Flora and Fauna Assessment Widgiemooltha Project

For

Mincor Resources NL

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Final

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Glossary

Acronym	Description
ANCA	Australian Nature Conservation Agency.
BAM Act	Biosecurity and Agriculture Management Act 2007, WA Government.
BC	Botanica Consulting.
BOM	Bureau of Meteorology.
CALM	Department of Conservation and Land Management (now DPaW), WA Government.
DAFWA	Department of Agriculture and Food, WA Government.
DEC	Department of Environment and Conservation (now DPaW), WA Government.
DEH	Department of Environment and Heritage (now DoE), Australian Government.
DEP	Department of Environment Protection (now DER), WA Government.
DEWHA	Department of the Environment, Water, Heritage and the Arts (now DotEE), Australian Government
DER	Department of Environment Regulation (formerly DEC, DoE), WA Government.
DMP	Department of Mines and Petroleum (formerly DoIR), WA Government.
DoE	Department of Environment (now DER/DPaW), WA Government.
DoIR	Department of Industry and Resources (now DMP), WA Government.
DotEE	Department of the Environment and Energy (formerly DSEWPaC, DEWHA, and DEH), Australian Government.
DPaW	Department of Parks and Wildlife (formerly DEC, CALM, DoE), WA Government.
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (now DotEE, formerly DEH, DEWHA), Australian Government.
EP Act	Environmental Protection Act 1986, WA Government.
EP Regulations	Environmental Protection (Clearing of Native Vegetation) Regulations 2004, WA Government.
EPA	Environmental Protection Authority, WA Government.
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999, Australian Government.
ESA	Environmentally Sensitive Area.
Ha	Hectare (10,000 square metres).
IBRA	Interim Biogeographic Regionalisation for Australia.
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union.
Km	Kilometre (1,000 metres).
Mincor	Mincor Resources NL.
MVG	Major Vegetation Groups.
NVIS	National Vegetation Information System.
OEPA	Office of the Environmental Protection Authority, WA Government.
PEC	Priority Ecological Community.
TEC	Threatened Ecological Community.
WA	Western Australia.
WAHERB	Western Australian Herbarium.
WC Act	Wildlife Conservation Act 1950, WA Government.

Executive Summary

Botanica Consulting was commissioned by Mincor Resources NL to undertake a Level 2 flora and level 1 fauna survey of the Widgiemooltha Project (referred to as the 'survey area'), which is located approximately 32 km south-west of Kambalda, Western Australia, adjacent to the Widgmiemooltha townsite. The survey covered an area of approximately 836 ha. The primary flora survey was conducted in spring on the 27th and 28th October 2016 in which 30 quadrats were established. A supplementary flora survey was conducted in Autumn on the 6th and 7th May 2017. The fauna survey was conducted on the 19th November 2016.

Seven broad floristic communities were identified within the survey area. These communities comprised of two landform types and two major vegetation groups. The communities were represented by 24 plant families, 45 genera and 88 taxa (including 12 annual taxa). Broad scale terrestrial fauna habitats within the survey area have been identified as clay-loam plains and rocky hillslopes. Results of the literature review identified 31 mammals (including 9 bat species), 109 bird, 79 reptile and five frog species that have previously been recorded in the general area, some of which have the potential to occur in or utilise at times, the survey area.

No Threatened Flora were identified within the survey area. Three Priority Flora taxa were identified within the survey area; *Austrostipa blackii* (P3), *Austrostipa* sp. Carlingup Road (S. Kern & R. Jasper LCH 18459) (P1) and *Philotheca apiculata* (P1).

A review of the EPBC Act threatened fauna list, DPAW's Threatened Fauna Database and Priority List, unpublished reports and scientific publications identified a number of specially protected, migratory or priority fauna species as having been previously recorded or as being potentially present in the general vicinity of the survey area. Most species are considered unlikely to occur mainly due to a lack of suitable habitat and no fauna of conservation significance is likely to be significantly impacted on by the proposed development. This conclusion is primarily based on the relatively small size of the impact footprint and the extensive habitat connectivity with adjoining areas. Impacts on fauna and fauna habitat are therefore anticipated to be localised, small/negligible and as a consequence manageable.

No Threatened or Priority Ecological Communities (TEC/PEC) were recorded within the survey area.

The survey area is not within an Environmentally Sensitive Area. There are no conservation areas/DPaW managed land located within the survey area. The eastern boundary of the survey area is located within a Schedule 1 Area centered on the Kalgoorlie-Esperance Highway and pipeline.

Based on the vegetation health condition scale adapted from Keighery and Trudgen (1 being 'pristine' and 7 being 'completely degraded'), the floristic communities ranged from health rating 3 to 4. Two introduced taxa were identified within the survey area.

1 Introduction

1.1 Project Description

Botanica Consulting (BC) was commissioned by Mincor Resources NL (Mincor) to undertake a Level 2 flora survey and level 1 fauna survey of the Widgiemooltha Project (referred to as 'survey area'), which covered an area of approximately 836 ha. The primary flora survey was conducted in Spring on the 27th and 28th October 2016 in which 30 quadrats were established. The 30 quadrats were revisited in Autumn on the 6th and 7th May 2017, during the supplementary flora survey. The fauna survey was conducted on the 19th November 2016.

The project area is located approximately 32km south-west of Kambalda, Western Australia, adjacent to the Widgmiemooltha townsite. Figure 1 provides a regional map of the survey area.

1.2 Survey Objectives

The flora assessment was conducted in accordance with *Technical Guide - Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment – December 2015* (DPaW & EPA, 2015), EPA Guidance Statement 51 (EPA, 2004) and EPA position statement No 3 (EPA, 2002). The objectives of the assessment were to:

- Gather background information on flora and vegetation in the survey area (literature review, database and map-based searches);
- Define and map the floristic communities of the survey area;
- Assess species abundance and diversity within the survey area and compile a species list for the survey area by floristic community;
- Provide plot based data in accordance with *Technical Guide - Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment – December 2015* (DPaW & EPA, 2015).
- Document and map locations of any Flora of Conservation Significance identified;
- Assess the regional and local conservation status of plant species and ecological communities within the survey area;
- Provide observations on vegetation condition in the survey area; and
- Identify occurrences of any "Declared and Environmental" weeds within the survey area.

The fauna assessment was conducted in accordance with the relevant requirements of a Level 1 and Level 2 terrestrial fauna survey as defined in EPA Guidance Statement 56 (EPA 2004). EPA Position Statement 3 (EPA, 2002) and Technical Guide 2010 (EPA/DEC, 2010). The objectives of the fauna survey were to:

- Determine the local and regional conservation significance of fauna species and ecological communities in the survey area;
- Define and map the fauna habitats within the survey area;
- Identify and record the locations of any conservation significant fauna species;
- Identify and record the locations of any declared organisms in the survey area;
- Provide information on the distribution of conservation significant fauna species or communities identified during the survey;
- Provide observations on habitat condition in the survey area; and
- Identify any special landscape characteristics that may provide fauna refuge or breeding areas.

