	0	0	0	0	0	0	0	0
Sclerolaena divaricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	1	1	0	1
Sclerolaena eriacantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena intricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena lanicuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	1	0	0	0	0
Sclerolaena muricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena obliquicuspis	0	2	2	1	1	0	0	0	0	0	0	0	0	0	4	5	1	0	0	0	0	0	0	0	0	0
Sclerolaena parviflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSP34	CSP35	CSP36	CSP37	CSP38	CSP4	CSP5	CSP6	CSP7	CSP8	CSP9	CSW1	CAL1_OFF	CHS69	CSH102	CSH57	CSH64	CSH65	CSH66	CSH70	CSH71	CSH73	CSH75	CSH76	CSH79	CSH80
Sclerolaena patenticuspis	0	2	3	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	1	3	3	0
Sclerolaena stelligera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Sclerolaena tricuspis	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	0
Senecio glossanthus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio productus subsp. productus	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio runcinifolius	0	1	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0
Senna form taxon 'coriacea'	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Senna form taxon 'filifolia'	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Senna form taxon 'petiolaris'	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Sida corrugata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida filiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida intricata	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	2	1	0	0
Sida sp. C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida trichopoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum coactiliferum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum esuriale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Solanum simile	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spergularia marina	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sporobolus caroli	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Stackhousia muricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stemodia florulenta	1	0	0	0	1	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Stenopetalum lineare	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenopetalum sphaerocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Taraxacum officinale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia pergranulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia tenuis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	0	0	0	0	0	0	0
Tetragonia tetragonioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	2	2	1	1	0
Teucrium albicaule	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teucrium racemosum	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
Thysanotus baueri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tragus australianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	1	1	0
Triodia scariosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tripogon loliiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triptilodiscus pygmaeus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triraphis mollis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Velleia arguta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Verbena gaudichaudii	0	0	0	0	0	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia blackii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia cervicularis	0	1	0	0	2	0	0	0	0	0	0	3	0	0	2	2	0	0	0	0	0	0	0	0	0	0
Vittadinia condyloides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia cuneata	0	1	2	0	0	0	0	0	0	0	1	0	1	1	0	0	2	0	0	0	1	0	0	0	1	0
Vittadinia dissecta	0	0	0	0	0	0	0	0	0	1	0	1	2	0	0	0	1	0	0	0	0	0	0	0	1	0
Vittadinia eremaea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Vittadinia gracilis	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia muelleri	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia pterochaeta	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia sulcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia communis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Wahlenbergia fluminalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Wahlenbergia gracilenta	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia tumidifructa	2	0	0	2	2	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walwhalleya proluta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Westringia rigida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Xerochrysum bracteatum	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Xerochrysum viscosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum ammophilum	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum apiculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum aurantiacum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum confluens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum eremaeum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Zygophyllum glaucum	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum iodocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0

Data Matrix from Analysis

Scientific Name	CSH81	CSH82	CSH85	CSH87	CSH88	CSH90	CSH91	CSH93	CSHRE-D	CSHRE-E	CSHRE-E(canegrass)	CSHRE-G	CSHRE-I	CSO35
Abutilon otocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia aneura	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia colletioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia ligulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia melvillei	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Acacia oswaldii	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia rigens	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia sclerophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acacia wilhelmiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Actinobole uliginosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alectryon oleifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Alternanthera denticulata	0	0	0	0	0	0	1	0	0	0	0	2	2	0
Alternanthera sp. A	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amphipogon caricinus var. caricinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema cambagei	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema miraculosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amyema preissii	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Angianthus brachypappus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apophyllum anomalum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arabidella nasturtium	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Arabidella trisecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aristida leichhardtiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asperula conferta	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex acutibractea subsp. acutibractea	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex angulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex eardleyae	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Atriplex holocarpa	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Atriplex leptocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex limbata	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex lindleyi	2	0	2	0	3	2	0	0	0	0	0	0	0	0
Atriplex nummularia	0	0	1	2	0	0	5	0	0	0	0	0	0	0
Atriplex pseudocampanulata	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Atriplex semibaccata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex spinibractea	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex stipitata	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Atriplex vesicaria	0	0	0	0	0	4	0	4	4	4	3	5	2	0
Austrodanthonia setacea	0	0	0	0	0	2	0	2	0	0	0	0	0	1
Austrostipa drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa elegantissima	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa eremophila	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa nitida	2	3	2	0	2	2	0	3	0	0	0	0	0	1
Austrostipa platychaeta	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa puberula	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa scabra	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa tuckeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bergia trimera	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boerhavia dominii	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bossiaea walkeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyscome ciliaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyscome papillosa	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Brachyscome trachycarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulbine alata	2	0	1	0	3	3	0	2	0	0	0	1	1	0
Bulbine semibarbata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calandrinia eremaea	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callitris glaucophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callitris verrucosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis erinacea	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis hispidula	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calotis scapigera	0	0	0	0	1	1	0	1	0	0	0	0	0	0
Cassytha melantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassytha pubescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Casuarina pauper	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centipeda crateriformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centipeda cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centipeda thespidioides	0	0	0	0	0	0	0	0	0	0	1	3	2	0
Chamaesyce drummondii	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Cheilanthes sieberi	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium cristatum	2	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSH81	CSH82	CSH85	CSH87	CSH88	CSH90	CSH91	CSH93	CSHRE-D	CSHRE-E	CSHRE-E(canegrass)	CSHRE-G	CSHRE-I	CSO35
Chenopodium curvispicatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium desertorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium melanocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium nitrariaceum	0	0	0	2	0	0	3	0	0	0	2	0	0	0
Chenopodium truncatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chloris divaricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chloris truncata	1	2	1	0	2	1	0	0	0	0	0	2	0	0
Chrysocephalum apiculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chthonocephalus pseudevax	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus clementii	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus graminetinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus remotus	0	0	0	0	0	1	0	1	0	0	0	0	0	0
Crassula colorata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crassula sieberiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cryptandra propinqua	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperus difformis	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Dactyloctenium radulans	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daucus glochidiatus	0	0	0	0	0	1	0	0	0	0	2	0	0	0
Dianella revoluta	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diplachne fusca	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disphyma crassifolium	0	0	0	0	0	0	0	0	5	5	0	3	0	0
Dissocarpus paradoxus	2	1	2	0	1	1	0	1	0	0	0	0	1	1
Dodonaea bursariifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea lobulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dodonaea viscosa	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Dysphania littoralis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eclipta platyglossa	0	0	0	0	0	0	0	0	0	0	2	0	0	0
Einadia nutans subsp. nutans	0	1	0	0	1	1	0	0	0	0	0	0	0	0
Einadia polygonoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Einadia trigonos	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis acuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis pallens	0	0	0	3	0	0	1	0	0	0	6	0	0	0
Eleocharis plana	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis pusilla	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Elymus scaber	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enchylaena tomentosa	1	0	1	0	1	2	0	3	0	0	0	0	2	2
Enneapogon avenaceus	0	5	2	0	1	2	0	2	0	0	0	0	0	0
Enteropogon acicularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enteropogon ramosus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epaltes australis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis australasica	0	0	0	0	0	0	0	0	1	0	4	0	0	0
Eragrostis dielsii	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis elongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis eriopoda	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Eragrostis falcata	2	0	0	0	2	2	0	0	0	0	3	0	4	0
Eragrostis lacunaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis parviflora	2	0	0	0	0	0	0	0	0	0	0	1	2	0
Eremophila deserti	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila glabra	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Eremophila longifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila oppositifolia subsp. rubra	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eremophila sturtii	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Erodium crinitum	2	2	2	0	2	2	0	2	0	0	0	0	2	0
Erodium cygnorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus costata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus dumosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus largiflorens	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus leptophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus oleosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eucalyptus socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euchiton involucratus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euchiton sphaericus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euphorbia eremophila	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eutaxia microphylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exocarpos aphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fimbristylis dichotoma	0	0	0	0	0	0	0	0	0	0	0	0	3	0

Data Matrix from Analysis

Scientific Name	CSH81	CSH82	CSH85	CSH87	CSH88	CSH90	CSH91	CSH93	CSHRE-D	CSHRE-E	CSHRE-E(canegrass)	CSHRE-G	CSHRE-I	CSO35
Geijera parviflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia cycloptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia fascicularis	1	0	0	1	0	0	0	0	0	0	2	0	2	1
Goodenia glauca	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia havilandii	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia pinnatifida	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia willisiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grevillea huegelii	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hakea leucoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Halgania cyanea	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haloragis glauca	0	0	0	0	0	0	4	0	0	0	0	0	0	0
Haloragis odontocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harmsiodoxa blennodioides	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Harmsiodoxa brevipes var. brevipes	1	1	1	0	0	0	0	0	0	0	0	0	0	0
Heliotropium europaeum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hibiscus sturtii	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isoetes muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isoetopsis graminifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isolepis australiensis	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Juncus aridicola	0	0	0	2	0	0	4	0	0	0	3	0	0	0
Juncus flavidus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus subsecundus	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Lachnagrostis filiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa leptolepis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa semicalva	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa websteri	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lemooria burkittii	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium fasciculatum	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Lepidium leptopetalum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium monoplocoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium papillosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium phlebopetalum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidium pseudohyssopifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptorhynchos baileyi	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptospermum coriaceum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra collina	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra effusa	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lomandra leucocephala	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lotus cruentus	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Lycium australe	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lysiana exocarpi	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lythrum hyssopifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lythrum wilsonii	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana appressa	0	0	0	0	2	0	0	0	0	0	0	0	4	0
Maireana brevifolia	0	4	0	0	0	0	0	0	0	0	0	0	0	1
Maireana coronata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana decalvans	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana enchylaenoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana georgei	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana pentatropis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana pyramidata	2	0	3	0	5	5	0	3	1	0	0	2	4	0
Maireana radiata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana sclerolaenoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana sedifolia	0	0	1	0	0	0	0	2	0	0	0	0	0	0
Maireana trichoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana triptera	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Maireana turbinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacocera tricornis	0	0	1	0	0	0	0	1	2	1	0	0	2	0
Marsdenia australis	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Marsilea drummondii	4	0	0	6	0	0	6	0	3	0	6	3	2	0
Marsilea hirsuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Millotia tenuifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria cunninghamii	2	2	0	0	2	3	0	1	2	2	2	2	2	0
Minuria denticulata	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Minuria integerrima	0	0	0	0	0	0	1	0	0	0	2	0	0	0
Mollugo cerviana	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Muehlenbeckia florulenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSH81	CSH82	CSH85	CSH87	CSH88	CSH90	CSH91	CSH93	CSHRE-D	CSHRE-E	CSHRE-E(canegrass)	CSHRE-G	CSHRE-I	CSO35
Myoporum platycarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myriophyllum verrucosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nicotiana goodspeedii	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nicotiana simulans	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Nitraria billardierei	0	0	0	0	2	2	0	0	0	0	2	0	0	0
Olearia calcerea	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olearia pimeleoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olearia rudis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Omphalolappula concava	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Osteocarpum acropterum var. diminuta	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Oxalis chnoodes	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxalis perennans	0	0	0	0	0	0	0	0	0	0	2	2	0	2
Panicum effusum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parsonsia eucalyptophylla	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paspalidium constrictum	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Paspalidium jubiflorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pelargonium australe	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Persicaria lapathifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllanthus lacunellus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pimelea microcephala	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pimelea trichostachya	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago debilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago drummondii	0	0	0	0	3	3	0	2	0	0	0	2	0	0
Plantago turrifera	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa fax	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis canescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis capillaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podolepis neglecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polygonum plebeium	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portulaca bicolor	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portulaca oleracea	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pratia purpurascens	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudognaphalium luteoalbum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pterostylis cobarensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus exaltatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus gaudichaudii	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus obovatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus polystachyus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus sessilifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pycnosorus thompsonianus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Radyera farragei	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ranunculus sessiliflorus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia candolleana	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhagodia spinescens	1	1	0	0	2	1	0	0	0	0	1	1	2	2
Rhagodia ulicina	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe corymbiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe floribunda	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhyncharrhena linearis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex crystallinus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex tenax	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Rutidosis helichrysoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salsola kali	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scaevola spinescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schenkia spicata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schoenus subaphyllus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scleranthus minisculus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scleranthus pungens	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena brachyptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena decurrens	0	3	1	0	0	2	0	0	0	0	1	0	0	0
Sclerolaena diacantha	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Sclerolaena divaricata	2	1	0	0	2	1	0	1	0	1	0	2	0	0
Sclerolaena eriacantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena intricata	2	0	1	0	0	0	0	0	2	1	2	0	0	0
Sclerolaena lanicuspis	0	0	2	0	0	0	0	1	0	0	0	0	0	0
Sclerolaena muricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sclerolaena obliquicuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Sclerolaena parviflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Data Matrix from Analysis

Scientific Name	CSH81	CSH82	CSH85	CSH87	CSH88	CSH90	CSH91	CSH93	CSHRE-D	CSHRE-E	CSHRE-E(canegrass)	CSHRE-G	CSHRE-I	CSO35
Sclerolaena patenticuspis	1	2	2	0	0	2	0	0	0	0	0	0	0	0
Sclerolaena stelligera	0	0	1	0	1	1	0	1	0	2	0	0	0	0
Sclerolaena tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio glossanthus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio productus subsp. productus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio runcinifolius	0	0	0	0	0	0	3	0	0	0	2	1	0	0
Senna form taxon 'coriacea'	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna form taxon 'filifolia'	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senna form taxon 'petiolaris'	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Sida corrugata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida cunninghamii	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida filiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida intricata	0	1	2	0	1	2	0	1	0	0	0	0	1	0
Sida sp. C	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida trichopoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum coactiliferum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum esuriale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solanum simile	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spergularia marina	0	0	0	0	0	0	0	0	0	0	1	2	1	0
Sporobolus caroli	0	0	0	0	0	0	0	0	1	0	0	2	0	0
Stackhousia muricata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stemodia florulenta	0	0	0	0	0	0	2	0	0	0	0	0	1	0
Stenopetalum lineare	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenopetalum sphaerocarpum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Taraxacum officinale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia pergranulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecticornia tenuis	0	0	0	0	0	0	0	0	4	2	0	1	0	0
Tetragonia tetragonioides	2	2	1	0	1	0	0	0	0	0	0	1	2	0
Teucrium albicaule	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teucrium racemosum	1	0	0	0	0	0	0	0	0	0	2	0	2	2
Thysanotus baueri	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tragus australianus	0	0	1	0	1	0	0	0	0	0	0	0	0	0
Triodia scariosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tripogon loliiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triptilodiscus pygmaeus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triraphis mollis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Velleia arguta	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Verbena gaudichaudii	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia blackii	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia cervicularis	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Vittadinia condyloides	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia cuneata	1	1	1	0	2	2	0	0	0	0	0	0	0	0
Vittadinia dissecta	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Vittadinia eremaea	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Vittadinia muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia pterochaeta	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia sulcata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia communis	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Wahlenbergia fluminalis	2	0	0	0	0	0	0	0	0	0	1	0	0	0
Wahlenbergia gracilenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia gracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahlenbergia tumidifructa	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walwhalleya proluta	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Westringia rigida	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Xerochrysum bracteatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Xerochrysum viscosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum ammophilum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum apiculatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum aurantiacum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum confluens	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum eremaeum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum glaucum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygophyllum iodocarpum	0	0	0	0	0	1	0	0	0	0	0	0	0	1

Appendix D: Likelihood of occurrence of threatened flora

- there are known records in the New South Wales (NSW) Wildlife Atlas within a defined perimeter around the Project areas; or
- the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* Protected Matters Search Tool has identified as potentially occurring within a defined perimeter around the Atlas-Campaspe Mine area

Information regarding species habitat and distribution has been sourced from one or a combination of the following:

- NSW Office of Environment and Heritage Threatened Species Profile Database (OEH 2011a);
- Commonwealth Department of Sustainability, Environment, Water, Populations and Communities Threatened Species Profile and Threats Database (SEWPaC 2012a).

Scientific Name	Common Name	TSC Status[2]	EPBC Status[2]	Habitat	Distribution	Likelihood of Occurrence	Recommended Survey Period[1]	Study Area
Acacia acanthoclada	Harrow Wattle	E	-	Mallee communities on ridges and dunes; generally grows in deep, loose, sandy soil.	Sporadically occurs in south-west NSW. Most records in NSW are either in the Scotia mallee (Scotia Sanctuary and adjoining properties) or from an area to the north east of Buronga (between Mallee Cliffs and Mungo National Parks but not within either of these reserves). Some of these sites occur within Southern Mallee Reserves on leasehold land which stock grazing excluded. A single (dead) plant has also recently been recorded west of Lake Victoria, so additional survey may expand the number of known populations in south western NSW	Potential	August - December	Atlas-Campaspe Mine, roadworks along the MCTR
Acacia carneorum	Needle Wattle	V	V	Needle Wattle occurs on sand ridges or sandy flats or in alluvium along watercourses. Occurs in *Acacia aneura* (Mulga) communities, *Callitris glaucophylla* (White Cypress Pine) woodland, *Eucalyptus socialis* (Red Mallee) woodland, grassland and chenopod low shrubland	Needle Wattle is known from the far south-east of Central Australia (Jessop, 1981). It has a scattered distribution from south-west of Lake Frome and near Peterborough, in eastern South Australia, to near Tibooburra, Menindee Lakes and Wanaaring in western NSW (Orchard & Wilson, 2001; Harden, 2002). Occurs within the Western and Lower Murray Darling (NSW) and South Australian Arid Lands Natural Resource Management Regions	Potential-unconfirmed record on Boree Plains in 1989 (Anon 1998)	All Year	Atlas-Campaspe Mine, roadworks along the MCTR

Scientific Name	Common Name	TSC Status[2]	EPBC Status[2]	Habitat	Distribution	Likelihood of Occurrence	Recommended Survey Period[1]	Study Area
Atriplex infrequens	Saltbush	V	V	*Atriplex infrequens* (Saltbush) is associated with broad drainage tracts, clay flats and possibly occasionally inundated habitats. Very little ecological information is available for this species so it's critical habitat components can only be speculated as relatively undisturbed and ungrazed drainage lines and flats.	Confined to the NSW far western plains. North western records recorded from east of Tibooburra, south east of Brewarrina and near Wilcannia with isolated collections from the Pooncarie area in the south.	Unlikely - study area is grazed	All Year	Atlas-Campaspe Mine, roadworks along the MCTR
Austrostipa metatoris		V	V	sandhills, sand ridges, undulating plains and flat open mallee country, with red to red-brown clay-loam to sandy-loam soils	Most records occur in the Murray Valley with sites including Cunninyeuk Station, Stony Crossing, Kyalite State Forest (now part of Murrumbidgee Valley Regional Park) and Lake Benanee. Scattered records also occur in central NSW including Lake Cargelligo, east of Goolgowi, Condobolin and south west of Nymagee. Otherwise only known from near Bordertown in south east South Australia, where it may be locally extinct.	Unlikely- previous records are some distance from the study area	All Year	Atlas-Campaspe Mine, roadworks along the MCTR
Austrostipa nullanulla	Club Speargrass	E	-	Within the Murray mallee it is restricted to gypseous lunettes and copi rises and at Nulla Station it grows on the margins of relict lakes, on the crests and sides of lunettes above old lake floors.	Currently known only in NSW from Nulla Station to the north of Lake Victoria in the far south west, with the total population estimated at 200,000+ individuals. In Victoria there are an estimated 1500 plants in the Towan Plains Flora and Fauna Reserve, 300 plants in Murray-Sunset National Park and 330 plants on the Raak Plain. It is more widespread in South Australia, but is still considered Vulnerable in that state.	Unlikely - previous records are some distance from the study area; suitable habitat not present	December - February	Atlas-Campaspe Mine, roadworks along the MCTR

Scientific Name	Common Name	TSC Status[2]	EPBC Status[2]	Habitat	Distribution	Likelihood of Occurrence	Recommended Survey Period[1]	Study Area
Austrostipa wakoolica	A spear-grass	E	-	Grows on floodplains of the Murray River tributaries, in open woodland on grey, silty clay or sandy loam soils. Habitats include the edges of a lignum swamp with *Eucalyptus largiflorens* (Black Box) and mallee; creek banks in grey, silty clay; mallee and lignum sandy-loam flat; open *Callitris* sp. *forest* on low sandy range; and a low, rocky rise. Associated species include *C. glaucophylla*, *Eucalyptus microcarpa* (Grey Box), E. populnea (Brimble Box), *Austrostipa eremophila*, *A. drummondii*, *Austrodanthonia eriantha* and *Einadia nutans.*	Confined to the floodplains of the Murray River tributaries of central-western and south-western NSW, with localities including Manna State Forest, Matong, Lake Tooim, Merran Creek, Tulla, Cunninyeuk and Mairjimmy State Forest (now part of South West Woodland Nature Reserve).	Unlikely - previous records are some distance from the study area; suitable habitat not present	September - December	Atlas-Campaspe Mine, roadworks along the MCTR
Brachyscome papillosa	Mossgiel Daisy	V	V	Recorded primarily in clay soils on Bladder Saltbush (*Atriplex vesicaria*) and *Maireana aphylla* plains, but also in grassland and in Grey Box (*Eucalyptus microcarpa*) - Cypress Pine (*Callitris* spp.) woodland.	Occurs chiefly from Mossgiel to Urana, with sites in the Jerilderie area, the Hay Plain, Willandra Lakes district and north to Ivanhoe. A north-western outlier is a Byrnedale Station, north of Menindee. The only known slopes on South Western Slopes is Ganmain Reserve.	Potential	June to December	Atlas-Campaspe Mine, roadworks along the MCTR, Ivanhoe Rail Facility

Scientific Name	Common Name	TSC Status[2]	EPBC Status[2]	Habitat	Distribution	Likelihood of Occurrence	Recommended Survey Period[1]	Study Area
Convolvulus tedmoorei		E	-	Grows in self-mulching grey clay soils on the floodplains of the Darling and Murrumbidgee Rivers.	Originally known from only two areas on the Murrumbidgee and Darling River floodplains in central-western NSW, from Toganmain Station, Darlington Point, and from a locality 5 miles NW of Louth. Two other recorded localities for the species are ENE of Broken Hill on the road to Wilcannia, and Menindee Road, Scarsdale.	Unlikely - previous records are some distance from the study area; suitable habitat not present	All Year	Atlas-Campaspe Mine, roadworks along the MCTR
Cratystylis conocephala	Bluebush Daisy	E	-	*Cratystylis conocephala* Bluebush Daisy grows in mallee with areas of Belah (*Casuarina pauper*) on calcareous red soil. NSW populations are invariably found in Belah-Rosewood woodland or on the edge of sandplain mallee in calcareous soils.	Very rare in NSW, restricted to a few small populations in the Wentworth district in the far south-western plains. Most records are from the Scotia mallee near the South Australian border, including Tarawi Nature Reserve, Scotia Sanctuary and Nanya Station. It has also been recorded from near Lake Victoria and from Garston Station between the Darling River and the Great Darling Anabranch. The species is also rare in Victoria, known from only seven plants in three reserves in the far north-west. Bluebush Daisy is more common in South Australia, Western Australia and the Northern Territory.	Unlikely - previous records are some distance from the study area	September - December	Atlas-Campaspe Mine, roadworks along the MCTR
Dodonaea sinuolata subsp. *acrodentata*	Hopbush	E	-	Grows in red sandy loams on stony ridges in arid and semi-arid areas. Also other sandy or stony sites in open woodland. The species is commonly found in Queensland on stony hills and ranges and sandy "jump-ups", in red sandy-loam soils with limonite and quartzite pebbles.	In NSW, known only from near Hillston and Ivanhoe in the south-western plains. Also occurs in Qld in the Warrego and Maranoa districts.	Potential	January – May (flowers); July – November (fruit)	Ivanhoe Rail Facility

Scientific Name	Common Name	TSC Status[2]	EPBC Status[2]	Habitat	Distribution	Likelihood of Occurrence	Recommended Survey Period[1]	Study Area
				Common associated species include open woodlands of *Acacia aneura* (Mulga), *Acacia harpophylla*, *Eucalyptus melanophloia*, *Eucalyptus populnea* and Eucalyptus *cambageana* (Qld).				
Dysphania plantaginella		E	-	Grows in sandy areas, either coastal or on the margin of waterholes and inland salt lakes. Also grows in disturbed sites, including the strandline of previous water levels on the side of the gypsum mine at Marlow Station, among old rabbit warrens, on roadsides and even in the middle of tracks on red sandy soils. Interstate habitats include river banks, moist edges of a saline lake, dry river beds, flood channels and open depression on sandplains. Associated species include *Eucalyptus* camaldulensis, *Eucalyptus microtheca*, *Acacia stenophylla*, *Nitraria billardierei* and Spinifex.	Found in both coastal and inland areas of Australia but confined to the south-western plains of NSW. It has been recorded there from Marlow Station NNW of Conoble railway siding.	Potential	Jan – April; Aug - Sept	Ivanhoe Rail Facility

Scientific Name	Common Name	TSC Status[2]	EPBC Status[2]	Habitat	Distribution	Likelihood of Occurrence	Recommended Survey Period[1]	Study Area
Eleocharis obicis	Spike-Rush; Striate Spike sedge	V	V	It grows in ephemerally wet situations such as roadside mitre drains and depressions, usually in low-lying grassland. NSW sites include depressions with heavy clay soils on the Lachlan River floodplain	Found near Condobolin and Hay, as well as being known from an old collection from the Barrier Range near Broken Hill. The later collection was made on the Lachlan River floodplain at Micabil, near Condobolin.	Potential - previous records are some distance from the offset study area; suitable habitat not present	All Year	Atlas-Campaspe Mine, roadworks along the MCTR, Ivanhoe Rail Facility
Kippistia suaedifolia	Fleshy Minuria	E	-	Grows around saline lakes and depressions, often in association with gypsum. Rare in NSW, recorded only from a restricted area on a loamy and highly gypseous soil.	Recorded from several collections near Conoble in the Ivanhoe district. This locality is an open-cast gypsum mine (Marlow Gypsum Mine), located 22 km north of Conoble railway siding. Also reported from the Scotia mapsheet area in far south-western NSW.	Unlikely – unsuitable habitat	Aug – Oct mostly Sept – Nov. Also said to flower and fruit from June to September.	Ivanhoe Rail Facility
Lasiopetalum behrii	Pink Velvet Bush	CE	-	Grows in mallee and red dune and swale country. In Victoria recorded in *Eucalyptus gracilis* mallee woodland with an understorey of *Acacia* sp. and *Triodia* sp., *Halgania andromedifolia* (Lavender Halgania) and *Eutaxia microphylla*, on deep sand.	Pink Velvet Bush is known in NSW from a single record made in 1997 on leasehold land to the south east of Pooncarie in the far south western plains. The species is common in mallee areas of north western Victoria, with an outlier in the whipstick mallee near Bendigo. It is also widespread in south eastern South Australia.	Potential	Late winter - spring	Atlas-Campaspe Mine, roadworks along the MCTR

Scientific Name	Common Name	TSC Status[2]	EPBC Status[2]	Habitat	Distribution	Likelihood of Occurrence	Recommended Survey Period[1]	Study Area
Lepidium monoplocoides	Winged Pepper-cress	E	E	Occurs on seasonally moist to waterlogged sites, on heavy fertile soils, with a mean annual rainfall of around 300-500 mm. Predominant vegetation is usually an open woodland dominated by *Allocasuarina luehmannii* (Bulloak) and/or eucalypts, particularly *Eucalyptus largiflorens* (Black Box) or *Eucalyptus populnea* (Poplar Box). The field layer of the surrounding woodland is dominated by tussock grasses.	Widespread in the semi-arid western plains regions of NSW. Collected from widely scattered localities, with large numbers of historical records but few recent collections. There is a single collection from Broken Hill and only two collections since 1915, the most recent being 1950. Also previously recorded from Bourke, Cobar, Urana, Lake Cargelligo, Balranald, Wanganella and Deniliquin. Recorded more recently from the Hay Plain, south-eastern Riverina, and from near Pooncarie.	Potential	November - February	Atlas-Campaspe Mine, roadworks along the MCTR, Ivanhoe Rail Facility
Phyllanthus maderaspatanus		E	-	Grows in floodplain areas on heavy soils and may rely on appropriate and intermittent rainfall and flooding events for its survival. The species is described as being a summer-growing annual and is thus dependent on seasonal conditions. Often associated with open grasslands and eucalypt woodlands in or near creek beds, and grassy flats and levees near watercourses.	Recorded for the Brewarrina and Collarenebri districts in the north-western plains of NSW. Also occurs in Queensland, the Northern Territory, South Australia and Western Australia.	Unlikely - previous records are some distance from the study area; suitable habitat not present	September - February	Atlas-Campaspe Mine, roadworks along the MCTR

Scientific Name	Common Name	TSC Status[2]	EPBC Status[2]	Habitat	Distribution	Likelihood of Occurrence	Recommended Survey Period[1]	Study Area
Pimelea serpyllifolia subsp. serpyllifolia	Thyme Rice-Flower	E	-	Grows in scrub and woodland on calcareous soils. Often found in sandy red soils supporting mallee scrub. Associated species include *Eucalyptus oleosa* (Red Mallee), *Eucalyptus leptophylla* (Narrow-leaved Red Mallee), *Eucalyptus dumosa* (White Mallee), *Melaleuca lanceolata* (Moonah), *Leptospermum laevigatum* (Coast Teatree), *Leucopogon parviflorus* (Coastal Beard-heath), *Olearia axillaris* (Coast Daisy-bush), *Myoporum insulare* (Boobialla), *Rhagodia candolleana* (Sea Berry Saltbush), *Acacia* ssp. and *Hakea* spp., *Triodia (spinifex)* and other tall grasses.	Not common in NSW, found only in the far south-western plains in the Euston district, becoming more abundant in Victoria and South Australia.	Unlikely - previous records are some distance from the study area	Most of the year esp. July - November	Atlas-Campaspe Mine, roadworks along the MCTR

Scientific Name	Common Name	TSC Status[2]	EPBC Status[2]	Habitat	Distribution	Likelihood of Occurrence	Recommended Survey Period[1]	Study Area
Santalum murrayanum	Bitter Quandong	E	-	Usually grows in mallee communities. Generally grows in gravely and sandy loam soils on dunes, in open woodland and tall shrubland. Also recorded in sand in spinifex-shrub steppe. NSW populations found in mallee habitats on soft linear dune-crests, with deep and well-drained calcareous earths or red and brown sands, loamy sands or clay-loams. Associated species include *Eucalyptus socialis* and *Pimelea microcephala* (Shrubby Rice-flower), *Eucalyptus costata* (Ridge-fronted Mallee), *Eucalyptus leptophylla, E. dumosa, Callitris verrucosa* (Mallee Pine) and *Triodia scariosa* (Spinifex).	The Bitter Quandong occurs between inland southern Western Australia, through South Australia, east to north-western Victoria and south-western NSW. Many of the NSW records occur within the vicinity of the Sturt Highway (between Dareton and Balranald), but recently more plants have been over a much wider distribution, including between Kyalite and Moulamein in the east, west of Lake Victoria in the west and in mallee to the south east of Menindee in the north. Only one plant is known from formal conservation reserves in NSW (Mallee Cliffs National Park), though another is known from the Travelling Stock Route within northern Mungo National Park and a number are known from various conservation initiatives on leasehold land	Potential	August - January	Atlas-Campaspe Mine, roadworks along the MCTR
Solanum karsense	Menindee Nightshade	V	V	Grows in occasionally flooded depressions with heavy soil, including level river floodplains of grey clay with *Eucalyptus largiflorens* (Black Box)and *Atriplex nummularia* (Old Man Saltbush), and open treeless plains with solonised brown soils..	*Solanum karsense* (Menindee Nightshade) is the only species of Solanum endemic to NSW and is restricted to the far south-western plains, extending up the Darling River to the Menindee and Wilcannia districts. Mainly restricted to the area between the Darling and Lachlan Rivers. Localities include Kars Station, Lake Tandou, Lake Cawndilla, Oxley area, between Broken Hill and Menindee, and the Darling River. It has been recorded from Kinchega National Park and Nearie Lake Nature Reserve.	Potential	Spring	Atlas-Campaspe Mine, roadworks along the MCTR

Scientific Name	Common Name	TSC Status[2]	EPBC Status[2]	Habitat	Distribution	Likelihood of Occurrence	Recommended Survey Period[1]	Study Area
Swainsona colutoides		E	-	Grows on sandy flats or skeletal hillside soils in mallee woodland. Plants are usually found in large numbers in areas of previous controlled burns and wildfires.	Occurs in the south-western corner of NSW, with several populations all located within Tarawi Nature Reserve. Also found in inland parts of southern Western and South Australia (where it is widespread), and in the Northern Territory near Alice Springs.	Unlikely - previous records are some distance from the study area.	All Year (except October, March & January)	Atlas-Campaspe Mine, roadworks along the MCTR
Swainsona murrayana	Murray Swainson-pea	V	V	The species has been collected from clay-based soils, ranging from grey, red and brown cracking clays to red-brown earths and loams. Grows in a variety of vegetation types including *Atriplex vesicaria* (bladder saltbush), *Eucalyptus largiflorens (*black box) and grassland communities on level plains, floodplains and depressions and is often found with *Maireana* species. Plants have been found in remnant native grasslands or grassy woodlands that have been intermittently grazed or cultivated.	Found throughout NSW , it has been recorded in the Jerilderie and Deniliquin areas of the southern riverine plain, the Hay plain as far north as Willandra National Park, near Broken Hill and in various localities between Dubbo and Moree.	Unlikely – there are no database records within 50 km of the Atlas-Campaspe and MCTR study area and no potential habitat in the Ivanhoe study area.	September - February	Atlas-Campaspe Mine, roadworks along the MCTR , Ivanhoe Rail Facility

Scientific Name	Common Name	TSC Status[2]	EPBC Status[2]	Habitat	Distribution	Likelihood of Occurrence	Recommended Survey Period[1]	Study Area
Swainsona pyrophila	Yellow Swainson-pea	V	V	Grows in mallee scrub on sandy or loamy soil, usually found only after fire. Sites include cleared and burnt mallee scrub on red loam to sand, previously burnt *Eucalyptus dumosa* mallee, disturbed woodland in sheltered aspects, a bulldozed firebreak adjacent to wheat paddocks, roadsides, claypans and at the edge of fire ash.	Occurs in the south-western plains regions of NSW and into Victoria and South Australia. The species is distributed in the south-eastern half of South Australia, along the Murray River valley into north-western Victoria, with isolated occurrences northward.	Potential	September - December	Atlas-Campaspe Mine, roadworks along the MCTR
Swainsona plagiotropis	Red Darling Pea	V	V	Grows on flat grassland and in heavy red soil, often on roadsides and especially in table drains. Soils are derived from quaternary sediments and are usually red-brown clay-loams. The species is absent from black low-lying soils. Associated species include *Austrostipa aristiglumis*, *Austrostipa nodosa*, *Austrodanthonia setacea*, *Homopholis proluta, Chloris truncata, Austrodanthonia caespitosa, Austrodanthonia duttoniana, Enteropogon acicularis, Hordeum spp., Lolium rigidum, Rhodanthe corymbiflora, Calotis scabiosifolia, Microseris lanceolata* and *Chrysocephalum apiculatum*	Occurs in the upper Murray River valley in the south-western plains of NSW and into Victoria. Most NSW records are from the Jerilderie area, with possible collections from the Louth-Bourke area and a disjunct record in the north-western plains from Buttabone Stud Park 35 km NW of Warren. Also rare in Victoria, restricted to a few sites in the central north, mostly between Bendigo and the Murray River south of Echuca.	Potential	Aug – Oct mostly Sept – Nov Also said to flower and fruit from June to September	Ivanhoe Rail Facility

[1] Recommended survey period taken from The Threatened Species Profile Database (OEH 2011a)
[2] V = vulnerable; E = endangered; CE = critically endangered

Appendix E: Native plant species recorded in the Atlas-Campaspe mine study area and the study area for the roadwork's along the MCTR.

Family	Scientific Name	Common Name	Floristic Status
Malvaceae	*Abutilon fraseri*		Uncommon
Malvaceae	*Abutilon otocarpum*		Extension of range within the South Far Western Plains (SFWP)
Fabaceae	*Acacia aneura*	Mulga	
Fabaceae	*Acacia brachybotrya*	Grey Mulga	
Fabaceae	*Acacia colletioides*	Wait-a-while	
Fabaceae	*Acacia homalophylla*	Yarran	
Fabaceae	*Acacia ligulata*	Umbrella Bush	
Fabaceae	*Acacia melvillei*	Yarran	
Fabaceae	*Acacia oswaldii*	Miljee	
Fabaceae	*Acacia rigens*	Needle Wattle	
Fabaceae	*Acacia sclerophylla*		
Fabaceae	*Acacia wilhelmiana*	Wilhelm's Wattle	
Asteraceae	*Actinobole uliginosum*	Flannel Cudweed	
Sapindaceae	*Alectryon oleifolius*	Western Rosewood, Bonaree	
Amaranthaceae	*Alternanthera denticulata*	Lesser Joyweed	
Amaranthaceae	*Alternanthera sp. A*		
Poaceae	*Amphipogon caricinus var. caricinus*	Long Greybeard Grass	
Loranthaceae	*Amyema cambagei*		
Loranthaceae	*Amyema miraculosum*		
Loranthaceae	*Amyema preissii*		
Asteraceae	*Angianthus brachypappus*	Spreading Cup-flower	
Capparaceae	*Apophyllum anomalum*	Warrior Bush	
Brassicaceae	*Arabidella nasturtium*		
Brassicaceae	*Arabidella trisecta*		
Poaceae	*Aristida leichhardtiana*		
Rubiaceae	*Asperula conferta*	Common Woodruff	
Chenopodiaceae	*Atriplex acutibractea*		
Chenopodiaceae	*Atriplex angulata*	Fan Saltbush	
Chenopodiaceae	*Atriplex conduplicata*		
Chenopodiaceae	*Atriplex eardleyae*		
Chenopodiaceae	*Atriplex holocarpa*	Pop Saltbush	
Chenopodiaceae	*Atriplex leptocarpa*	Slender-fruit Saltbush	
Chenopodiaceae	*Atriplex limbata*		
Chenopodiaceae	*Atriplex lindleyi*		
Chenopodiaceae	*Atriplex nummularia*	Old Man Saltbush	
Chenopodiaceae	*Atriplex pseudocampanulata*		
Chenopodiaceae	*Atriplex semibaccata*	Creeping Saltbush	
Chenopodiaceae	*Atriplex spinibractea*		
Chenopodiaceae	*Atriplex spongiosa*	Pop Saltbush	
Chenopodiaceae	*Atriplex stipitata*	Mallee Saltbush	
Chenopodiaceae	*Atriplex suberecta*		

Family	Scientific Name	Common Name	Floristic Status
Chenopodiaceae	*Atriplex vesicaria*	Bladder Saltbush	
Poaceae	*Austrodanthonia setacea*		
Poaceae	*Austrostipa drummondii*		
Poaceae	*Austrostipa elegantissima*	Feather Speargrass	
Poaceae	*Austrostipa eremophila*		
Poaceae	*Austrostipa nitida*		
Poaceae	*Austrostipa platychaeta*	Flat-awn Speargrass	
Poaceae	*Austrostipa puberula*		
Poaceae	*Austrostipa scabra*	Speargrass	
Poaceae	*Austrostipa tuckeri*		
Elatinaceae	*Bergia trimera*		
Pittosporaceae	*Billardiera versicolor*	Pale Appleberry	
Nyctaginaceae	*Boerhavia dominii*	Tarvine	
Fabaceae	*Bossiaea walkeri*	Cactus Pea	
Asteraceae	*Brachyscome ciliaris*	Variable Daisy	
Asteraceae	*Brachyscome multifida*	Cut-leaved Daisy	
Asteraceae	*Brachyscome papillosa*	Mossgiel Daisy	Vulnerable
Asteraceae	*Brachyscome trachycarpa*	Smooth Daisy	
Brassicaceae	*Brassica tournefortii*	Mediterranean Turnip	
Asphodelaceae	*Bulbine alata*	Native Leek	
Asphodelaceae	*Bulbine semibarbata*	Wild Onion	
Portulacaceae	*Calandrinia eremaea*		
Cupressaceae	*Callitris glaucophylla*	White Cypress Pine	
Cupressaceae	*Callitris verrucosa*	Mallee Pine	
Asteraceae	*Calotis erinacea*	Tangled Burr-daisy	
Asteraceae	*Calotis hispidula*	Bogan Flea	
Asteraceae	*Calotis scapigera*	Tufted Burr-daisy	
Asteraceae	*Cassinia laevis*	Cough Bush	
Lauraceae	*Cassytha melantha*		
Lauraceae	*Cassytha pubescens*		
Casuarinaceae	*Casuarina pauper*	Belah	
Gentianaceae	*Centaurium spicatum*	Spike Centaury	
Asteraceae	*Centipeda crateriformis*		
Asteraceae	*Centipeda cunninghamii*	Common Sneezeweed	
Asteraceae	*Centipeda thespidioides*	Desert Sneezeweed	
Euphorbiaceae	*Chamaesyce drummondii*	Caustic Weed	
Adiantaceae	*Cheilanthes sieberi*		
Chenopodiaceae	*Chenopodium cristatum*	Crested Goosefoot	
Chenopodiaceae	*Chenopodium curvispicatum*		
Chenopodiaceae	*Chenopodium desertorum*		
Chenopodiaceae	*Chenopodium melanocarpum*	Black Crumbweed	
Chenopodiaceae	*Chenopodium nitrariaceum*	Nitre Goosefoot	
Chenopodiaceae	*Chenopodium pumilio*	Small Crumbweed	
Chenopodiaceae	*Chenopodium truncatum*		
Poaceae	*Chloris divaricata*		
Poaceae	*Chloris truncata*	Windmill Grass	
Santalaceae	*Choretrum glomeratum*	Common Sour Bush	
Asteraceae	*Chrysocephalum apiculatum*	Common Everlasting, Yellow But	

Family	Scientific Name	Common Name	Floristic Status
Asteraceae	*Chthonocephalus pseudevax*	Ground-heads	
Convolvulaceae	*Convolvulus clementii*	Desert Bindweed	
Convolvulaceae	*Convolvulus graminetinus*		
Convolvulaceae	*Convolvulus remotus*		
Crassulaceae	*Crassula colorata*		
Crassulaceae	*Crassula sieberiana*	Australian Stonecrop	
Amaryllidaceae	*Crinum flaccidum*	Darling Lily	
Rhamnaceae	*Cryptandra propinqua*		
Fabaceae	*Cullen discolor*	Annual Verbine	
Boraginaceae	*Cynoglossum suaveolens*		
Cyperaceae	*Cyperus difformis*	Dirty Dora	
Poaceae	*Dactyloctenium radulans*	Button Grass	
Apiaceae	*Daucus glochidiatus*	Native Carrot	
Phormiaceae	*Dianella revoluta*		
Poaceae	*Diplachne fusca*		
Aizoaceae	*Disphyma crassifolium*		
Chenopodiaceae	*Dissocarpus paradoxus*	Cannonball Burr	
Sapindaceae	*Dodonaea bursariifolia*		
Sapindaceae	*Dodonaea lobulata*		Second record for the SFWP
Sapindaceae	*Dodonaea viscosa*		
Solanaceae	*Duboisia hopwoodii*	Pituri	
Chenopodiaceae	*Dysphania littoralis*		
Asteraceae	*Eclipta platyglossa*		
Chenopodiaceae	*Einadia nutans subsp. nutans*	Climbing Saltbush	
Chenopodiaceae	*Einadia polygonoides*		
Chenopodiaceae	*Einadia trigonos*	Fishweed	
Cyperaceae	*Eleocharis acuta*		
Cyperaceae	*Eleocharis pallens*		
Cyperaceae	*Eleocharis plana*		
Cyperaceae	*Eleocharis pusilla*		
Poaceae	*Elymus scaber*		
Chenopodiaceae	*Enchylaena tomentosa*	Ruby Saltbush	
Poaceae	*Enneapogon avenaceus*	Bottle Washers	
Poaceae	*Enneapogon nigricans*	Niggerheads	
Poaceae	*Enteropogon acicularis*		
Poaceae	*Enteropogon ramosus*	Curly Windmill Grass	
Asteraceae	*Epaltes australis*	Spreading Nut-heads	
Poaceae	*Eragrostis australasica*	Canegrass	
Poaceae	*Eragrostis dielsii*	Mallee Lovegrass	
Poaceae	*Eragrostis elongata*	Clustered Lovegrass	New record for SFWP
Poaceae	*Eragrostis eriopoda*	Woollybutt	
Poaceae	*Eragrostis falcata*	Sickle Lovegrass	Extension of range within SFWP
Poaceae	*Eragrostis lacunaria*	Purple Lovegrass	
Poaceae	*Eragrostis parviflora*	Weeping Lovegrass	
Myoporaceae	*Eremophila deserti*	Turkeybush	
Myoporaceae	*Eremophila glabra*	Tar Bush	
Myoporaceae	*Eremophila glabra subsp. murrayana*	Tar Bush	

Family	Scientific Name	Common Name	Floristic Status
Myoporaceae	*Eremophila longifolia*	Emubush	
Myoporaceae	*Eremophila maculata*	Spotted Fuchsia	
Myoporaceae	*Eremophila oppositifolia subsp. rubra*	Weeooka	
Myoporaceae	*Eremophila sturtii*	Turpentine Bush	
Geraniaceae	*Erodium crinitum*	Blue Storksbill, Blue Crowfoot	
Geraniaceae	*Erodium cygnorum*		
Myrtaceae	*Eucalyptus costata*	Ridge-fruited Mallee	
Myrtaceae	*Eucalyptus dumosa*	White Mallee	
Myrtaceae	*Eucalyptus gracilis*	Snap and Rattle	
Myrtaceae	*Eucalyptus largiflorens*	Black Box	
Myrtaceae	*Eucalyptus leptophylla*	Narrow-leaved Red Mallee	
Myrtaceae	*Eucalyptus oleosa*	Glossy-leaved Red Mallee	
Myrtaceae	*Eucalyptus socialis*	Red Mallee	
Asteraceae	*Euchiton involucratus*	Star Cudweed	
Asteraceae	*Euchiton sphaericus*		
Euphorbiaceae	*Euphorbia eremophila*	Desert Spurge	
Fabaceae	*Eutaxia microphylla*		
Santalaceae	*Exocarpos aphyllus*	Leafless Ballart	
Cyperaceae	*Fimbristylis dichotoma*	Common Fringe-sedge	
Rutaceae	*Geijera parviflora*	Wilga	
Asteraceae	*Gnephosis tenuissima*		
Goodeniaceae	*Goodenia cycloptera*		
Goodeniaceae	*Goodenia fascicularis*		
Goodeniaceae	*Goodenia glauca*		
Goodeniaceae	*Goodenia gracilis*		
Goodeniaceae	*Goodenia havilandii*		New record for SFWP
Goodeniaceae	*Goodenia pinnatifida*		
Goodeniaceae	*Goodenia willisiana*		
Proteaceae	*Grevillea huegelii*		
Caryophyllaceae	*Gypsophila tubulosa*	Annual Chalkwort	New record for SFWP
Proteaceae	*Hakea leucoptera*	Needlewood	
Proteaceae	*Hakea tephrosperma*	Hooked Needlewood	
Boraginaceae	*Halgania cyanea*	Rough Halgania	
Haloragaceae	*Haloragis glauca*		
Haloragaceae	*Haloragis odontocarpa*		
Brassicaceae	*Harmsiodoxa blennodioides*		
Brassicaceae	*Harmsiodoxa brevipes var. brevipes*		
Boraginaceae	*Heliotropium europaeum*	Common Heliotrope	
Malvaceae	*Hibiscus sturtii*	Hill Hibiscus	
Asteraceae	*Hyalosperma spp.*		
Isoetaceae	*Isoetes muelleri*		New record for SFWP
Asteraceae	*Isoetopsis graminifolia*	Grass Cushion	
Cyperaceae	*Isolepis australiensis*		
Juncaceae	*Juncus aridicola*		
Juncaceae	*Juncus flavidus*		
Juncaceae	*Juncus subsecundus*		
Poaceae	*Lachnagrostis filiformis*		

Family	Scientific Name	Common Name	Floristic Status
Asteraceae	*Leiocarpa leptolepis*		Extension of range within SFWP
Asteraceae	*Leiocarpa semicalva*		
Asteraceae	*Leiocarpa websteri*		
Asteraceae	*Lemooria burkittii*	Wires-a-wool	
Brassicaceae	*Lepidium fasciculatum*		
Brassicaceae	*Lepidium leptopetalum*		
Brassicaceae	*Lepidium monoplocoides*	Winged Peppercress	Endangered
Brassicaceae	*Lepidium papillosum*	Warty Peppercress	
Brassicaceae	*Lepidium phlebopetalum*	Veined Peppercress	
Brassicaceae	*Lepidium pseudohyssopifolium*	Peppercress	
Asteraceae	*Leptorhynchos baileyi*		
Myrtaceae	*Leptospermum coriaceum*		
Lomandraceae	*Lomandra collina*		
Lomandraceae	*Lomandra effusa*	Scented Mat-rush	
Lomandraceae	*Lomandra leucocephala*	Woolly Mat-rush	
Fabaceae	*Lotus cruentus*	Red-flowered Lotus	
Solanaceae	*Lycium australe*	Australian Boxthorn	
Loranthaceae	*Lysiana exocarpi*		
Lythraceae	*Lythrum hyssopifolia*	Hyssop Loosestrife	
Lythraceae	*Lythrum wilsonii*		
Chenopodiaceae	*Maireana appressa*		
Chenopodiaceae	*Maireana brevifolia*		
Chenopodiaceae	*Maireana coronata*		
Chenopodiaceae	*Maireana decalvans*	Black Cotton Bush	
Chenopodiaceae	*Maireana enchylaenoides*		
Chenopodiaceae	*Maireana georgei*		
Chenopodiaceae	*Maireana pentatropis*		
Chenopodiaceae	*Maireana pyramidata*	Black Bluebush	
Chenopodiaceae	*Maireana radiata*		
Chenopodiaceae	*Maireana sclerolaenoides*		
Chenopodiaceae	*Maireana sedifolia*	Pearl Bluebush	
Chenopodiaceae	*Maireana trichoptera*		
Chenopodiaceae	*Maireana triptera*	Three-wing Bluebush	
Chenopodiaceae	*Maireana turbinata*		
Chenopodiaceae	*Malacocera tricornis*	Soft Horns	
Apocynaceae	*Marsdenia australis*	Doubah	
Marsileaceae	*Marsilea drummondii*	Common Nardoo	
Marsileaceae	*Marsilea hirsuta*		
Asteraceae	*Millotia tenuifolia*		
Asteraceae	*Minuria cunninghamii*		
Asteraceae	*Minuria denticulata*		
Asteraceae	*Minuria integerrima*		
Asteraceae	*Minuria leptophylla*		
Aizoaceae	*Mollugo cerviana*		
Polygonaceae	*Muehlenbeckia florulenta*	Lignum	
Loranthaceae	*Muellerina eucalyptoides*		
Myoporaceae	*Myoporum platycarpum*	Sugarwood	
Haloragaceae	*Myriophyllum verrucosum*	Red Water-milfoil	

Family	Scientific Name	Common Name	Floristic Status
Solanaceae	*Nicotiana goodspeedii*		
Solanaceae	*Nicotiana simulans*		
Nitrariaceae	*Nitraria billardierei*	Dillon Bush	
Asteraceae	*Olearia calcarea*	Limestone Dasiy Bush	
Asteraceae	*Olearia decurrens*		
Asteraceae	*Olearia passerinoides subsp. passerinoides*		
Asteraceae	*Olearia pimeleoides*		
Asteraceae	*Olearia rudis*		
Boraginaceae	*Omphalolappula concava*	Burr Stickseed	
Chenopodiaceae	*Osteocarpum acropterum var. diminuta*		
Oxalidaceae	*Oxalis chnoodes*		
Oxalidaceae	*Oxalis perennans*		
Poaceae	*Panicum effusum*	Poison or Hairy Panic	
Apocynaceae	*Parsonsia eucalyptophylla*	Gargaloo	
Poaceae	*Paspalidium constrictum*	Knottybutt Grass	
Poaceae	*Paspalidium jubiflorum*	Warrego Grass	
Geraniaceae	*Pelargonium australe*	Native Storksbill	
Polygonaceae	*Persicaria lapathifolia*	Pale Knotweed	
Euphorbiaceae	*Phyllanthus lacunellus*		
Thymelaeaceae	*Pimelea microcephala*		
Thymelaeaceae	*Pimelea trichostachya*		
Plantaginaceae	*Plantago cunninghamii*		
Plantaginaceae	*Plantago debilis*		
Plantaginaceae	*Plantago drummondii*		
Plantaginaceae	*Plantago turrifera*		
Poaceae	*Poa fax*	Scaly Poa	
Asteraceae	*Podolepis canescens*	Large Copper-wire Daisy	New record for SFWP
Asteraceae	*Podolepis capillaris*	Invisible Plant	
Asteraceae	*Podolepis neglecta*		
Asteraceae	*Polycalymma stuartii*	Poached Eggs	
Polygonaceae	*Polygonum plebeium*	Small Knotweed	
Portulacaceae	*Portulaca bicolor*		
Portulacaceae	*Portulaca oleracea*	Pigweed	
Lobeliaceae	*Pratia purpurascens*	Whiteroot	
Asteraceae	*Pseudognaphalium luteoalbum*	Jersey Cudweed	
Orchidaceae	*Pterostylis cobarensis*	Cobar Greenhood Orchid	Vulnerable
Amaranthaceae	*Ptilotus exaltatus*		
Amaranthaceae	*Ptilotus gaudichaudii*		
Amaranthaceae	*Ptilotus obovatus*	Smoke Bush	
Amaranthaceae	*Ptilotus polystachyus*		
Amaranthaceae	*Ptilotus sessilifolius*		
Asteraceae	*Pycnosorus thompsonianus*		
Malvaceae	*Radyera farragei*	Bush Hibiscus	
Ranunculaceae	*Ranunculus sessiliflorus*		
Chenopodiaceae	*Rhagodia candolleana*		
Chenopodiaceae	*Rhagodia spinescens*		

Family	Scientific Name	Common Name	Floristic Status
Chenopodiaceae	*Rhagodia ulicina*		
Asteraceae	*Rhodanthe corymbiflora*	Small White Sunray	
Asteraceae	*Rhodanthe floribunda*	Common White Sunray	
Apocynaceae	*Rhyncharrhena linearis*		
Polygonaceae	*Rumex crystallinus*	Shiny Dock	
Polygonaceae	*Rumex tenax*	Shiny Dock	
Asteraceae	*Rutidosis helichrysoides*		
Chenopodiaceae	*Salsola kali*		
Goodeniaceae	*Scaevola spinescens*		
Gentianaceae	*Schenkia spicata*	Spike Centaury	
Cyperaceae	*Schoenus subaphyllus*		
Caryophyllaceae	*Scleranthus minisculus*		
Caryophyllaceae	*Scleranthus pungens*		
Chenopodiaceae	*Sclerolaena brachyptera*		
Chenopodiaceae	*Sclerolaena decurrens*		
Chenopodiaceae	*Sclerolaena diacantha*	Grey Copperburr	
Chenopodiaceae	*Sclerolaena divaricata*	Tangled Copperburr	
Chenopodiaceae	*Sclerolaena eriacantha*		
Chenopodiaceae	*Sclerolaena intricata*		
Chenopodiaceae	*Sclerolaena lanicuspis*	Woolly Copperburr	
Chenopodiaceae	*Sclerolaena muricata*	Black Rolypoly	
Chenopodiaceae	*Sclerolaena obliquicuspis*		
Chenopodiaceae	*Sclerolaena parviflora*		
Chenopodiaceae	*Sclerolaena patenticuspis*		
Chenopodiaceae	*Sclerolaena stelligera*		
Chenopodiaceae	*Sclerolaena tricuspis*	Giant Redburr	
Asteraceae	*Senecio glossanthus*		
Asteraceae	*Senecio productus subsp. productus*		
Asteraceae	*Senecio quadridentatus*	Cotton Fireweed	Extension of range within SFWP
Asteraceae	*Senecio runcinifolius*	Tall Groundsel	
Fabaceae	*Senna form taxon 'coriacea'*		
Fabaceae	*Senna form taxon 'filifolia'*		
Fabaceae	*Senna form taxon 'petiolaris'*	Woody Cassia	
Malvaceae	*Sida corrugata*		
Malvaceae	*Sida cunninghamii*		
Malvaceae	*Sida filiformis*		
Malvaceae	*Sida intricata*		
Malvaceae	*Sida sp. C*		
Malvaceae	*Sida trichopoda*		
Solanaceae	*Solanum coactiliferum*	Western Nightshade	
Solanaceae	*Solanum esuriale*	Quena	
Solanaceae	*Solanum simile*	Oondoroo	
Caryophyllaceae	*Spergularia marina*		
Poaceae	*Sporobolus caroli*	Fairy Grass	
Stackhousiaceae	*Stackhousia muricata*		
Scrophulariaceae	*Stemodia florulenta*	Bluerod	
Brassicaceae	*Stenopetalum lineare*		
Brassicaceae	*Stenopetalum sphaerocarpum*		

Family	Scientific Name	Common Name	Floristic Status
Asteraceae	*Taraxacum officinale*	Dandelion	
Chenopodiaceae	*Tecticornia pergranulata*		
Chenopodiaceae	*Tecticornia tenuis*		
Aizoaceae	*Tetragonia tetragonioides*	New Zealand Spinach	
Lamiaceae	*Teucrium albicaule*		
Lamiaceae	*Teucrium racemosum*	Grey Germander	
Anthericaceae	*Thysanotus baueri*		
Poaceae	*Tragus australianus*	Small Burrgrass	
Poaceae	*Triodia scariosa*	Porcupine Grass	
Poaceae	*Tripogon loliiformis*	Fiveminute Grass	
Asteraceae	*Triptilodiscus pygmaeus*		New record for SFWP
Poaceae	*Triraphis mollis*	Purple Needlegrass	
Typhaceae	*Typha domingensis*	Narrow-leaved Cumbungi	
Goodeniaceae	*Velleia arguta*		New record for SFWP
Verbenaceae	*Verbena gaudichaudii*		
Asteraceae	*Vittadinia blackii*		Uncommon
Asteraceae	*Vittadinia cervicularis*		
Asteraceae	*Vittadinia condyloides*		
Asteraceae	*Vittadinia cuneata*	Fuzzweed	
Asteraceae	*Vittadinia dissecta*		
Asteraceae	*Vittadinia eremaea*		
Asteraceae	*Vittadinia gracilis*		
Asteraceae	*Vittadinia muelleri*		
Asteraceae	*Vittadinia pterochaeta*	Rough Fuzzweed	New record for SFWP
Asteraceae	*Vittadinia sulcata*		
Campanulaceae	*Wahlenbergia communis*	Tufted Bluebell	
Campanulaceae	*Wahlenbergia fluminalis*	River Bluebell	
Campanulaceae	*Wahlenbergia gracilenta*	Annual Bluebell	
Campanulaceae	*Wahlenbergia gracilis*	Sprawling or Australian Bluebell	
Campanulaceae	*Wahlenbergia luteola*		
Campanulaceae	*Wahlenbergia tumidifructa*		
Poaceae	*Walwhalleya proluta*		
Lamiaceae	*Westringia rigida*	Stiff Westringia	
Asteraceae	*Xerochrysum bracteatum*	Golden Everlasting	
Asteraceae	*Xerochrysum viscosum*		
Zygophyllaceae	*Zygophyllum ammophilum*	Sand Twinleaf	
Zygophyllaceae	*Zygophyllum apiculatum*	Gallweed, Pointed or Common Twinleaf	
Zygophyllaceae	*Zygophyllum aurantiacum*	Shrubby Twinleaf	
Zygophyllaceae	*Zygophyllum confluens*		
Zygophyllaceae	*Zygophyllum eremaeum*	Climbing Twinleaf	
Zygophyllaceae	*Zygophyllum glaucum*	Pale Twinleaf	
Zygophyllaceae	*Zygophyllum iodocarpum*	Violet Twinleaf	
Cucurbitaceae	*Zehneria micrantha*	Desert Cucumber	

Appendix F: Introduced species recorded in the Atlas-Campaspe mine study area and the study area for the roadwork's along the MCTR.

Family	Scientific Name	Common Name	Status
Brassicaceae	*Alyssum linifolium*	Flax-leaf Alyssum	
Boraginaceae	*Amsinckia intermedia*	Common Fiddleneck	
Asteraceae	*Arctotheca calendula*	Capeweed	
Asphodelaceae	*Asphodelus fistulosus*	Onion Weed	Noxious Class 4
Asteraceae	*Aster subulatus*	Wild Aster	
Poaceae	*Avena barbata*	Bearded Oats	
Brassicaceae	*Brassica tournefortii*	Mediterranean Turnip	Priority Weed in the Lower Darling Catchment Management Authority (CMA)
Poaceae	*Bromus rubens*	Red Brome	Priority Weed in the Lower Murray Darling CMA
Asteraceae	*Calendula arvensis*	Field Marigold	
Brassicaceae	*Carrichtera annua*	Ward's Weed	Priority Weed in the Lower Murray Darling CMA
Asteraceae	*Carthamus lanatus*	Saffron Thistle	
Asteraceae	*Centaurea calcitrapa*	Star Thistle	
Asteraceae	*Centaurea melitensis*	Maltese Cockspur	
Asteraceae	*Centaurea solstitialis*	St Barnabys Thistle	
Gentianaceae	*Centaurium spp.*		
Chenopodiaceae	*Chenopodium murale*	Nettle-leaf Goosefoot	
Asteraceae	*Chondrilla juncea*	Skeleton Weed	
Asteraceae	*Cirsium vulgare*	Spear Thistle	
Cucurbitaceae	*Citrullus colocynthis*	Colocynth	
Cucurbitaceae	*Citrullus lanatus* var. *lanatus*		
Asteraceae	*Conyza bonariensis*	Flaxleaf Fleabane	
Asteraceae	*Conyza sumatrensis*	Tall fleabane	
Cucurbitaceae	*Cucumis myriocarpus* subsp. *leptodermis*	Paddy Melon	
Convolvulaceae	*Cuscuta campestris*	Golden Dodder	Noxious Class 4
Cyperaceae	*Cyperus sesquiflorus*		
Asteraceae	*Dittrichia graveolens*	Stinkwort	
Boraginaceae	*Echium plantagineum*	Patterson's Curse	
Poaceae	*Eragrostis cilianensis*	Stinkgrass	
Geraniaceae	*Erodium cicutarium*	Common Crowfoot	
Fumariaceae	*Fumaria indica*		
Rubiaceae	*Galium aparine*	Goosegrass	
Asteraceae	*Gamochaeta coarctata*		
Asteraceae	*Hedypnois rhagadioloides*		
Boraginaceae	*Heliotropium europaeum*	Common Heliotrope	
Boraginaceae	*Heliotropium supinum*	Prostrate Heliotrope	Priority Weed in the Lower Murray Darling CMA
Poaceae	*Hordeum leporinum*	Barley Grass	
Asteraceae	*Hypochaeris glabra*	Smooth Catsear	

Family	Scientific Name	Common Name	Status
Juncaceae	*Juncus bufonius*	Toad Rush	
Asteraceae	*Lactuca serriola*	Prickly Lettuce	
Poaceae	*Lamarckia aurea*	Goldentop	
Brassicaceae	*Lepidium bonariense*		
Poaceae	*Lolium perenne*	Perennial Ryegrass	
Solanaceae	*Lycium ferocissimum*	African Boxthorn	Noxious Class 4; Priority Weed in the Lower Murray Darling CMA
Malvaceae	*Malva parviflora*	Small-flowered Mallow	
Malvaceae	*Malvastrum americanum*	Spiked Malvastrum	
Lamiaceae	*Marrubium vulgare*	Horehound	Priority Weed in the Lower Murray Darling CMA
Fabaceae	*Medicago laciniata*	Cut-leaved Medic	
Fabaceae	*Medicago minima*	Woolly Burr Medic	
Fabaceae	*Medicago polymorpha*	Burr Medic	
Solanaceae	*Nicotiana glauca*	Tree Tobacco	
Asteraceae	*Onopordum acaulon*	Stemless Thistle	
Asteraceae	*Picris angustifolia* subsp. *angustifolia*	Hawkweed Picris	
Poaceae	*Poa annua*	Winter Grass	
Aizoaceae	*Psilocaulon tenue*	Wiry Noon-flower	Priority Weed in the Lower Murray Darling CMA
Brassicaceae	*Rapistrum rugosum*	Turnip Weed	
Asteraceae	*Reichardia tingitana*	False Sowthistle	
Brassicaceae	*Rorippa palustris*	Yellow Cress	
Lamiaceae	*Salvia officinalis*	Sage	
Lamiaceae	*Salvia verbenaca*	Wild Sage	
Poaceae	*Schismus barbatus*	Arabian Grass	Priority Weed in the Lower Murray Darling CMA
Caryophyllaceae	*Silene apetala*		
Caryophyllaceae	*Silene vulgaris*	Bladder Campion	
Brassicaceae	*Sisymbrium erysimoides*	Smooth Mustard	Priority Weed in the Lower Murray Darling CMA
Brassicaceae	*Sisymbrium irio*	London Rocket	
Solanaceae	*Solanum nigrum*	Black-berry Nightshade	
Asteraceae	*Sonchus asper*	Prickly Sowthistle	
Asteraceae	*Sonchus oleraceus*	Common Sowthistle	
Caryophyllaceae	*Spergularia diandra*	Lesser Sandspurry	
Caryophyllaceae	*Spergularia rubra*	Sandspurry	
Asteraceae	*Taraxacum officinale*	Dandelion	
Aizoaceae	*Tetragonia decumbens*		
Verbenaceae	*Verbena officinalis*	Common Verbena	
Verbenaceae	*Verbena supina*	Trailing Verbena	
Asteraceae	*Verbesina encelioides*		
Asteraceae	*Xanthium occidentale*	Noogoora Burr, Cockle Burr	Noxious Class 4; Priority Weed in the Lower Murray Darling CMA
Asteraceae	*Xanthium orientale*	Californian Burr	Noxious Class 4
Asteraceae	*Xanthium spinosum*	Bathurst Burr	Noxious Class 4; Priority Weed in the Lower Murray Darling CMA

Appendix G: Native and introduced plant species recorded in the Ivanhoe Rail Facility study area

Native Species			
Family	**Scientific Name**	**Common Name**	**Flora Status**
Fabaceae	*Acacia homalophylla*	Yarran	
Fabaceae	*Acacia loderi*	Nealie	
Fabaceae	*Acacia oswaldii*	Miljee	
Sapindaceae	*Alectryon oleifolius*	Western Rosewood, Bonaree	
Capparaceae	*Apophyllum anomalum*	Warrior Bush	
Chenopodiaceae	*Atriplex eardleyae*		
Chenopodiaceae	*Atriplex semibaccata*	Creeping Saltbush	
Chenopodiaceae	*Atriplex stipitata*	Mallee Saltbush	
Poaceae	*Austrodanthonia setacea*		
Poaceae	*Austrostipa nitida*		
Asteraceae	*Brachyscome ciliaris var. lanuginosa*		
Asphodelaceae	*Bulbine alata*	Native Leek	
Casuarinaceae	*Casuarina pauper*	Belah	
Euphorbiaceae	*Chamaesyce drummondii*	Caustic Weed	
Chenopodiaceae	*Chenopodium cristatum*	Crested Goosefoot	
Poaceae	*Chloris truncata*	Windmill Grass	
Convolvulaceae	*Convolvulus clementii*	Desert Bindweed	
Convolvulaceae	*Convolvulus remotus*		
Apiaceae	*Daucus glochidiatus*	Native Carrot	
Poaceae	*Dichanthium sericeum*	Queensland Bluegrass	
Chenopodiaceae	*Dissocarpus paradoxus*	Cannonball Burr	
Chenopodiaceae	*Einadia nutans subsp. nutans*		
Chenopodiaceae	*Enchylaena tomentosa*	Ruby Saltbush	
Poaceae	*Enneapogon avenaceus*	Bottle Washers	
Poaceae	*Enteropogon acicularis*		
Poaceae	*Eragrostis eriopoda*	Woollybutt	
Myoporaceae	*Eremophila maculata*	Spotted Fuchsia	
Myoporaceae	*Eremophila sturtii*	Turpentine Bush	
Geraniaceae	*Erodium crinitum*	Blue Storksbill	
Myrtaceae	*Eucalyptus largiflorens*	Black Box	
Santalaceae	*Exocarpus aphyllus*	Leafless Ballart	
Rutaceae	*Flindersia maculosa*	Leopardwood	
Rutaceae	*Geijera parviflora*	Wilga	
Asteraceae	*Gnephosis arachnoidea*		
Goodeniaceae	*Goodenia fascicularis*		
Goodeniaceae	*Goodenia heteromera*		
Goodeniaceae	*Goodenia pinnatifida*		
Malvaceae	*Hibiscus brachysiphonius*		
Asteraceae	*Hyalosperma semisterile*		
Asteraceae	*Leiocarpa leptolepis*		
Brassicaceae	*Lepidium phlebopetalum*	Veined Peppercress	
Chenopodiaceae	*Maireana brevifolia*		
Chenopodiaceae	*Maireana georgei*		

Native Species			
Family	**Scientific Name**	**Common Name**	**Flora Status**
Chenopodiaceae	*Maireana pyramidata*	Black Bluebush	
Chenopodiaceae	*Maireana sclerolaenoides*		
Chenopodiaceae	*Osteocarpum acropterum*		
Poaceae	*Panicum queenslandicum var. queenslandicum*		
Pittosporaceae	*Pittosporum angustifolium*		
Plantaginaceae	*Plantago drummondii*		
Asteraceae	*Podolepis canescens*	Large Copper-wire Daisy	
Amaranthaceae	*Ptilotus nobilis*		
Asteraceae	*Pycnosorus thompsonianus*		
Chenopodiaceae	*Rhagodia spinescens*		
Asteraceae	*Rhodanthe floribunda*		
Chenopodiaceae	*Sclerolaena bicornis*	Goathead Burr	
Chenopodiaceae	*Sclerolaena brachyptera*		
Chenopodiaceae	*Sclerolaena decurrens*		
Chenopodiaceae	*Sclerolaena diacantha*	Grey Copperburr	
Chenopodiaceae	*Sclerolaena divaricata*	Tangled Copperburr	
Chenopodiaceae	*Sclerolaena lanicuspis*	Woolly Copperburr	
Chenopodiaceae	*Sclerolaena obliquicuspis*		
Chenopodiaceae	*Sclerolaena stelligera*		
Asteraceae	*Senecio spp.*		
Fabaceae	*Senna form taxon 'filifolia'*		
Malvaceae	*Sida intricata*		
Solanaceae	*Solanum esuriale*	Quena	
Poaceae	*Sporobolus caroli*	Fairy Grass	
Aizoaceae	*Tetragonia tetragonioides*	New Zealand Spinach	
Lamiaceae	*Teucrium racemosum*	Grey Germander	
Asteraceae	*Vittadinia gracilis*		
Asteraceae	*Vittadinia pterochaeta*	Rough Fuzzweed	
Campanulaceae	*Wahlenbergia fluminalis*	River Bluebell	
Zygophyllaceae	*Zygophyllum glaucum*	Pale Twinleaf	
Zygophyllaceae	*Zygophyllum iodocarpum*	Violet Twinleaf	
Zygophyllaceae	*Zygophyllum simile*		

Introduced Species			
Family	**Scientific Name**	**Common Name**	**Status**
Brassicaceae	*Alyssum linifolium*	Flax-leaf Alyssum	
Asphodelaceae	*Asphodelus fistulosus*	Onion Weed	
Brassicaceae	*Carrichtera annua*	Ward's Weed	
Boraginaceae	*Echium plantagineum*	Patterson's Curse	
Poaceae	*Eragrostis cilianensis*	Stinkgrass	
Asteraceae	*Lactuca serriola*	Prickly Lettuce	
Fabaceae	*Medicago truncatula*	Barrel Medic	
Lamiaceae	*Salvia verbenaca*	Wild Sage	
Brassicaceae	*Sisymbrium erysimoides*	Smooth Mustard	
Asteraceae	*Sonchus oleraceus*	Common Sowthistle	
Fabaceae	*Vicia monantha*	Square-stemmed Vetch	

Appendix H: Weed species listed by vegetation community

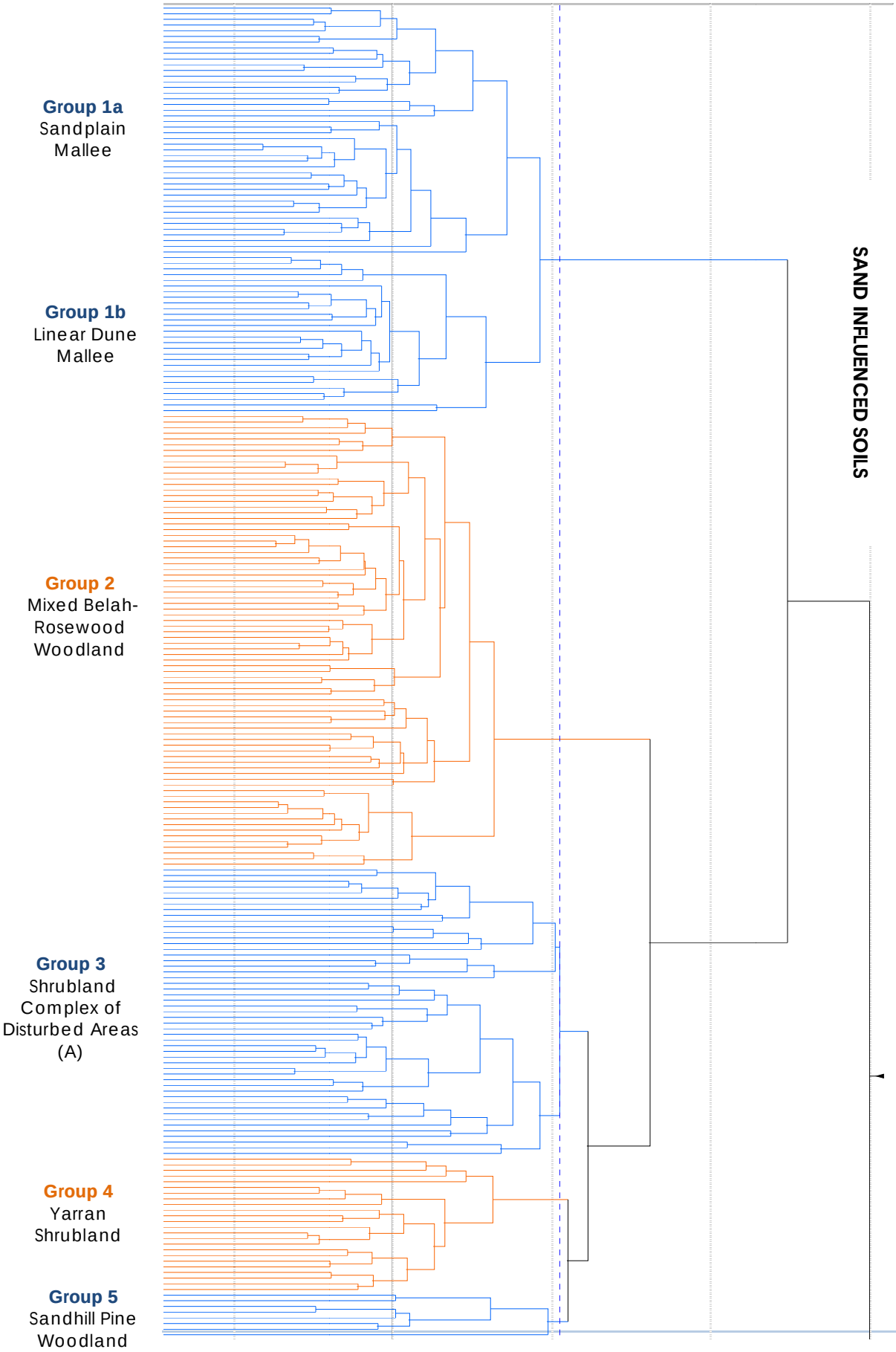
Weed species recorded for each vegetation community listed in order of most common to least common.

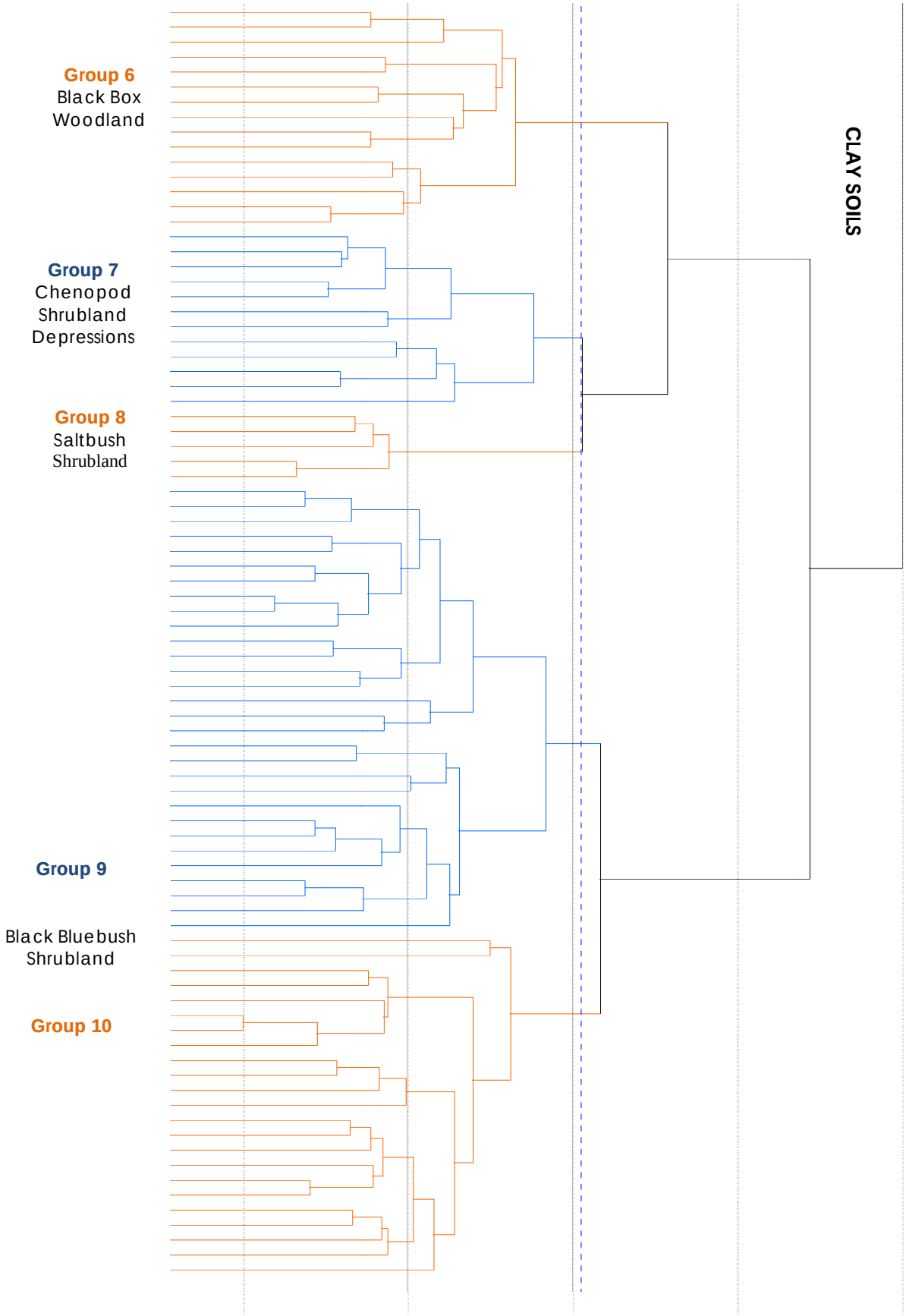
Sandplain Mallee	Linear Dune Mallee	Belah-Rosewood Woodland	Shrubland Complex of Disturbed Areas (A)	Yarran Shrubland	Sandhill Pine Woodland	Black Box Woodland	Chenopod Shrubland Depressions	Saltbush Shrubland	Bluebush Shrubland
Salvia verbenaca	*Conyza bonariensis*	*Medicago minima*	*Salvia verbenaca*	*Medicago laciniata*	*Heliotropium europaeum*	*Conyza bonariensis*	*Conyza bonariensis*	*Sonchus oleraceus*	*Salvia verbenaca*
Conyza bonariensis		*Medicago laciniata*	*Medicago minima*	*Salvia verbenaca*	*Cucumis myriocarpus subsp. leptodermis*	*Reichardia tingitana*	*Cirsium vulgare*	*Medicago polymorpha*	*Medicago polymorpha*
Chondrilla juncea		*Reichardia tingitana*	*Conyza bonariensis*	*Sisymbrium erysimoides*	*Medicago polymorpha*	*Spergularia diandra*	*Verbena officinalis*	*Sisymbrium irio*	*Medicago minima*
Cirsium vulgare		*Spergularia diandra*	*Sonchus oleraceus*	*Conyza bonariensis*	*Salvia verbenaca*	*Medicago minima*	*Aster subulatus*		*Centaurea melitensis*
Medicago minima		*Conyza bonariensis*	*Centaurea melitensis*	*Sonchus oleraceus*	*Asphodelus fistulosus*	*Centaurea melitensis*	*Centaurea solstitialis*		*Sonchus oleraceus*
Medicago polymorpha		*Medicago polymorpha*	*Medicago polymorpha*	*Cucumis myriocarpus subsp. leptodermis*	*Centaurea melitensis*	*Salvia verbenaca*	*Centaurium spp.*		*Cucumis myriocarpus subsp. leptodermis*
Onopordum acaulon		*Salvia verbenaca*	*Cucumis myriocarpus subsp. leptodermis*	*Carthamus lanatus*	*Chenopodium murale*	*Heliotropium supinum*	*Chondrilla juncea*		*Heliotropium europaeum*
Solanum nigrum		*Sisymbrium erysimoides*	*Marrubium vulgare*	*Reichardia tingitana*	*Citrullus lanatus var. lanatus*	*Juncus bufonius*	*Dittrichia graveolens*		*Lycium ferocissimum*
Sonchus oleraceus		*Marrubium vulgare*	*Hordeum leporinum*	*Marrubium vulgare*	*Conyza bonariensis*	*Sonchus oleraceus*	*Galium aparine*		*Malva parviflora*
		Centaurea melitensis	*Chondrilla juncea*	*Hordeum leporinum*	*Cyperus sesquiflorus*	*Bromus rubens*	*Hordeum leporinum*		*Echium plantagineum*
		Cirsium vulgare	*Citrullus colocynthis*	*Centaurea calcitrapa*	*Hordeum leporinum*	*Chondrilla juncea*	*Malva parviflora*		*Lamarckia aurea*
		Citrullus colocynthis	*Lycium ferocissimum*	*Lactuca serriola*	*Malva parviflora*	*Cirsium vulgare*	*Sisymbrium irio*		*Alyssum linifolium*

Sandplain Mallee	Linear Dune Mallee	Belah-Rosewood Woodland	Shrubland Complex of Disturbed Areas (A)	Yarran Shrubland	Sandhill Pine Woodland	Black Box Woodland	Chenopod Shrubland Depressions	Saltbush Shrubland	Bluebush Shrubland
		Hypochaeris glabra	*Medicago laciniata*	*Malva parviflora*	*Psilocaulon tenue*	*Gamochaeta spicata*	*Sonchus oleraceus*		*Asphodelus fistulosus*
		Malva parviflora	*Spergularia diandra*	*Schismus barbatus*	*Schismus barbatus*	*Lactuca serriola*	*Spergularia rubra*		*Centaurea solstitialis*
		Silene apetala	*Asphodelus fistulosus*	*Arctotheca calendula*	*Sisymbrium erysimoides*	*Lolium perenne*	*Medicago polymorpha*		*Erodium cicutarium*
		Solanum nigrum	*Bromus rubens*	*Avena barbata*	*Sonchus oleraceus*	*Medicago laciniata*			*Xanthium occidentale*
		Sonchus asper	*Cirsium vulgare*	*Hypochaeris glabra*		*Medicago polymorpha*			*Brassica tournefortii*
		Sonchus oleraceus	*Cuscuta campestris*	*Citrullus colocynthis*		*Psilocaulon tenue*			*Carrichtera annua*
		Verbesina encelioides	*Lolium perenne*	*Medicago polymorpha*		*Amsinckia intermedia*			*Centaurium spp.*
		Xanthium spinosum	*Psilocaulon tenue*	*Centaurea melitensis*		*Aster subulatus*			*Conyza bonariensis*
			Reichardia tingitana	*Medicago minima*		*Conyza sumatrensis*			*Dittrichia graveolens*
			Sonchus asper	*Xanthium orientale*		*Marrubium vulgare*			*Marrubium vulgare*
			Xanthium orientale			*Onopordum acaulon*			*Sisymbrium irio*
			Arctotheca calendula			*Picris hieracioides*			*Spergularia rubra*
			Aster subulatus			*Rapistrum rugosum*			*Nicotiana glauca*
			Avena barbata			*Rorippa palustris*			*Chenopodium murale*
			Calendula arvensis			*Silene vulgaris*			*Chondrilla juncea*
			Nicotiana glauca			*Sisymbrium erysimoides*			*Cirsium vulgare*
			Citrullus lanatus var. lanatus			*Sonchus asper*			*Citrullus lanatus var. lanatus*

Sandplain Mallee	Linear Dune Mallee	Belah-Rosewood Woodland	Shrubland Complex of Disturbed Areas (A)	Yarran Shrubland	Sandhill Pine Woodland	Black Box Woodland	Chenopod Shrubland Depressions	Saltbush Shrubland	Bluebush Shrubland
			Fumaria indica			*Spergularia rubra*			*Heliotropium supinum*
			Hedypnois rhagadioloides			*Verbena supina*			*Hordeum leporinum*
			Hypochaeris glabra						*Malvastrum americanum*
			Onopordum acaulon						*Onopordum acaulon*
			Poa annua						*Psilocaulon tenue*
			Spergularia rubra						*Salvia officinalis*
			Taraxacum officinale						*Schismus barbatus*
			Tetragonia decumbens						*Solanum nigrum*

Appendix I: Vegetation survey analysis results dendrogram.




CLAY SOILS
Group 6
Black Box
Woodland
Group 7
Chenopod
Shrubland
Depressions
Group 8
Saltbush
Shrubland
Group 9
Black Bluebush
Shrubland
Group 10

Appendix J: Comparison of Yarran Shrubland vegetation community to the *Acacia melvillei* Shrubland EEC.

The vegetation community Yarran Shrubland was determined to form part of *Acacia melvillei* Shrubland of the Riverina and Murray-Darling Depression Bioregions Endangered Ecological Community (EEC). The Final Determination for *Acacia melvillei* Shrubland of the Riverina and Murray-Darling Depression bioregions EEC describes the diagnostic features of this community. The floristic features of Yarran Shrubland recorded in the study area are discussed below in relation to selected key features listed in the Final Determination. Only features from the Final Determination relevant to the description of this EEC are included in the discussion below.

Selected Key Features listed in the Final Determination	Key Features of Yarran Shrubland
1. *Acacia melvillei* Shrubland typically: • *... occupies sandhills and undulating sandplains...* • *...occurs on red-brown, sandy loam soils as scattered patches grading into surrounding woodlands of Belah and Rosewood, White Cypress Pine or sandplain mallee.*	Areas of Yarran Shrubland within the study area: • occupied sandplains of sandy loam and alluvial plains of clay loam soils; and • graded into Belah-Rosewood Woodland, Black Box Woodland and Sandplain Mallee Woodland. In some locations White Cypress Pine (*Callitris glaucophylla*) occurred in the canopy layer of Belah-Rosewood Woodland.
2. *Acacia melvillei* Shrubland is characterised by an assemblage of species .	The following 18 characteristic species were recorded within areas of Yarran Shrubland within the study area: *Acacia melvillei, Atriplex stipitata, Austrostipa nitida, Casuarina pauper, Dissocarpus paradoxus, Einadia nutans, Enchylaena tomentosa, Eremophila sturtii, Erodium crinitum, Eucalyptus socialis, Maireana pyramidata, Maireana sclerolaenoides, Myoporum platycarpum, Nitraria billardierei, Rhagodia spinescens, Sclerolaena diacantha, Sclerolaena obliquicuspis, Sida corrugata.*
4. *Acacia melvillei* Shrubland is characterised by: • *...an open stratum of large shrubs or small trees, which may be reduced to isolated individuals or may be absent as a result of past clearing.* • *...shrub/tree layer is dominated by Acacia melvillei (Yarran) either in pure stands or with a range of other less abundant trees or tall shrubs* • *A scattered small shrub layer is sometimes present and may include Enchylaena tomentosa (Ruby Saltbush), Eremophila sturtii, Nitraria billardierei (Dillon bush), Rhagodia spinescens (Thorny Saltbush) and/or Maireana pyramidata (Black bluebush).* • *...groundcover is highly variable in structure and composition. It may be sparse or more continuous, depending on the history of disturbance, grazing and rainfall events. It comprises chenopod subshrubs such as Atriplex stipitata, Dissocarpus paradoxus (Cannonball Burr), Maireana spp., Sclerolaena spp. (Copperburrs), Einadia*	Areas of Yarran Shrubland within the study area: • Were severely disturbed and did not have a well-developed canopy *of Acacia melvillei.* In many locations *Acacia melvillei* was re-sprouting or had large isolated individuals in the late stages of senescence. Other small tree species recorded include *Alectryon oleifolius subsp. canescens Casuarina pauper*, and *Myoporum platycarpum*. • Had a small shrub and ground layer that varied from a shrub layer of dense small shrubs with a sparse ground layer to open areas dominated by grasses and *Sclerolaena* species.. After recent rainfall many sites had a dense cover of the grass species including *Austrostipa nitida. Enchylaena tomentosa, Eremophila sturtii*, *Nitraria billardierei, Rhagodia spinescens* and *Maireana pyramidata*. • Had a ground cover that included species such as Atriplex stipitata, Dissocarpus paradoxus, Maireana spp., Sclerolaena spp., *Einadia nutans subsp. nutans* and grasses and forbs including *Austrostipa nitida*, *Crassula colorata* and *Erodium crinitum*.

Selected Key Features listed in the Final Determination	Key Features of Yarran Shrubland
nutans subsp. nutans (Climbing Saltbush) and grasses and forbs including Austrostipa nitida, Crassula colorata, Erodium crinitum (Blue Storksbill), Tetragonia tetragonioides. Triraphis mollis and Zygophyllum ammophilum (Sand Twinleaf).	
5. *Acacia melvillei* Shrubland may be confused with: • *Acacia loderi Shrublands, another ecological community currently listed as Endangered under the Threatened Species Conservation Act 1995. .....but Acacia loderi Shrublands are more common in the northern part of the Riverina and Murray-Darling Depression bioregions and extend further north into several other bioregions* • *...the closely related species Acacia homalophylla. ....To reliably identify the species in the field, the presence of seed pods is required (Kodela 2001).*	• The species *Acacia loderi* was not recorded in the study area. • At time of survey seed pods were present on many *Acacia melvillei* plants. Acacia species within survey sites were confirmed as *Acacia melvillei* using fruits and/or leaf dimensions. Only two individuals of *Acacia homalophylla* were recorded during the surveys.
6. The community includes: *...'Acacia melvillei Woodland' (Map unit 17) of Scott (1992), Porteners (1993) and Porteners et al. (1997); 'Acacia melvillei Yarran tall open-shrubland' (Community 3b) of Westbrooke & Miller (1995); 'Acacia melvillei /Acacia homalophylla woodlands on sandy rises' of Horner et al. (2002); and 'Yarran shrubland of the sandplains and plains of the semi-arid (warm) and arid climate zones' (Veg. Comm. ID 23) of Benson et al. (2006)...*	Areas of Yarran Shrubland within the study area conform to those described by: • Benson et al (2006) ID 23 Yarran shrubland of the sandplains and plains of the semi-arid (warm) and arid climate zones. • Scott (1992): ID 17 *Acacia melvillei* woodland. • Westbrooke and Miller (1995): ID 3b *Acacia melvillei* tall open shrubland. • Porteners et al. (1997): ID 17 *Acacia melvillei* woodland.
6. *Acacia melvillei Shrubland is currently recorded from south-western portion of NSW in the Riverina and Murray-Darling Depression bioregions in the local government areas of Balranald, Carrathool, Central Darling, Conargo, Wakool and Wentworth.*	The study area is located within the Murray-Darling Depression bioregion in the Balranald local government area.
8. *Acacia melvillei Shrubland is generally not found on soils of high suitability for agriculture. However, some stands of the community are threatened by clearing for cropping, particularly in the east of its range (Porteners 1993, Benson et al. 2006).*	Yarran Shrubland within the study area has been extensively cleared. A large area of cropping land may have been the *Acacia melvillei* shrubland prior to clearing.
9. *Most of the remaining stands of Acacia melvillei Shrubland are heavily degraded by overgrazing which has resulted in simplification of community structure, changes in species composition, invasion of weeds and soil erosion (Eldridge and Greene 1994, Eldridge 1998, Benson et al. 2006. Overgrazing by domestic livestock and feral herbivores, including rabbits and goats, has resulted in a scarcity of woody understorey plants and a lack of regeneration of palatable trees and shrubs in the community*	Yarran Shrubland in the study area is represented by degraded stands with little or no canopy layer. Large individual trees of *Acacia melvillei* occur rarely and are in the late stages of senescence. In a few locations small shrubs of *Acacia melvillei* occur but in most locations the species exists as heavily grazed re-sprouting root stock. Rabbits and goats occur in Yarran shrubland in the study area
10. *Fragmentation, grazing and small-scale physical disturbance have resulted in weed invasion... Principal weed species include: Asphodelus fistulosus, Brassica tournefortii, Bromus rubens, Erodium cicutarium, Hordeum spp., Medicago minima, Medicago polymorpha, Sisymbrium erysimoides*	Weeds occur within most remnants of Yarran Shrubland. The following weed species have been recorded in areas of Yarran Shrubland in the study area: *Asphodelus fistulosus, Bromus rubens, Hordeum leporinum, Medicago minima, Medicago polymorpha* and *Sisymbrium erysimoides.*

Appendix K: Comparison of Sandhill Pine Woodland vegetation community to the Sandhill Pine Woodland EEC

The vegetation community Sandhill Pine Woodland was determined to form part of Sandhill Pine Endangered Ecological Community (EEC). The Final Determination for Sandhill Pine Woodland EEC describes the diagnostic features of this community. The floristic features of Sandhill Pine Woodland recorded in the study area are discussed below in relation to selected key features listed in the Final Determination Only features from the Final Determination relevant to the description of this EEC are included in the discussion below.

Selected Key Features listed in the Final Determination	Key Features of Sandhill Pine Woodland
1. Sandhill Pine Woodland…….:	
• *is the name given to the ecological community dominated by Callitris glaucophylla that typically occupies red-brown loamy sands with alkaline sub-soils on the alluvial plain of the Murray River and its tributaries, and on parts of the sandplain in south-western NSW.*	• Sandhill Pine Woodland within the study area occurs on red loamy sands on rises across riverine chenopod plains and has a sparse canopy of *Callitris glaucophylla*.
• *…the community is typically associated with prior streams and aeolian source-bordering dunes, which are scattered within an extensive alluvial clay plain dominated by chenopod shrublands.*	• Sandhill Pine Woodland within the study area is associated with aeolian source-bordering dunes within an extensive alluvial clay plain dominated by chenopod shrublands.
• *…occurs as scattered patches on sandhills and lunettes within an extensive aeolian sandplain dominated by woodlands of mallee eucalypts or belah.*	• To the west of the MCTR study area Sandhill Pine Woodland occurs on sandy rises adjacent to belah and mallee woodlands.
• *…typically comprises an open tree canopy with a sometimes sparse, but highly variable ground layer dominated by grasses and herbs, sometimes with scattered shrubs and/or small trees. The structure and species composition of the community varies depending on disturbance history and temporal variability in rainfall*	• Sandhill Pine Woodland within the study area is highly disturbed, the canopy layer has been depleted by logging and regeneration is prevented by grazing. The canopy layer consists of a sparse layer of *Callitris glaucophylla*. The ground layer is dominate variably by shrubs, grasses and herbs.
2. Sandhill Pine woodland is characterised by an assemblage of species.	The following 11 characteristic species were recorded in those survey sites within Sandhill Pine EEC in the study area: *Austrostipa scabra, Callitris glaucophylla, Dissocarpus paradoxus, Dodonaea viscosa, Enchylaena tomentosa, Geijera parviflora, Maireana pyramidata, Myoporum platycarpum, Sclerolaena obliquicuspis, Boerhavia dominii, Oxalis perennans*
4 Sandhill Pine Woodland is characterised by:	
• *an open tree stratum, which may be reduced to isolated individuals or may be absent as a result of past clearing. The tree layer is dominated by Callitris glaucophylla (White Cypress Pine), either in pure stands or with a range of other less abundant trees or tall shrubs.*	• Sandhill Pine Woodland within the study area has a sparse canopy layer consists layer of *Callitris glaucophylla* with *Myoporum platycarpum* occurring less often.
• *A scattered shrub layer is sometimes present and may include Dodonaea viscosa subsp. angustifolia, Enchylaena tomentosa (Ruby Saltbush), Sclerolaena muricata (Black Rolypoly) and/or Maireana enchylaenoides (bluebush).*	• A shrub layer when present consists *of Maireana pyramidata, Enchylaena tomentosa, Dodonaea viscosa* subsp. *angustisssima* and other *Sclerolaena obliquicuspis.*

Selected Key Features listed in the Final Determination	Key Features of Sandhill Pine Woodland
• *The groundcover is highly variable in structure and composition. It may be sparse or more continuous, depending on the history of disturbance, grazing and rainfall events. It comprises grasses, such as Austrodanthonia caespitosa (Ringed Wallaby Grass), A. setacea (Small-flowered Wallaby Grass), Austrostipa nodosa (a speargrass), A. scabra (Rough Speargrass), Enteropogon acicularis (Curly Windmill Grass), Panicum effusum and Paspalidium constrictum; and forbs including Atriplex semibaccata (Creeping Saltbush), Einadia nutans (Climbing Saltbush), Erodium crinitum (Blue Storksbill), Oxalis perennans, Sida corrugata (Corrugated Sida) and Wahlenbergia spp. (bluebells).*	• The ground cover was highly disturbed in all sites. Grasses present included *Austrostipa scabra, Eragrostis parvifolia* and *Enneapogon avenaceus.* Many forbs were present included *Oxalis perennans, Boerhavia dominii, Salsola kali, Chamaesyce drummondii, Tripogon loliiformis.*
5. Sandhill Pine Woodland may be confused with: • *…. another endangered ecological community listed under the Threatened Species Conservation Act 1995: Allocasuarina luehmannii Woodland in the Riverina and Murray-Darling Depression bioregions…… When tree abundance is assessed at hectare scales, Callitris glaucophylla is the most abundant tree species in Sandhill Pine Woodland, whereas in Allocasuarina luehmannii Woodland, A. luehmannii is the most abundant tree species.*	• *Allocasuarina luehmannii* was not recorded at any survey location within the study area.
6. The community includes: …The community includes: *'Callitris glaucophylla Woodland' (Community 36) and 'Dodonaea viscosa - Callitris preissii Shrubland' (Community 37) of Smith and Smith (1990); 'Mixed Woodland, Callitris Woodland' (a subunit of map units 4 and 11) of Fox (1991); 'Callitris Mixed Woodland' (map unit 16) of Scott (1992), Porteners (1993) and Porteners et al. (1997): 'Prior Stream Remnant Woodland' (Map unit 27) of Porteners (1993); 'Callitris glaucophylla open-woodland' (Community 1c) of Westbrooke and Miller (1995) and Westbrooke et al. (1998), and 'Callitris glaucophylla low open-woodland' (Community 4) of Morcom and Westbrooke (1990); 'Thyridolepis mitchelliana – Themeda australis understorey remnants in open woodland' (Community 2) of Benson et al. (1997); 'Callitris Mixed Woodland' (map units 1,2,3 & 6) of Stafford and Eldridge (2000); Callitris, Yellow Box, Western Grey Box, Needlewood, Buloke (map unit 53) and Callitris Mixed Woodland (map unit 55) of Roberts and Roberts (2001); Source Bordering Sands Woodland (Community 6) of White et al. (2002); Callitris glaucophylla ± Allocasuarina luehmannii ± Alectryon oleifolius Woodland on Sandy Rises (map unit ALP017) of Horner et al. (2002); and 'Pine-Oak Woodlands on Alluvial Dunes and Plains' (map unit ALP017) and 'Pine Woodlands on Dunes of the Murray Floodplain' (Map Unit FLP008) of McNellie et al. (2005).*	The characteristics of the sites allocated to this EEC conform to those described by: • Benson et al (2006) for Community ID 28 White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone (Benson et al. 2006). • Scott (1992): ID 16 Callitris Mixed Woodland. • Westbrooke and Miller (1995): ID 1b Callitris glaucophylla Cypress-Pine Woodland. • Porteners et al. (1997): ID 16 Callitris Mixed Woodland. Survey sites from the study area allocated to this EEC occur within or close to polygons of Callitris Mixed Woodland mapped by Porteners et al. (1997)

Selected Key Features listed in the Final Determination	Key Features of Sandhill Pine Woodland
7. *Sandhill Pine Woodland has been recorded in the far south-western portion of the NSW South Western Slopes bioregion near Urana, extending through the Riverina bioregion, from the Urana – Narrandera district in the east, into the southern part of the Murray-Darling Depression bioregion, as far west as the South Australian border. It is currently known from the Balranald, Berrigan, Carrathool, Central Darling, Conargo, Corowa, Deniliquin, Hay, Murray, Narrandera, Urana, Wakool and Wentworth Local Government Areas, but may occur elsewhere in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions.*	The study area is located in the Murray-Darling Depression bioregion approximately 100 km north west of Balranald.
10. *Most of the stands of Sandhill Pine Woodland that have escaped broad-scale clearing have been maintained as sources of timber, either in state forests or on private land…… As a consequence, many contemporary stands lack large old trees and, where tree recruitment has been limited by grazing, trees in other size classes may have been reduced in density or may have been eliminated altogether.* *……. large senescent trees are the only remaining size class of trees present, as a result of the continual removal of regeneration by grazing animals (Mackenzie and Keith 2007).*	Remnant patches of Sandhill Pine Woodland in the study area have old senescing or dead *Cypress glaucophylla* trees. No evidence of recruitment was seen at any of the survey sites allocated to this community.
11. *Most of the remaining stands of Sandhill Pine Woodland are degraded by overgrazing, which has resulted in simplification of community structure, changes in species composition, invasion of weeds and soil erosion (Stafford and Eldridge 2000)*	Sandhill Pine Woodland in the study area is: • degraded by overgrazing, which has resulted in simplification of community structure, changes in species composition, invasion of weeds and soil erosion; • senescent trees are not being replaced with new individuals and there is a prolonged trend of stand degeneration; • overgrazing has reduced structural complexity, plant species diversity and habitat suitability for vertebrate fauna of the community; and • erosion is evident in the sandy-textured soils of as a result of trampling by hooved animals and burrowing by rabbit.
12. *Fragmentation, grazing and small-scale physical disturbance have resulted in weed invasion throughout the distribution of Sandhill Pine Woodland, which continues to threaten the ecological function of the community.*	Sixteen weed species were recorded in survey sites allocated to this community. Seven are included in the list of principle weeds species in the final determination for this EEC: *Heliotropium europaeum, Medicago polymorpha, Salvia verbenaca, Hordeum leporinum, Citrullus lanatus var. lanatus, Schismus barbatus,* and *Sonchus oleraceus.*

Appendix L: TSC Act significance assessments

Brachyscome papillosa G.L.Davis (Mossgiel Daisy)

Brachyscome papillosa (The Mossgiel Daisy) is listed as vulnerable under Schedule 2 of the *NSW Threatened Species Conservation Act 1995* (NSW Scientific Committee 2011a). *Brachyscome papillosa* is a multi-stemmed, perennial herb that grows to 40 centimetres tall with woolly young shoots. Leaves are stalkless and can be up to 7 cm long; leaf edges vary from being smooth-edged to deeply indent. The flowering stem is 10 - 25 cm long and produces solitary, 6–11 mm diameter flower heads which are mauve with a yellow centre. Flowers appear between June and December (OEH 2011a).

Known records of *Brachyscome papillosa* are confined to south-western NSW, chiefly from Mossgiel to Urana. Known sites are located in the Jerilderie area, the Hay Plain, Willandra Lakes district and north to Ivanhoe. One north-western outlier has been recorded at Byrnedale Station, north of Menindee and one site on South Western Slopes is at Ganmain.

The species has been recorded primarily in clay soils on *Atriplex vesicaria* (Bladder Saltbush) and *Maireana aphylla* plains, but also in grassland and in *Eucalyptus microcarpa* (Grey Box) - *Callitris* spp. (Cypress Pine) woodland. It has been recorded as locally occasional to common in populations.

Brachyscome papillosa was located along the Mineral Concentrate Transport Route (MCTR) (Figure 7). The population occurs anywhere from immediately adjacent to the compact road surface to 250 metres away from the road. In this location it occurs on soft grey to red cracking clays in a shrubland dominated by *Atriplex vessicaria* and *Mariana pyramidata*. The vegetation has an open structure and the soils are prone to erosion and scalding both of which were observed in this location. The population and its habitat cover an area of approximately 142 ha on either side of Magenta Road. Estimates of the population present are > 1000 individuals. Due to the continuity in the connectivity between individuals this population has been determined as representing a local population as defined by the threatened species assessment guide (DECC 2007).

Brachyscome papillosa has been verified by 40 specimens collected from 22 locations in NSW and Victoria and held in Herbaria across Australia (CHAH 2012). In NSW it has been recorded in two conservation reserves, Mungo National Park and the Willandra Lakes Region World Heritage Area. The nearest record is in Mungo National Park, approximately 56 km from Magenta Road.

Table L1: Impact and mitigation measures for *Brachyscome papillosa* (Mossgiel Daisy)

Potential Impacts	Mitigation Measure
Clearing of vegetation	No road widening would be undertaken through the area of habitat where the *Brachyscome papillosa* was found.
Introduction of exotic flora (weeds) Increasing traffic movements as a result of the development of the Atlas-Campaspe Mine would increase the risk of introduction of invasive weeds. It should be noted, however, that the known habitat in the study area is bisected by an existing road, is subject to grazing, and currently contains some weeds.	Weed management and monitoring would be undertaken as part of the Project.
Dust	The section of road in the location of the *Brachyscome papillosa* population would be sealed. Sealing would be undertaken as soon as practicable to minimise dust from extra vehicle movements. Loads would be covered.

Potential Impacts	Mitigation Measure
Pollutants (risk of oil, hydraulics, spills from road transport entering the habitat)	Stockpiles and machinery associated with road-sealing for the roadworks would be stored outside of the location of the *Brachyscome papillosa* population and habitat. If a spill did occur in the location of the *Brachyscome papillosa* population it would be reported immediately and spill containment procedures implemented.
Alteration to hydrology. Some evidence of erosion as a result of run-off from the road surface was observed. There is potential for increases in flow rates of runoff and channelling to occur as a result of sealed surface, and changes to roadside soil chemistry as a result of sealing.	Road would not be raised or lowered in this location. However there may be some impacts on habitat that occurs adjacent to the road, with impacts likely to decrease with distance from road.
Off-road incursions by passing vehicles as a result of narrower roadway	Signage would be erected to encourage drivers to reduce speed and to remain on the sealed surface.

The following assessment of significance is based on the understanding that the list of impact mitigation measures described above (Table L1) would be implemented.

(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

The *Brachyscome papillosa* population is located both side of a 1.5 km section of the MCTR and covers an area of approximately 142 ha. Well over 1000 individuals of the *Brachyscome papillosa* were estimated to occur at the time of survey. This population is likely to be the largest yet recorded for this species.

To minimise the impact of the Project to the *Brachyscome papillosa* the road would not be widened and the surface of the road would be sealed along the section in the vicinity of the *Brachyscome papillosa* population and habitat. These measures would dramatically reduce the impact from road work disturbance and dust build-up on the *Brachyscome papillosa* population. There may potentially be some impact from the sealing of the road surface as some preparatory activities would be required and this may result in dust generation.

It was noted during the survey that there were some individual plants growing on compacted ground adjacent to the current road surface. In the past, road grading along the existing road would have impacted on any individuals occurring in a similar location close to the road surface. Occurrences of this species in these areas are unusual and most likely a result of re-colonisation following these routine maintenance activities. It is possible that some individual plants growing on compacted ground adjacent to the current road surface would be removed if they happen to occur along the existing road surface.

It is unlikely that this population of *Brachyscome papillosa* would be placed at risk of extinction by the Project considering the measures which would be taken to avoid and minimise impacts on the population.

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the lifecycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

Not applicable

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

Not applicable

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Not applicable

(d) in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

It is intended that there would be no removal or modification to the habitat of *Brachyscome papillosa.* It was noted that during the survey there were some individual plants growing on compacted ground adjacent to the current road surface. It is possible that some individuals would be removed if they happen to occur along the existing road surface.

Dust generation would be prevented by sealing the surface of the road which passes through the habitat of *Brachyscome papillosa*.

There is potential for indirect impacts overtime from alterations to hydrology and the possible introduction of new exotic species. Attention to the batter of roadway to reduce flow rate of surface runoff would help to reduce potential indirect impacts of changes to hydrology. Washing down of construction machinery and mineral transport vehicles and load cover would reduce the potential for new weed species to be introduced.

Providing the road is sealed to reduce dust and there is no indirect impact on the population from changes to hydrology or introduction of weeds habitat for *Brachyscome papillosa* is not expected to be significantly impacted by the Project.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

The habitat of *Brachyscome papillosa* in the study area is dissected by an already existing road (Magenta Road). As described in Table L1 above this section of road would not be widened and no other activities associated with the Project are expected to result in further fragmentation or isolation of the habitat.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality

It is intended that there would be no removal or modification to the habitat of *Brachyscome papillosa.* In the location of the population the road would not be widened and the surface would be sealed. Some disturbance would result from preparatory activities that would be required for the sealing of the surface and this may result in dust. Dust deposits should decrease to below the levels experienced prior to the sealing of the surface once sealing is completed.

Any disturbance resulting from preparatory activities for the sealing of the surface is not expected to impact on the long term survival of *Brachyscome papillosa* in this location.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

Not applicable.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

No recovery plan or threat abatement plans have been established for this species.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Clearing of native vegetation is a key threatening processes of relevance to the *Brachyscome papillosa* habitat. However there is no intention to clear vegetation along the section of road which passes through this habitat. Although there may by some impact to the vegetation immediately adjacent to the road observance of the mitigation measure listed in Table L1 would minimise impacts. The action does not constitute any other key threatening processes.

Conclusion

It is unlikely that the Project would impact significantly on the *Brachyscome papillosa* population or its habitat considering the measures which would be taken to avoid and minimise impacts on the population. Crucial to the outcome of this assessment are the efforts made to minimise disturbance by not undertaking road widening and the suppression of dust by sealing the section of Magenta Road which passes through the habitat. Sealing should be undertaken as soon as practicable so that dust from extra vehicle movements related to all aspects of the construction of the Project as well as the transportation of mineral sands do not result in damage to the habitat.

Lepidium monoplocoides F.Muell. (Winged Peppercress)

Lepidium monoplocoides (Winged Peppercress) is listed as Endangered under the NSW *Threatened Species Conservation Act 1995*. *Lepidium monoplocoides* is an erect annual herb which grows to 15-20 cm high. Leaves are narrow-linear, mostly 2-7 cm long, pinnatisect to entire and arranged along and at the base of stems. The inflorescence is an elongating raceme with tiny green-brown flowers to 2 mm wide, with sepals 1 mm long and petals inconspicuous or absent. Fruits are broadly ovate to circular, 5 mm long and 4 mm wide, and borne on flattened pedicels to 3 mm long. The apex of the fruit is pointed, with a small notch and two smooth wings that are divided into halves that surround the entire fruiting body. Flowering occurs in the spring and summer (Entwisle 1996).

The pollination vector's for *Lepidium monoplocoides* are unknown, however, research in North America (Robertson and Klemash 2003) on a species with similar habit, *Lepidium papilliferum* has found that insects from at least nine different families such as bees, wasps, flies, beetles and ants are the main pollinator of this particular species in North America. This is important as the movement of genetic material between populations depends not only on a seed dispersal mechanism but also on the ability of insects to move pollen from population to population.

Lepidium monoplocoides is widely distributed on the inland plains of south-eastern Australia, occurring from northern NSW to western Victoria, with an old record from south-eastern South Australia (Mavromihalis 2010). Mavromihalis (2010) reports that in 2010 *Lepidium monoplocoides* was known from 13 locations, six in Victoria and seven in NSW. In NSW, the species is known from several locations on the Hay Plain, including the Booberoi regeneration area/railway siding, Urana Nature Reserve, along the Cobb Highway south of Ivanhoe, Lake Cargelligo, Micabil and the Morundah property owned by the Department of Defence. Since the preparation of the recovery plan, *Lepidium monoplocoides* has been found in a further three separate localities in NSW, at Pilliga National Park (Bell et al. 2012), near Gunnedah (Whitehaven Coal Pty Ltd 2012) and in the locality of the Project by AMBS.

Lepidium monoplocoides occurs in open, sparsely vegetated sites in a range of habitats on heavy clay or clay-loam soils, usually on sites that are seasonally flooded or prone to waterlogging, in arid to semi-arid areas with an average rainfall range of 200–450 mm per year. Vegetation communities in which the species occurs include grasslands, wetlands and floodplain woodlands dominated by Coolibah (*Eucalyptus coolabah*) and Black Box (*Eucalyptus largiflorens*), and chenopod shrublands dominated by *Atriplex* spp., *Maireana* spp. and/or *Nitraria* spp.

Lepidium monoplocoides is more readily observable following significant rainfall, and virtually disappears in dry years, when only a small proportion of the total population may be visible above ground at any one time (Mavromihalis 2010). Like many annual species occurring in dry environments, some seed probably remains dormant in the soil for several years. The magnitude of the soil seed store is also unknown, but is likely to be large. During extended wet periods, the species can behave like a short-lived perennial plant (Scarlet 2000).

Lepidium monoplocoides has apparently suffered a widespread decline in both range and abundance since European settlement (Mavromihalis 2010). Wide-scale clearing of grassland and grassy woodland habitats across the inland plains of Victoria and NSW is probably the major cause of the decline of the *Lepidium monoplocoides*. Changes to hydrological cycles, through both drainage of shallow freshwater marshes and prolonged flooding of sites through irrigation, have also contributed to the decline (Mavromihalis 2010).

Lepidium monoplocoides was recorded at six locations within and in the vicinity of the Atlas-Campaspe Mine (Figure 7). The number of individual plants recorded at each location ranged from one to approximately 188 plants (Table L2). A further six locations for this species were identified in October 2012 (FloraSearch 2012). The identification of these records has not been confirmed by the NSW Herbarium (Figure 7). No estimates of population size were undertaken.

Table L 2. Number of Individual *Lepidium monoplocoides* Plants Recorded

Site Number (refer to Figure 7)	Approximate Number of Individual Plants Recorded*	Location	Vegetation Community
1	1	Campaspe footprint	Belah-Rosewood Woodland
2	1	Atlas footprint	Belah-Rosewood Woodland
3	104	Surrounds	Black Box Woodland
4	4	Proposed offset area	Black Box Woodland
5	188	Proposed offset area	Black Box Woodland
6	3	Proposed offset area	Grass/Herbland of Drainage Depressions
Total	301	-	

* The number of plants indicated is the number of plants counted in a 100 m x 20 m plot and represents the individuals present above ground at the time of the surveys (i.e. does not include individuals that may be present in the seed bank). The population of above ground plants in Sites 3, 4, 5 and 6 extended beyond the plot and the overall number of above ground plants was greater than that shown here, particularly at Sites 3 and 5.

The following assessment has been undertaken based on those locations where the identification of *Lepidium monoplocoides* has been confirmed by the NSW Herbarium. Future confirmation of specimens from additional locations (FloraSearch 2012) would increase the number of locations to be protected in the proposed offset area and this would reduce the risk that the Project would have a significant effect on populations of *Lepidium monoplocoides*.

(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

Two *Lepidium monoplocoides* plants were found in the Project area at two different locations (one in the Campaspe footprint (Site 1) and one in the Atlas footprint (Site 2). No additional plants were found at each locality despite targeted searches. These individuals may be isolated occurrences or indicative of a larger group of individuals present in the seed bank. Populations of *Lepidium monoplocoides* fluctuate markedly in size in response to drying and wetting cycles, and the inconspicuous nature of the plant makes it difficult to obtain an accurate total population size for the species (Mavromihalis 2010).

One plant was found in the Campaspe footprint (Site 1) in an isolated stand of Belah-Rosewood Woodland (1 ha) surrounded by cleared land previously used for cropping. A second plant was found in the Atlas footprint (Site 2) in a gilgai depression within Belah-Rosewood Woodland which had been disturbed by livestock and goats (37 ha). The habitats at both occurrences were threatened by existing agricultural land use practises (grazing and clearing).

Four other occurrences of this species were recorded outside of the Project area. In these locations *Lepidium monoplocoides* was found in Black Box Woodland and in Grass/Herbland of Drainage Depressions (Figure 7). The populations in the surrounding area had higher numbers of extant individuals but were also prone to disturbance by livestock and goats. The higher number of extant individuals in these locations could be a product of the local conditions.

The distance from Sites 1 and 2 in the Project area to Sites 3 ,4, 5 and 6 in the surrounds varies from approximately 1.5 to 12 km. Due to the inconspicuous nature of the plants, there may be additional records of the species between and beyond locations where it was found.

Lepidium monoplocoides is an annual species completing its reproductive cycle in a period of 12 months or less. The species responds to rain and could also be considered to be ephemeral appearing more commonly but not exclusively after significant rainfall events (Mavromihalis 2010).

The genus *Lepidium* L. is one of the larger genera of the Brassicaceae family consisting of 230 species distributed worldwide (Stevens 2001). Although little is known of the specific pollination and seed dispersal of the *Lepidium monoplocoides* (Mavromihalis 2010), inferences can be made based on a review of literature relating to other *Lepidium* species and consideration of the known biology (e.g. seed and plant structure) and distribution patterns of *Lepidium monoplocoides*.

It is likely that *Lepidium monoplocoides* is pollinated by insects (Robertson and Klemash 2003). Members of the genus (*Lepidium* L.) have similar flower structure and have not been recorded as having a specific obligate pollinator. The types of insects that may pollinate *Lepidium* species include insects that area capable of directional flight and travelling across distances for pollen (e.g. bees and beetles) as well as insects which travel much shorter distances (e.g. ants) (Robertson and Klemash 2003). There are no obvious physical barriers to insect movement in the locality.

The fruit of *Lepidium monoplocoides* is small (5 mm by 4 mm) and dehiscent with a winged structure which probably aids in dispersal by wind or water. Each fruit contains many seeds which have a mucilaginous coating that becomes sticky in water enabling the seed to float and to adhere to dispersal vectors such as birds and the feet of other animals. Seeds of *Lepidium africanum* have been recorded in the dung of African animals (Milton and Dean 2001).

Based on known information about the lifecycle of other *Lepidium* species the six local *Lepidium monoplocoides* occurrences could be considered to be part of the one population in which case the loss of the species at two sites within the Project area is not likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species would be placed at risk of extinction.

Lepidium monoplocoides located at Sites 4, 5 and 6 would be protected in the offset area for the Project (at least 195 individuals). A total of 100 ha of known or potential habitat and an unidentified area of unmapped habitat would be conserved and improved in the proposed offset area. In addition, the implementation of the proposed offset area management practices are expected to improve the habitat for *Lepidium monoplocoides* and removal of grazing by livestock and goats and the control of rabbits could result in an increase in population numbers.

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the lifecycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

Not applicable.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

Not applicable.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Not applicable.

(d) in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

Lepidium monoplocoides was located in three habitat types, Belah-Rosewood Woodland, Black Box Woodland and Grass/Herblands of Drainage Depressions. In Belah-Rosewood Woodland *Lepidium monoplocoides* was associated with gilgai which often occur in this community as small depressions sometimes only 3 m across. Such small depressions are difficult to map and so potential habitat for this species can occur within the map unit for Belah-Rosewood Woodland. As four of the six *Lepidium monoplocoides* records occurred in the Black Box Woodland and larger areas of Grass/Herblands of Drainage Depressions it seems that this vegetation is its preferred habitat. Approximately 50 ha of Black Box Woodland is located in the Atlas-Campaspe Mine footprint. No areas of Grass/Herblands of Drainage Depressions were large enough to be mapped in the Atlas-Campaspe Mine footprint.

Approximately 38 ha of known habitat for *Lepidium monoplocoides* within the Atlas-Campaspe Mine footprint would be removed or impacted. It is probable that the species occurs as seed in other locations within the Atlas-Campaspe Mine footprint but the cryptic habit of the species means that its detection is not always possible.

Habitat for this species also occurs in the surrounds of the Atlas-Campaspe Mine footprint. Approximately 147 ha of mapped known or potential habitat (Black Box Woodland, Grass/Herblands of Drainage Depressions) occurs in the area outside of the Project area and 90 ha (30 ha of which is known habitat) would be included within the proposed offset area (Appendix A).

The Project would remove a proportion of available habitat which is smaller than that which occurs outside of the disturbance area and in the proposed offset area.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

The distribution of *Lepidium monoplocoides* within the Atlas-Campaspe Mine footprint and surrounds is governed by the distribution of Black Box Woodland, Grass/Herblands of Drainage Depressions and stands of Belah-Rosewood Woodland that have gilgai. All of these vegetation communities occur as smaller isolated patches within the landscape of semi-arid woodland.

The Project would, at its widest point, impact on a strip of vegetation approximately 2 km wide. Not all vegetation would be cleared within the Atlas-Campaspe Mine footprint but there is likely to be disruption to the connectivity between potential habitat. Progressive clearing and rehabilitation that would return vegetation to the cleared areas would restore connectivity between remnant vegetation and the vegetation of the surrounding area including the proposed offset area.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality

One plant was found in the Campaspe footprint (Site 1) in an isolated stand of Belah-Rosewood Woodland (1 ha) surrounded by cleared land previously used for cropping. Continuation of cropping practices and associated grazing in this location would most likely result in the eventual loss of this occurrence. A second plant was found in the Atlas footprint (Site 2) in gilgai depressions within Belah-Rosewood Woodland which had been disturbed by livestock and goats (37 ha).

Four other occurrences where recorded in the locality outside of the Atlas-Campaspe Mine footprint in 30 ha of habitat (Figure 7). An additional 60 ha of potential habitat (Black Box Woodland, Grass/Herblands of Drainage Depressions) was mapped in the surrounds of the Atlas-Campaspe Mine footprint (Appendix A).

Given that *Lepidium monoplocoides* has been found in four other locations in the locality in approximately 90 ha of known or potential habitat it is not expected that the area of habitat to be removed by the Project would impact on the long-term survival of this species.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

Not applicable.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

A national recovery plan has been prepared for *Lepidium monoplocoides.* Within the duration of this Recovery Plan, a set of specific objectives for the recovery of *Lepidium monoplocoides* have been described (Mavromihalis 2010).

- Determine distribution, abundance and population structure.
- Determine habitat requirements.
- Manage threats to populations.
- Identify key biological functions.
- Determine growth rates and viability of populations.
- Establish a seed bank.
- Build community support for conservation.

While the Project would remove approximately 38 ha of known habitat, substantial potential habitat exists in the surrounding area. In addition, post-mining landforms would be rehabilitated and revegetated and 90 ha of known or potential habitat would be conserved and improved in the proposed offset area. The management plan for the proposed offset area would address the following management practices required to conserve *Lepidium monoplocoides* (Mavromihalis 2010):

- Fencing and signposting to protect and prevent inadvertent damage.
- Weed control.
- Removal of grazing pressure, both from livestock and other herbivores.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

'Clearing of native vegetation' is listed as a Key Threatening Process in NSW under the TSC Act. The Project would result in the clearing of 38 ha of known habitat, a further 50 ha of potential habitat and an unidentified area of unmapped habitat.

The impact of two other key threatening processes are likely to increase as a result of the Project: ‘Competition and habitat damage by feral goats (*Capra hircus*)’ and ‘Competition and grazing feral European rabbit (*Oryctolagus cuniculus)’.* Whilst it is acknowledged that rabbits and goats are already present in the known areas of habitat for the species, there is some potential for the Project to aggravate or augment these threatening processes in remaining potential habitat within the Atlas-Campaspe footprint through an increase in water resources, shelter material for warrens (rabbits only) and foraging resources.

That is, the Project is likely to provide permanent sources of standing water, large tracts of open grassland foraging resources during the early stages of rehabilitation and increased rabbit shelter through the stockpiling of removed soil and cleared trees during the construction stages. Management and monitoring of feral herbivores would be implemented to control of rabbit and remove goats in the Project and proposed offset areas to mitigate these potential key threatening processes.

Conclusion

If the 'local population' as defined under the TSC Act is considered to be represented by the six occurrences of the *Lepidium monoplocoides* then the available information on other *Lepidium* species would suggest that the Project is not likely to have a significant impact on a population such that it is placed at risk of extinction. If it is assumed that each single plant found in the Project area represents a viable 'local population' (and not an isolated occurrence) then land clearance by the Project would have a significant impact on two local populations of the *Lepidium monoplocoides*.

Sites 4, 5 and 6, where larger numbers of the species were recorded, would be protected in the proposed offset area, and a total of 90 ha of known or potential habitat and an unidentified area of unmapped habitat would be maintained and improved in the proposed offset area. In addition, a further occurrence at Site 3 has been located in the surrounds of the Project.

Pterostylis cobarensis M.A.Clem (Cobar Greenhood Orchid)

Pterostylis cobarensis (Cobar Greenhood Orchid) is listed as Vulnerable under the NSW *Threatened Species Conservation Act 1995.* The species is a terrestrial orchid with 7–11 narrow-elliptic leaves which form a basal rosette, each 1.5–2.5 cm long and 5–8 mm wide (SEWPaC 2012). Three to eight flowers grow on stems up to 40 cm high, with 3–5 closely sheathing stem leaves. Flowers are transparent with brown and green markings, each flower about 1.2 cm long. Flowering occurs from September to November (OEH 2011a).

Pterostylis cobarensis is pollinated by the males of small gnats which are attracted to the flower by a pseudo sexual perfume. The type of gnat and its ability to move over distances is not known.

Pterostylis cobarensis is known mainly from the far western plains of NSW in the districts surrounding Nyngan, Cobar and Bourke. It has also been located in the Darling Downs district of Queensland and the eastern part of South Australia (SEWPaC 2012a). Recorded localities in NSW include Narrabri, Nyngan, Cobar, Nymagee, Mt Gundabooka, Mt Grenfell, and Mutawintji National Park. Cobar Greenhood Orchid occurs within the Central West, Namoi and Western (NSW) Border Rivers Maranoa–Balonne, Condamine (Queensland), and South Australia Arid Lands Natural Resource Management Regions. *Pterostylis cobarensis* has been verified by 22 specimens collected from 15 locations in NSW, Queensland and Victoria and held in Herbaria across Australia (CHAH 2012). In NSW, this species has been recorded in two conservation reserves, Gundabooka National Park and the Mutawintji National Park. The closest record is at Mootawingee, 165 km north-west of the Project.

The species inhabits eucalypt woodland, open mallee, or *Callitris* shrubland on low stony ridges and slopes with skeletal sandy-loam soils. Associated species include Grey Mallee (*Eucalyptus morrisii*), Green Mallee (*Eucalyptus viridis*), Gum Coolibah (*Eucalyptus intertexta*), *Eucalyptus vicina*, White Cypress Pine (*Callitris glaucophylla*), Wilga (*Geijera parviflora*), Belah (*Casuarina cristata*), Currawang (*Acacia doratoxylon*), *Senna* spp., and *Eremophila* spp. (OEH 2012c).

Pterostylis cobarensis only occurs above ground during spring and early summer. Plants are deciduous and die back to form large, underground tubers after seed release. Some species may form more than one daughter tuber annually. New rosettes are produced following soaking autumn and winter rains. *Pterostylis cobarensis* is pollinated by the males of small gnats which are attracted to the flower by some pseudosexual perfume. There is no information on the size of individual populations, however, some populations have been described as abundant to occasional (OEH 2012c). The orchid is dependent on specific soil mycorrhizal fungus to provide germinating seed with nutrition until the young orchid grows leaves and roots large enough to support the orchid. Without this fungus, there is no possibility of the seed developing.

Orchid specimens were collected during targeted searches for threatened flora in the mining leases during ideal survey timing (November) in 2011. At the time, the specimens could not be identified and they were submitted to the NSW Herbarium for identification. The specimens were subsequently identified as *Pterostylis cobarensis* in May 2012. The samples were taken from an area that is well outside the previously reported range for this species so the identification was unexpected. Surveys for this species undertaken in October 2012 found three more occurrences, two within the Atlas footprint and one 25 m to the east in the proposed offset area (FloraSearch, 2012).

There are three occurrences of the species (Sites 1, 2, and 3) which would be removed or impacted by the Project (Figure 18) and a fourth (Site 4) which Cristal Mining commit to avoid. A fifth occurrence (Site 5) is located within the proposed offset area and a minimum 25 m distance between surface mining activities and these two locations would be maintained. Approximately 1,575 ha of known or potential habitat for the species (mallee woodland) would be removed. The maximum distance between the locations of known populations is approximately 2.5 km, between Site 1 and Sites 2, 3, 4 and 5.

Approximately 0.2 to 0.7 kms separate Sites 2, 3, 4 and 5. Based on current knowledge of the reproductive biology of this species and the distance between Site 1 and Sites 2, 3, 4 and 5, Site 1 consisting of one individual is considered to represent a separate population (Population 1) and Sites 2, 3, 4 and 5 consisting of 17 individuals to represent Population 2 (as defined by the NSW TSC Act). These records of the *Pterostylis cobarensis* from the study area are the first for the region. The nearest record outside the locality is approximately 165 km north-west of the study area.

A portion of population 2 of *Pterostylis cobarensis* (11 individuals at Site 5) is located within the proposed offset area but it is within 25 m of the disturbance relating the development activities in the Atlas footprint. A number of measures are described in Table L3 to avoid impacts on this occurrence.

Table L3: Impact and mitigation measures for *Pterostylis cobarensis* (Cobar Greenhood Orchid)

Potential Impacts	Mitigation Measure
Clearing of vegetation	Fencing to be erected to prevent incursions into the population of *Pterostylis cobarensis* and its habitat that occurs at Site 4 and Site 5 in the proposed offset area, adjacent to the Atlas footprint. Pre clearance surveys to locate other populations of *Pterostylis cobarensis* and incorporation of the species into revegetation trials, when practicable.
Introduction of exotic flora (weeds)	Weed management and monitoring would be undertaken in the location of the *Pterostylis cobarensis* population to prevent invasion.
Dust	Dust would be suppressed.
Off-road incursions by vehicles	Signage would be erected to prevent off road incursions into the known habitat.
Protection from grazing by goats and rabbits	Fencing to be erected to protect the remaining known population of this species from grazing by goats and rabbits.

Pre-clearance surveys would be undertaken to locate other populations that may occur in potential habitat areas. This species has been cultivated from collected bulbs and as such, there is some potential that incorporation of the species into revegetation trials and selective placement of top soil would be successful.

(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

Seven individual *Pterostylis cobarensis* plants at four locations (Sites 1, 2, 3, and 4) were recorded within the Atlas footprint. Three individuals, one at each of three of these locations (Site 1, 2 and 3) would be removed by the land clearance required for the Project (Figure 18). The design of the Atlas stockpiles would avoid direct impacts on the fourth location (Site 4) of *Pterostylis cobarensis,* comprising of 4 plants. The fifth location (Site 5) comprising 11 individuals is located within the proposed offset area outside of the Atlas footprint. A portion of the 25 m-radius zone around this location occurs within the approximate extent of proposed surface development. The mine plan would avoid this zone.

In addition, a number of measures (such as fencing labelled with signage) are described to avoid impacts on this occurrence. This occurrence (Site 5) is likely to be part of a population represented by Sites 2, 3 and 4 (Population 2 = 17 individuals). Site 1is located 2.5 km to the south of Sites 2, 3, 4 and 5 which are separated by 0.2 to 0.9 km. Based on our current knowledge of the occurrence of this species in the area and given the distance between Site 1 and the other four known sites, and the small size of the pollination vector of this species, Site 1 may represent a separate population (Population 1 = one individual) considering the definition of local population as defined by the NSW Assessment of Significance Guidelines (DECC 2007).

It is likely that the Project would result in an adverse effect on the lifecycle of the species by removing one individual representing Population 1 and reducing the size of Population 2 (e.g. by removing 3 out of 17 known individuals). However, extensive areas of mallee woodland, which may be potential habitat for *Pterostylis cobarensis,* exists in the offset area (12,765 ha).

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the lifecycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

Not applicable.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

Not applicable.

(iii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Not applicable.

(d) in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

Approximately 1,575 ha of known or potential habitat for the species in the form of mallee woodland would be removed. However, extensive areas of mallee woodland exists in the offset area (12,765 ha).

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

Seven individual *Pterostylis cobarensis* plants (Sites 1, 2, 3 and 4) were recorded within the Atlas footprint (Figure 18). Significant areas of connected potential habitat (mallee woodland) occur in the surrounds of the Project area and 11 individuals were recorded at one location (Site 5) within the proposed offset area. The mine planwould avoid direct impacts on the individuals at Site 4.
Removal of habitat may result in the fragmentation of the species in the area if there are undetected occurrences south of the Atlas footprint. Notwithstanding, significant areas of potential habitat occur to the north of this occurrence in the proposed offset area. Also, the fragmentation may be reduced by rehabilitation of the post-mine landform.

Site 4 (comprising 4 individuals) would be temporarily isolated, with the level of isolation potentially reduced over time through rehabilitation of the post-mine landform

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality

The species is likely to persist in the locality at Site 5 (comprising 11 individuals) within the proposed offset area and may persist at Site 4 (comprising 4 individuals) if measures to minimise and mitigate indirect impacts are effective. The design of the stockpiles would avoid direct impacts on Site 4 and provide a 25 m distance between the location the plants were recorded and any surface mining activity. In addition, a number of measures (such as fencing labelled with signage) are described to avoid direct impacts on this occurrence (Table L3).

Extensive areas of mallee woodland, potential habitat for *Pterostylis cobarensis,* exists in the offset area (12,765 ha). It is possible that the species is more widespread given the connectivity of potential habitat and lack of targeted surveys for the species in the potential habitat.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

Not applicable.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

No recovery or threat abatement plan exists for *Pterostylis cobarensis.*

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

'Clearing of native vegetation' is listed as a Key Threatening Process in NSW under the TSC Act. The Project would result in the clearing 1,575 ha of mallee woodland which is known or potential habitat for *Pterostylis cobarensis.* Approximately 12,765 ha of potential habitat would be protected and improved in the proposed offset area.

Two other key threatening processes that have the potential to increase as a result of the Project are 'Competition and habitat damage by feral goats (*Capra hircus*)' and 'Competition and grazing feral European rabbit (*Oryctolagus cuniculus)'.* Rabbits and goats are already present in the known areas of habitat for this species. There is some potential for the Project to aggravate or augment these threatening processes in remaining potential habitat within the Project area through an increase in water resources, shelter material for warrens (rabbits only) and foraging resources. That is, the Project is likely to provide permanent sources of standing water, large tracts of open grassland foraging resources during the early stages of rehabilitation and increased rabbit shelter through the stockpiling of removed soil and cleared trees during the construction stages. Accordingly, management and monitoring of feral herbivores would be implemented to control of rabbit and remove goats in the Project and offset areas to mitigate these potential key threatening processes.

Conclusion

Three of the five known occurrences of the *Pterostylis cobarensis* would be removed by the land clearance required for the Project (Figure 18). Based on current knowledge of the extent of this species in the area, the Project would have a significant impact on the known population of *Pterostylis cobarensis*.

The mine plan would avoid direct impacts at Site 4 (comprising of 4 plants) and Site 5 (comprising of 11 individuals) is located within the proposed offset area. A minimum 25 m distance would be maintained between surface mining activity and these two locations. In addition, a number of measures (such as fencing labelled with signage) are described to avoid impacts on this occurrence. These measures are described in Table L3 to avoid impacts on this occurrence.

Extensive areas of mallee woodland, potential habitat for *Pterostylis cobarensis,* exists in the offset area (12,765 ha). It is possible that the species is more widespread given the connectivity of potential habitat and lack of targeted surveys for the species in the potential habitat.

Acacia melvillei Shrubland in the Riverina and Murray Darling Depression Bioregions

Acacia melvillei Shrubland is listed as an Endangered Ecological Community (EEC) under the NSW *Threatened Species Conservation Act 1995*. The community typically has an open canopy of shrubs or small trees, sometimes with scattered mid-stratum shrubs (which may be reduced to isolated individuals or may be absent as a result of past clearing) and a sometimes sparse, but highly variable ground layer dominated by grasses, chenopods and herbs. The shrub/tree layer is dominated by *Acacia melvillei* (Yarran), either in pure stands or with a range of other less abundant trees or tall shrubs. These may include *Acacia loderi* (Nelia), *Alectryon oleifolius* subsp. *canescens* (Rosewood), *Casuarina pauper* (Belah) and/or *Myoporum platycarpum* (Sugarwood). A scattered small shrub layer is sometimes present and may include *Enchylaena tomentosa* (Ruby Saltbush), *Eremophila sturtii*, *Nitraria billardierei* (Dillon bush), *Rhagodia spinescens* (Spiny Saltbush) and/or *Maireana pyramidata* (Black Bluebush). The groundcover is highly variable in structure and composition. It may be sparse or more continuous, depending on the history of disturbance, grazing and rainfall events. It comprises chenopod subshrubs such as *Atriplex stipitata*, *Dissocarpus paradoxus* (Cannonball Burr), *Maireana* spp., *Sclerolaena* spp. (Copperburrs), *Einadia nutans* subsp. *nutans* (Climbing Saltbush) and grasses and forbs including *Austrostipa nitida*, *Crassula colorata*, *Erodium crinitum* (Blue Storksbill), *Tetragonia tetragonioides*, *Triraphis mollis* and *Zygophyllum ammophilum* (Sand Twinleaf). The structure of the community varies depending on past and current disturbances, particularly clearing, logging, grazing and soil erosion and on the timing and magnitude of recent rainfall invasion (NSW Scientific Committee 2008).

Acacia melvillei Shrubland EEC is scattered over a relatively large distribution, with an estimated extent of occurrence in the order of 50,000km2. The community is currently recorded from south-western portion of NSW in the Riverina and Murray-Darling Depression bioregions in the local government areas of Balranald, Carrathool, Central Darling, Conargo, Wakool and Wentworth. The community may occur elsewhere in the Riverina and Murray-Darling Depression bioregions. Throughout this distribution, *Acacia melvillei* Shrubland EEC occurs in relatively small patches. Based on available mapping and site records, *Acacia melvillei* Shrubland EEC is estimated to occupy an area of about 800 km2 (NSW Scientific Committee 2008).

Most remaining stands of *Acacia melvillei* Shrubland EEC have been moderately to heavily disturbed and degraded by overgrazing and fragmentation, and subsequent weed invasion (NSW Scientific Committee 2008). Excessive grazing has resulted in simplification of community structure, changes in species composition, invasion of weeds and soil erosion (Eldridge and Greene 1994, Eldridge 1998, Benson *et al*. 2006). Overgrazing by domestic livestock and feral herbivores (e.g. rabbits and goats) has resulted in a scarcity of woody understorey plants and a lack of regeneration of palatable trees and shrubs in the community (Batty and Parsons 1992, Porteners 2001, Benson *et al*. 2006, Enke 2007). Consequently senescent trees are not replaced with new individuals and there is a prolonged trend of stand degeneration, which is difficult to reverse, even under active conservation management (Dayman 2007, Enke 2007). Overgrazing also reduces structural complexity, plant species diversity and habitat suitability for vertebrate fauna of the community. The processes associated with overgrazing have resulted in a large reduction in the ecological function of the community. Fragmentation, grazing and small-scale physical disturbance have resulted in weed invasion throughout the distribution of *Acacia melvillei* Shrubland EEC, which continues to threaten the ecological function of the community (NSW Scientific Committee 2008).

Acacia melvillei Shrubland EEC is conserved in Mungo and Willandra National Parks, and Kajuligah and Yanga Nature Reserves (Westbrooke and Miller 1995; Porteners 2001, Benson *et al*. 2006). However, some of these reserves contain only a few hectares of the community, and all exhibit signs of degradation associated with past land uses and the continuing impacts of feral herbivores (NSW Scientific Community 2008).

Acacia melvillei Shrubland EEC is represented in the study area by the Yarran Shrubland map unit (Figure 8). The community is in poor condition and in most cases occurs as areas that have been heavily degraded by overgrazing, have a simplified community structure and are suffering from invasion by weeds and soil erosion. Overgrazing by domestic livestock and feral herbivores, including rabbits and goats, has resulted in the loss of woody understorey plants and of regenerating of *Acacia* trees and other shrubs. Senescent *Acacia melvillei* trees are not being replaced with new individuals and stand of this community have undergone a prolonged period of degeneration.

Local occurrence is defined by the threatened species assessment guide (DECC 2007) as the extent of the ecological community that occurs within the study area. However the local occurrence may include adjacent areas if the ecological community in the study area forms part of a larger contiguous area of that ecological community and the movement of individuals and exchange of genetic material across the boundary of the study area can be clearly demonstrated (DECC 2007). Although it is not possible to clearly demonstrate exchange of genetic material between the mapped stands of *Acacia melvillei* Shrubland EEC it has been shown that seed from species similar to those associated with *Acacia melvillei* Shrubland EEC can be moved across large distances by Emu and Kangaroo (Davies, 1978; Calvino-Cancela et al. 2008; He et al. 2008). Therefore although the areas of *Acacia melvillei* Shrubland EEC mapped in the study areas are in discontinuous patches in relation to the following seven part test the local occurrence is defined as those areas located during surveys of the study area (Figure 7). Other potential occurrences of *Acacia melvillei* have been observed within the greater area but these have not been surveyed or mapped and therefore have not been included in the definition of local occurrence for this assessment. Table L4 summarises the potential impacts and mitigation measures of the Project.

Table L 4: Impact and mitigation measures for *Acacia melvillei* shrubland EEC

Potential Impacts	Mitigation Measure
Clearing of vegetation	Protection of stands not removed within Atlas-Campaspe Mine footprint and surrounds from further disturbance and grazing by stock, goats and rabbits. Rehabilitation after mining disturbance to include reestablishment of *Acacia melvillei* shrubland EEC in suitable locations.
Introduction of exotic flora (weeds)	Implement weed management.
Dust	Water spraying of internal haul roads within the active mining area. Regular spraying of cleared area.

(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

Not applicable.

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the lifecycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

Not applicable.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

Within its known range *Acacia melvillei* Shrubland EEC is reported to have originally covered an area of 12,000 ha ± 50% (Benson et al. 2006). The extent of this community in 2006 has been recorded as being 5,000 ha ± 50% (Benson et al. 2006) an estimated reduction of 42% ± 80% (Benson et al. 2006).

Approximately 195 ha of *Acacia melvillei* Shrubland EEC would be removed, the remaining stands of approximately 42 ha may be subject to increased edge effects (e.g. dust) during mining activities adjacent to its occurrence (Figure 18).

In the surrounds of the Atlas-Campaspe Mine footprint, approximately 1,071 ha of *Acacia melvillei* Shrubland EEC in a similar condition to that mapped in the Atlas-Campaspe Mine footprint was located and mapped, 390 ha of which would be included in the proposed offset area.

The local occurrence of *Acacia melvillei* Shrubland EEC is defined here as those areas located during surveys of the study areas (Atlas-Campaspe Mine study area and proposed offset study area combined). However, these areas are likely to form part of a larger area of *Acacia melvillei* Shrubland EEC which has not been surveyed or mapped extending in patches to the north and south of the study areas. For example one potential patch of this EEC was observed approximately 3 km to the south of the offset study area and another to the north in the vicinity of the Boree Plains homestead.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

The mapped area representing the local occurrence is approximately 1,306 ha; 195 ha of which would be directly impacted and up to approximately 42 ha may be subject to increased edge effects (e.g. dust) during mining activities adjacent to its occurrence. *Acacia melvillei* Shrubland EEC has not been mapped by others in the vicinity of the Project and offset study areas (Porteners et al. 1997; DECCW 2011).

The Project is unlikely to modify the overall composition of the community because the local occurrence of the community is in a generally moderate to poor condition, and the current composition has already been highly modified by agricultural practices and weed invasion.

Therefore the Project is not likely to modify the composition of the community such that its local occurrence is likely to be placed at risk of extinction.

(d) in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

The mapped areas of *Acacia melvillei* Shrubland EEC in both the Atlas-Campaspe Mine footprint and surrounding areas (the local occurrence) are located in a band of intermittent patches extending from the north to the south of the MLA and offset study areas (Figure 18). The Project would remove two patches of vegetation between 1.5 and 2 km wide in two bands, the Atlas and Campaspe footprints; this vegetation includes 195 ha of the community. Up to approximately 42 ha may be subject to increased edge effects (e.g. dust) during mining activities adjacent to its occurrence. Therefore, up to approximately 235 ha of habitat for this community would be removed or possibly modified as a result of the Project.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

The mapped areas of *Acacia melvillei* Shrubland EEC in both the Atlas-Campaspe Mine footprint and surrounding areas (the local occurrence) are located in a band of intermittent patches extending from the north to the south of the MLA and offset study areas (Figure 18). The Project would remove two patches of vegetation between 1.5 and 2 km wide in two bands, the Atlas and Campaspe footprints. As a result the *Acacia melvillei* Shrubland EEC in between the two footprints would be isolated from other patches of *Acacia melvillei* Shrubland EEC which may occur to the north of the Campaspe footprint and that have been mapped to the south of Atlas footprint. The local occurrence of the community would be fragmented into several sections by the Project. Planned rehabilitation of the community in the Atlas-Campaspe Mine footprint and surrounds as a part of the progressive rehabilitation process following the mining disturbance could result in the reversal of the fragmentation impacts of the Project over time.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality

The mapped area of the community within the locality (the local occurrence) is 1,036 ha. 235 ha of the mapped area of the community is likely to be removed or modified as a result of the Project. This constitutes 18% of the local occurrence of the community. The two sections of habitat to be removed represent the central core portions of the community in the locality. These central sections provide avenues for propagule movement and gene flow, across the community in the locality. Given this, the proportion of habitat to be removed from this community, is considered to be important to the long-term survival in the locality.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

Not applicable.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

No recovery or threat abatement plans have been prepared for this community.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

'Clearing of native vegetation' is listed as a Key Threatening Process under the NSW TSC Act. The Project would result in the clearing of 195 ha of the community. Therefore the Project is likely to augment the impacts relating to this key threatening process through the removal, fragmentation and modification of a fair proportion of this community within the locality.

'Competition and grazing by the feral European rabbit (*Oryctolagus cuniculus)'* and *'*Competition and habitat degradation by feral goats *(Capra hircus)'* are key threatening processes that have some relevance. Whilst it is acknowledged that rabbits and goats are already present, there is some potential for the Project to aggravate or augment these threatening processes through an increase in water resources, shelter material for warrens (rabbits only) and foraging resources within the immediate area and close surrounds.

That is, the Project is likely to provide sources of standing water, large tracts of open grassland foraging resources during the early stages of rehabilitation and increased rabbit shelter through the stockpiling of removed soil and cleared trees during the construction stages. Management and monitoring of introduced herbivores would be implemented within the immediate areas and surrounding properties to assist with the control of rabbit and goat populations in the Atlas-Campaspe Mine and offset areas.

Conclusion

The Project would clear 195 ha of this community within the Project, constituting 15% of the known local occurrence. Up to approximately 42 ha may be subject to increased edge effects (e.g. dust) during mining activities adjacent to its occurrence. Therefore in total 18 % of the community currently mapped is likely to be removed or modified by the Project. It is likely that this community occurs to the north and south of the Project and proposed offset areas however this has not been determined during this assessment or mapped in previous mapping projects (Porteners et al. 1997; DECCW 2011). The Atlas-Campaspe Mine footprint would also fragment this community within the locality. Therefore, the Project is likely to result in a significant impact on the known local occurrence of *Acacia melvillei* Shrubland EEC.

A total of 390 ha of *Acacia melvillei* Shrubland EEC would be maintained and enhanced in the proposed offset area. A further 42 ha within the Atlas-Campaspe Mine study area would be retained. The mapped occurrence of *Acacia melvillei* Shrubland EEC is generally in poor condition. Through removal of grazing pressure from livestock, goats and rabbits and facilitation of regeneration in the proposed offset area, there is significant potential for substantial areas of *Acacia melvillei* Shrubland EEC to improve in the medium to long term.

Sandhill Pine Woodland in the Riverina and Murray-Darling Depression and NSW South Western Slopes Bioregion

Sandhill Pine Woodland is listed as an Endangered Ecological Community under the NSW *Threatened Species Conservation Act 1995*. The community is characterised by an open tree stratum, which may be reduced to isolated individuals or may be absent as a result of past clearing. The tree layer is dominated by *Callitris glaucophylla* (White Cypress Pine), either in pure stands or with a range of other less abundant trees or tall shrubs. These may include *Acacia melvillei, Acacia oswaldii, Allocasuarina luehmannii* (Buloke), *Callitris gracilis* subsp. *murrayensis* (Slender Cypress Pine), *Hakea leucoptera* (Needlewood), *Hakea tephrosperma* (Hooked Needlewood), *Myoporum platycarpum* (Sugarwood) and *Pittosporum angustifolium* (Berrigan). A scattered shrub layer is sometimes present and may include *Dodonaea viscosa* subsp. *angustifolia, Enchylaena tomentosa* (Ruby Saltbush), *Sclerolaena muricata* (Black Rolypoly) and/or *Maireana enchylaenoides* (bluebush). The groundcover is highly variable in structure and composition. It may be sparse or more continuous, depending on the history of disturbance, grazing and rainfall events. It comprises grasses, such as *Austrodanthonia caespitosa* (Ringed Wallaby Grass), *Austrodanthonia setacea* (Small-flowered Wallaby Grass), *Austrostipa nodosa* (a Speargrass), *Austrostipa scabra* (Rough Speargrass), *Enteropogon acicularis* (Curly Windmill Grass), *Panicum effusum* and *Paspalidium constrictum*; and forbs including *Atriplex semibaccata* (Creeping Saltbush), *Einadia nutans* (Climbing Saltbush), *Erodium crinitum* (Blue Storksbill), *Oxalis perennans, Sida corrugata* (Corrugated Sida) and *Wahlenbergia* spp. (Bluebells).

Sandhill Pine Woodland EEC has been recorded in the far south-western portion of the NSW South Western Slopes bioregion near Urana, extending through the Riverina bioregion, from the Urana – Narrandera district in the east, into the southern part of the Murray-Darling Depression bioregion, as far west as the South Australian border. It is currently known from the Balranald, Berrigan, Carrathool, Central Darling, Conargo, Corowa, Deniliquin, Hay, Murray, Narrandera, Urana, Wakool and Wentworth Local Government Areas, but may occur elsewhere in the Riverina, Murray-Darling Depression and NSW South Western Slopes Bioregions. The community typically occurs on red-brown sandy loams. In the Murray-Darling Depression Bioregion, the community occurs on lunettes associated with dry lake beds, and as patches within a mosaic of vegetation types on extensive sandplains. Mapping by botanists from the National Herbarium of NSW (Fox 1991, Scott 1992, Porteners 1993, Porteners *et al.* 1997) covers the majority of the geographic distribution of the community and show a combined extant area of approximately 85 000 ha, with an additional 86 000 ha estimated to have been cleared or degraded to 'highly disturbed' open areas, and a further 35 000ha mapped as 'scattered trees'. Additional areas of these vegetation types occur as unmapped patches within mosaics containing other vegetation types. (NSW Scientific Committee 2011b).

Sandhill Pine Woodland EEC has undergone a large reduction in its geographic distribution as a consequence of clearing for cropping and pasture improvement (NSW Scientific Committee 2011b). A recent synthesis of available map data indicates that the distribution of this community has been reduced by 40 - 75% (Mackenzie and Keith 2007).

Logging of cypress pines (*Callitris* sp.) for construction of fences and buildings has resulted in significant changes in the structure of vegetation in these remnants, indicating a large reduction in the ecological function of Sandhill Pine Woodland EEC. As a consequence, many contemporary stands lack large old trees and, where tree recruitment has been limited by grazing, trees in other size classes may have been reduced in density or may have been eliminated altogether.

Most of the remaining stands of Sandhill Pine Woodland EEC are degraded by overgrazing, which has resulted in simplification of community structure, changes in species composition, invasion of weeds and soil erosion (Stafford and Eldridge 2000). Overgrazing by domestic livestock and feral herbivores, including rabbits and goats, has resulted in a scarcity of woody understorey plants and a lack of regeneration of palatable trees and shrubs (Scott 1992, Porteners 1993, Benson *et al*. 2006).

Consequently, senescent trees are not replaced with new individuals and there is a prolonged trend of stand degeneration. The sandy-textured soils of Sandhill Pine Woodland EEC are particularly sensitive to erosion when de-stabilised as a result of trampling by hooved animals and burrowing by rabbits (Semple 1987, Eldridge 1998, Eldridge and Greene 1994). Fragmentation, grazing and small-scale physical disturbance have resulted in weed invasion throughout the distribution of Sandhill Pine Woodland EEC, which continues to threaten the ecological function of the community (NSW Scientific Committee 2011b).

In the locality Porteners et al (1997) mapped approximately 13,868 ha of *Callitris* woodland. Westbrooke & Miller (1995) recorded 1% of the total vegetation present as Cypress-pine open-woodland shrubland in mapping of the nearby Mungo National Park.

Sandhill Pine Woodland EEC is represented in the study area by the Sandhill Pine Woodland map unit (Figure 9). It was recorded in seven locations in the MCTR study area, three of these occur in the MCTR footprint and would be directly impacted by the Project. A total of 21 ha of Sandhill Pine Woodland EEC has been surveyed and mapped in the study area, 3 ha would be impacted by the Project.

Local occurrence is defined by the threatened species assessment guide (DECC 2007) as the extent of the ecological community that occurs within the study area. However the local occurrence may include adjacent areas if the ecological community on the study area forms part of a larger contiguous area of that ecological community and the movement of individuals and exchange of genetic material across the boundary of the study area can be clearly demonstrated (DECC 2007).

Table L5 summarises the potential impacts and mitigation measures of the Project.

Table L5: Impact and mitigation measures for Sandhill Pine Woodland

Potential Impacts	Mitigation Measure
Clearing of vegetation	Restrict vegetation clearance in mapped location for this EEC. Protective fencing installed to prevent incursion into the community. No stockpiles or machinery storage bays in mapped location of this EEC Signage and roadside fencing to indicate location of EEC during construction activities
Introduction of exotic flora (weeds)	Vehicles to be wash-down prior to accessing the area. Revegetation of areas once roadway has been upgraded.
Dust and pollution	Road surfaces to be wet down during construction.
Alteration to hydrology	Runoff to be confined in drains and directed to location identified as not having impact on the EEC.

(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

Not applicable to an EEC.

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the lifecycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

Not applicable to an EEC.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

Sandhill Pine Woodland EEC is located in the corridor for the MCTR footprint which would be affected by the widening of an existing road from the southern end of the Atlas deposit to the Ivanhoe-Balranald road. The project would have a direct impact 10 m either side of the current roadway. Sandhill Pine Woodland EEC occurs in 3 locations in the MCTR footprint. The total area to be impacted would be 3 ha. In all locations it is possible for the impact to be reduced or prevented given that the existing road way has disturbed margins up to 10 m. The composition of the ecological community may be moderately affected by the removal of the understorey elements of the community which are within the MCTR footprint. However, this impact is unlikely to place the local occurrence at risk of extinction.

Therefore the Project is not likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Sandhill Pine Woodland EEC is located in the corridor for the MCTR footprint which would be affected by the widening of an existing road from the southern end of the Atlas deposit to the Ivanhoe-Balranald road. The project would have a direct impact 10 m either side of the current roadway. Sandhill Pine Woodland EEC occurs in 3 locations in the MCTR footprint. The total area to be impacted would be 3 ha. In all locations it is possible for the impact to be reduced or prevented given that the existing road way has disturbed margins up to 10 m in width. The composition of the ecological community may be moderately affected by the removal of the understorey elements of the community which are within the MCTR footprint. However, this impact is unlikely to place the local occurrence at risk of extinction.

(d) in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

A total of 3 ha of Sandhill Pine Woodland EEC was mapped within the MCTR footprint. Some indirect impacts may occur along the edge of the habitat affected however this area is already highly disturbed and the Project is not expected to further modify habitat of this ecological community.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action

No fragmentation impacts are expected to occur in relation to this community, given only the edges of the community would be removed or modified.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality

The area of Sandhill Pine Woodland EEC which would be removed or indirectly impacted within the Atlas-Campaspe is small and is not considered to be important to the long-term survival of the community in the locality.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

No critical habitat has been declared for Sandhill Pine Woodland EEC.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

No Recovery plans or Threat Abatement Plans have been prepared for Sandhill Pine Woodland EEC.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

'Clearing of native vegetation' is listed as a Key Threatening Process under the NSW TSC Act. The Project would result in the clearing of up to 3 ha of the community. The extent to which the Project would increase the impact of a key threatening process is relatively small, given very little vegetation would be cleared.

Conclusion
The Project is unlikely to have a significant impact on the Sandhill Pine Woodland EEC in the locality.

Appendix M: EPBC Act significance assessments

Brachyscome papillosa G.L.Davis (Mossgiel Daisy)

Information relating to this species and the potential impacts of the Project are outlined in Appendix L.

The *Brachyscome papillosa* referred to in this assessment is considered to represent a single 'important population' as defined under the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act) necessary for the long- term survival and recovery of this species.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it would:

Criterion 1: lead to a long-term decrease in the size of an important population of a species

The *Brachyscome papillosa* population is located on both sides of a 1.5 km section of the MCTR corridor and covers an area of approximately 124 ha. Well over 1000 individuals of the *Brachyscome papillosa* were estimated to occur at the time of survey. This population is likely to be the largest yet recorded for this species.

To minimise the potential impact of the Project to the *Brachyscome papillosa* population the MCTR roadway would not be widened along the 1.5 km section and the surface of this section would be sealed. These measures would dramatically reduce the impact from road work disturbance and dust build-up that would result if the standard upgrade was applied. There may be some impact from the sealing of the road surface as some preparatory activities would be required and this may result in dust generation.

It was noted during the survey that there were some individual plants growing on compacted ground adjacent to the current road surface. In the past, road grading along the existing road would have impacted on any individuals occurring in a similar location close to the road surface. Occurrences of this species in these areas are unusual and most likely a result of re-colonisation following these routine maintenance activities. It is possible that some individual plants growing on compacted ground adjacent to the current road surface would be removed if they happen to occur along the existing road surface.

With the implementation of impact avoidance and mitigation measures it is considered unlikely that the Project would lead to a long-term decrease in the size of an important population.

Criterion 2: reduce the area of occupancy of an important population

The area of occupancy is approximately 142 ha. The road would not be widened in the vicinity of the known population. It was noted that during the survey there were some individual plants growing adjacent to the current road surface. It is possible that some individual would be removed if they happen to occur along the existing road surface.

With the implementation of the impact avoidance and mitigation measures described it is considered unlikely that the Project would lead to a reduction in the area of occupancy of an important population.

Criterion 3: fragment an existing important population into two or more populations
The habitat of *Brachyscome papillosa* in the study area is currently dissected by an existing road (Magenta Road). This section of road would not be widened and no other activities associated with the Project are expected to result in further fragmentation or isolation of the habitat.

Criterion 4: adversely affect habitat critical to the survival of a species
The *Brachyscome papillosa* population is located on both sides of a 1.5 km section of the road corridor. It covers an area of approximately 142 ha. Well over 1000 extant individuals were estimated to occur in that area at the time of survey. The Project would avoid direct impacts to the population and indirect impacts are likely to be confined to close to the road edge. With the implementation of impact avoidance and mitigation measures described it is considered that the Project would not adversely affect habitat critical to the survival of the species.

Criterion5: disrupt the breeding cycle of an important population
Road works in this location would be undertaken outside of the flowering period for this species and it is considered unlikely that the Project would disrupt the breeding cycle of the population.

Criterion 6: modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
The proposed impact avoidance and mitigation measures described would result in nil or very minor direct impacts and indirect impacts would be confined to the area adjacent to the existing road. Therefore it is unlikely that the Project would modify, remove, isolate or decrease the availability of habitat for the species, such that it is likely to decline.

Criterion 7: result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
Vehicles, including machinery used for sealing the road, would be washed down prior to accessing the relevant section of road and habitat Therefore, it is unlikely that these species would become established within *Brachyscome papillosa* habitat.

Invasive fauna species such as European rabbits (*Oryctolagus cuniculus)* and feral goats (*Capra hircus*) may degrade habitat for or put grazing pressure on the local population of *Brachyscome papillosa.* Whilst it is acknowledged that rabbits and goats are already present in the known areas of habitat for the species, there is some potential for the Project to aggravate or augment these threatening processes through an increase in water resources within the immediate area. That is, with the sealing of the road and the proposed introduction of a batter on the side of the roadway to reduce flow rate of surface runoff, there is potential for additional water to pool.

In dry periods this pooling of water may attract additional wildlife such as rabbits, goats, macropods and; sheep etc. and hence increase the grazing pressures on this species in the immediate area. It is unlikely however; that these processes would impose a significant impact on the population, given the availability of water in a number of surrounding areas.

Criterion 8: introduce disease that may cause the species to decline, or
This species is not known to be susceptible to any diseases and no plant pathogens are known to occur in the geographic range of the species.

Criterion 9: interfere substantially with the recovery of the species

No recovery plan or threat abatement plans have been established for this species. The Conservation Advice for the species recommends the following priorities to assist with the recovery of the species.

- Design and implement a monitoring program.
- Undertake survey work in suitable habitat and potential habitat to locate any additional populations.
- Determine the species response to disturbance regimes by conducting experimental research into the effects of fire and grazing disturbance, in order to guide recovery actions.
- Investigate seed viability, germination, dormancy and longevity in the natural environment and in storage.
- More precisely assess population size, distribution, ecological requirements and the relative impacts of threatening processes.

Conclusions

With the implementation of the proposed impact avoidance and mitigation measures it is unlikely that the Project would impact significantly on the *Brachyscome papillosa* population or its habitat. Crucial to the outcome of this assessment is the minimisation of disturbance by not undertaking any road widening in this location and the suppression of dust by sealing the section of Magenta Road which passes through the habitat.

Lepidium monoplocoides F.Muell. (Winged Peppercress)

Information relating to this species and the potential impacts from the Project is outlined in Appendix L.

The following assessing has been undertaken based on those locations where the identification of *Lepidium monoplocoides* has been confirmed by the NSW Herbarium. Future confirmation of specimens from additional locations (FloraSearch 2012) is not expected to change the outcome of the following EPBC assessment.

The occurrences of *Lepidium monoplocoides* referred to in this assessment are considered to represent a single 'population' as defined under the EPBC Act occurring in a geographically distinct region.

Criterion 1: lead to a long-term decrease in size of a population
The known distribution of *Lepidium monoplocoides* within the Project area consists of 301 individuals at six separate locations (Sites 1 – 6, Figure 7) representing one population (as defined in the Commonwealth Department of Environment, Water, Heritage and the Arts 2009 guidelines, *Significance Impact Guidelines 1.1: Matters of National Significance* [EPBC Act Significant Guidelines]). Individuals at Sites 1 and 2 would be removed by the Project. Individuals at Sites 3 – 6 occur within a 1.5 to 12 km radius of the individuals to be removed.

Only one individual was recorded at each of the locations which would be impacted by the Project. The individual at Site 1 occurs in an isolated stand of Belah-Rosewood Woodland surrounded by cleared land. Continuation of cropping practices and associated grazing in this location could potentially result in the eventual loss of this individual. The individual at Site 2 was located in Belah-Rosewood Woodland where significant disturbance has occurred as the gilgai in these locations retain water after rainfall and stock regularly visit them to graze and drink.

According to the Recovery Plan for the species all known locations (13) of the species are important, given the limited overall distribution and limited knowledge on the species seed dispersal and pollination (Mavromihalis 2010). Since the preparation of the recovery plan, *Lepidium monoplocoides* has been found in a further three separate localities in NSW, at Pilliga National Park (Bell et al. 2012), near Gunnedah (Whitehaven Coal Pty Ltd 2012) and in the locality of the Project by Australian Museum Business Services.

The Project would remove two individuals of a total known population of 301 plants. A total of 195 individuals would be protected at three locations within the proposed offset area. A long-term decrease in the size of the population is not expected as a result of the Project.

Criterion 2: reduce the area of occupancy of the species
The Project would remove two individuals at Sites 1 and 2 as well as 38 ha of associated habitat for both populations. Habitat for this species also occurs in the surrounds of the Project. Approximately 147 ha of mapped known or potential habitat (Black Box Woodland, Grass/Herblands of Drainage Depressions) occurs in the area outside of the Project area and 90 ha (30 ha of which is known habitat) would be included within the proposed offset area.

A total area of 50 ha of known or potential habitat would be impacted by the Project however a further 147 ha of known or potential habitat has been mapped outside of the Project area. Approximately 90 ha of known or potential habitat would be maintained and improved in the proposed offset area.

Criterion 3: fragment an existing population into two or more populations
The population of *Lepidium monoplocoides* occurs as isolated patches in a mosaic of semi-arid vegetation. There is no evidence fragmentation would impact on the population as a result of the Project.

Criterion 4: adversely affect habitat critical to the survival of a species
The individuals at Sites 1 and 2 occur in disturbed habitat. At Site 1 the individual occurs in an isolated stand of Belah-Rosewood Woodland surrounded by cropping land. Continuation of cropping practices and associated grazing in this location would most likely result in the eventual loss of this population. At Site 2 the individual was located in Belah-Rosewood Woodland where significant disturbance has occurred as the gilgai in these locations retain water after rainfall and stock, in particular goats, regularly visit them to graze and drink. The Project would also remove the associated area of suitable habitat for both populations which includes an area of 38 ha.

A further 147 ha of known or potential habitat has been mapped outside of the Project area. Approximately 90 ha of known or potential habitat would be maintained and improved in the proposed offset area. Based on the condition of habitat to be removed by the Project and the habitat remaining in the surrounding area, this loss is not likely to represent the loss of critical habitat to the survival of the species.

Criterion 5: disrupt the breeding cycle of a population
Lepidium monoplocoides is an annual species completing its reproductive cycle in a period of 12 months or less. The species responds to rain and could also be considered to be ephemeral, appearing more commonly but not exclusively after significant rainfall events. Both occurrences of *Lepidium monoplocoides* in the Project area would be removed. This species has been recorded in the surrounding area (including the proposed offset area).

It is likely that *Lepidium monoplocoides* is pollinated by insects (Robertson and Klemash 2003). Members of the genus (*Lepidium* L.) have similar flower structure and have not been recorded as having a specific obligate pollinator. The types of insects that may pollinate *Lepidium* species include insects that are capable of directional flight and travelling across distances for pollen (e.g. bees and beetles) as well as insects which travel much shorter distances (e.g. ants) (Robertson and Klemash 2003). There are no obvious physical barriers to insect movement in the locality.

The fruit of *Lepidium monoplocoides* is small (5 mm by 4 mm) and dehiscent with a winged structure which probably aids in dispersal by wind or water. Each fruit contains many seeds which have a mucilaginous coating that becomes sticky in water enabling the seed to float and to adhere to dispersal vectors such as birds and the feet of other animals. Seeds of *Lepidium africanum* have been recorded in the dung of African animals (Milton and Dean 2001). Based on this information it is assumed that the breeding cycle of the population would not be interrupted by the Project.

Criterion 6: modify, destroy, remove, or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
Lepidium monoplocoides was located in three habitat types, Belah-Rosewood Woodland, Black Box Woodland and Grass/Herblands of Drainage Depressions. In Belah-Rosewood Woodland *Lepidium monoplocoides* was associated with gilgai which often occur in this community as small depressions sometimes only 3 m across. As four of the six *Lepidium monoplocoides* occurrences in the Project area and surrounds occurred in the Black Box Woodland and larger areas of Grass/Herblands of Drainage Depressions it seems that this vegetation is its preferred habitat. Approximately 50 ha of Black Box Woodland is located in the Project area. No areas of Grass/Herblands of Drainage Depressions were large enough to be mapped in the Atlas-Campaspe Mine footprint.

Approximately 147 known or potential has been mapped in the surrounds of the Project area.

Although the Project is likely to remove a proportion of the available habitat in the local area, the habitat for this species that occurs outside of the Project area is greater than the area within the Project area. As such the Project is not likely to remove, destroy, modify or decrease the availability of habitat to the extent that the species is likely to decline.

Criterion 7: result in invasive species that are harmful to a critically endangered or endangered species becoming established in the critically endangered or endangered species' habitat

The individuals within the Project area would be removed and therefore would not be significantly impacted by invasive species. However, there is potential for the Project to facilitate invasion by invasive species into habitat outside of the disturbance areas. Three types of invasive species are considered to threaten *Lepidium monoplocoides* populations within the local area:

- Invasive weeds;
- European Rabbits (*Oryctolagus cuniculus);* and
- Feral Goats (*Capra hircus*).

A Biodiversity Management Plan would be prepared for the Project which would implement an invasive species control plan to mitigate any potential impacts from invasive species.

Criterion 8: introduce disease that may cause species to decline

This species is not known to be susceptible to any diseases and no plant pathogens are known to occur in the geographic range of the species.

Criterion 9: interfere with the recovery of the species

A national recovery plan has been prepared for *Lepidium monoplocoides.* Within the duration of this Recovery Plan, a set of specific objectives for the recovery of *Lepidium monoplocoides* have been described (Mavromihalis 2010).

- Determine distribution, abundance and population structure.
- Determine habitat requirements.
- Manage threats to populations.
- Identify key biological functions.
- Determine growth rates and viability of populations.
- Establish a seed bank.
- Build community support for conservation.

While the Project would remove approximately 38 ha of known habitat for this species, a substantial potential habitat exists in the surrounding area. Approximately 90 ha of known or potential habitat and an unidentified area of unmapped habitat would be conserved and improved in the offset area. The management plan for the proposed offset area would address the following management practices required to conserve *Lepidium monoplocoides* (Mavromihalis 2010):

- Fencing and signposting to protect and prevent inadvertent damage.
- Weed control.
- Removal of grazing pressure, both from livestock and other herbivores.

Conclusion

Given the distribution of the known population across six locations, and the mapped known and potential habitat occurring outside of the Project area the removal of two individuals within the Project area is not expected to have a significant impact on a population of *Lepidium monoplocoides.*

Further, Sites 4, 5 and 6, where the species was recorded, would be protected in the proposed offset area for the Project. A total of 90 ha of known or potential habitat and an unidentified area of unmapped habitat would be conserved and improved in the proposed offset area. As well the implementation of the proposed offset area management practices and mitigation measure (Table L2) are expected to improve the habitat for *Lepidium monoplocoides* and removal of grazing by livestock and goats and the control of rabbits could result in an increase in population numbers.

Pterostylis cobarensis M.A.Clem (Cobar Greenhood Orchid)

Information relating to this species and the potential impacts of the Project are outlined in Appendix L.

The *Pterostylis cobarensis* occurrences referred to in this assessment are considered to represent a single 'important population' as defined under the EPBC Act necessary for the long-term survival and recovery of this species.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it would:

Criterion 1: lead to a long-term decrease in the size of an important population of a species
Five occurrences (Sites 1 to 5) of *Pterostylis cobarensis* were recorded which represent a single population of 18 individuals (as defined in the EPBC Significance Impact Guidelines 2009). This population represents the only known occurrence of this species within the locality. The nearest record outside the locality is approximately 165 km north-west of the Project area.

Three of the five known occurrences (Sites 1, 2 and 3) of the *Pterostylis cobarensis* would be removed by the land clearance required for the Project. The design of the stockpiles would avoid Site 4 (comprising of 4 individuals) and provide a 25 m distance between the location the plants were recorded and any surface mine activity. Site 5 (comprising 11 plants) is located within the proposed offset area and a minimum distance of 25 m would be maintained between the surface mining activities and these two locations. In addition, a number of measures aimed at avoiding, minimising or mitigating impacts on this species are described, such as fencing, pre-clearance surveys, collection of soil and plants for use in revegetation and weed management.

Given the small number of occurrences currently known for this species in the locality the removal of three individuals at three separate locations may lead to the long-term decrease of the species in the local area.

Some potential mallee woodland habitat would be maintained in the mining lease area that is located outside of the Atlas-Campaspe footprint. Extensive areas of mallee woodland, potential habitat for *Pterostylis cobarensis,* exists in the offset area (12,765 ha). It is possible that the species is more widespread given the connectivity of potential habitat and lack of targeted surveys for the species in the potential habitat.

Criterion 2: reduce the area of occupancy of an important population
Approximately three individuals of the known population of *Pterostylis cobarensis* from three locations (Sites 1, 2 and 3) in the locality and the associated habitat would be removed. No other populations have been recorded within 165 km of this population. The area of known occupancy would be significantly reduced by the Project.

Notwithstanding the above, Site 4 and a 25 m distance between this location and any surface mine activity, Site 5 is located in the proposed offset area and potential habitat in the proposed offset area would be retained. Potential habitat in the proposed offset area would be maintained and improved under the management plan actions which have been developed for this area (Section 8.5.2).

Criterion 3: fragment an existing important population into two or more populations
The Project would not fragment an existing population however the remaining 15 individuals at Sites 4 and 5 may be isolated from other potential occurrences to the south of the Atlas footprint. Significant areas of potential habitat occur to the north of this occurrence in the proposed offset area.

Criterion 4: adversely affect habitat critical to the survival of a species
Part of the habitat in which the population of *Pterostylis cobarensis* occurs would be removed. Potential habitat occurs in the proposed offset area and this would be maintained and improved under the management plan actions which have been developed for this area (Section 8.5.2).

Criterion 5: disrupt the breeding cycle of an important population
This population of *Pterostylis cobarensis* is the only one recorded for this locality. It is likely that the Project would result in an adverse effect on the breeding cycle of the species by removing 4 out of 18 known individuals. As three of the five known occurrences of this species will be removed, and the distance to the nearest known population, 165 km, it is likely that the breeding cycle of this species would be disrupted.

Criterion 6: modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
Three individuals of the known population of *Pterostylis cobarensis* and its associated habitat in three of five known locations (Sites 1, 2 and 3) would be removed within the Project area. The design of the stockpiles would avoid direct impacts to Site 4 (comprising of 4 plants) and Site 5 (comprising 11 plants). Site 5 occurs within the proposed offset area. At Sites 4 and 5, the area will be fenced off and there would be a 25 m distance between these plant locations and proposed surface mining activity. In addition, a number of measures (such as fencing labelled with signage) are described to avoid direct impacts on this occurrence.

The removal of the habitat and individuals from three locations may cause a decline of the species in this location. The species may occur in other locations in the surrounding area but surveys have not located other occurrences or populations to date. Potential habitat occurs in the proposed offset area and this would be maintained and improved under the management plan actions which have been developed for this area (8.4.2).

Criterion 7: result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;
Two known locations of *Pterostylis cobarensis* (Sites 4 and 5) are located in the Atlas footprint, or in the proposed offset area (approximately 25 m away), respectively. Therefore there is potential for the Project to facilitate invasion by invasive species into known and potential habitat. Three types of invasive species are considered to threaten *Pterostylis cobarensis* populations within the local area:

- Invasive weeds;
- European Rabbits (*Oryctolagus cuniculus);* and
- Feral Goats (*Capra hircus*).

The listing advice for *Pterostylis cobarensis* includes the following two actions to mitigate trampling, browsing and grazing by feral goats.

- Implement the management plan for the control and eradication of feral goats, especially in reserves.
- Protect populations from feral goats and other grazing pressure through fencing.

A Biodiversity Management Plan would be prepared for the Project which would implement an invasive species control plan to mitigate any potential impacts from invasive species.

Criterion 8: introduce disease that may cause the species to decline; or
This species is not known to be susceptible to any diseases and no plant pathogens are known to occur in the geographic range of the species.

Criterion 9: interfere substantially with the recovery of the species
No recovery or threat abatement plan exists for *Pterostylis cobarensis*.

Conclusions
Three of the five known occurrences of the *Pterostylis cobarensis* would be removed by the land clearance required for the Project. Based on current knowledge of the extent of this species in the area, the Project would have a significant impact of the known population of *Pterostylis cobarensis*.

The design of the stockpiles would avoid the 4th location of *Pterostylis cobarensis* (comprising of 4 individuals) and provide a 25 m distance between the location the plants were recorded and any surface mine activity. The 5th occurrence (comprising 11 plants) is located within the proposed offset area and a minimum distance of 25 m would be maintained between the surface mining activity and these locations. In addition, a number of measures aimed at avoiding, minimising or mitigating impacts on this species are described, such as fencing, pre-clearance surveys, collection of soil and plants/bulbs for use in revegetation and weed management.

Extensive areas of mallee woodland, potential habitat for *Pterostylis cobarensis,* exists in the offset area (12,765 ha). It is possible that the species is more widespread given the connectivity of potential habitat and lack of targeted surveys for the species in the potential habitat.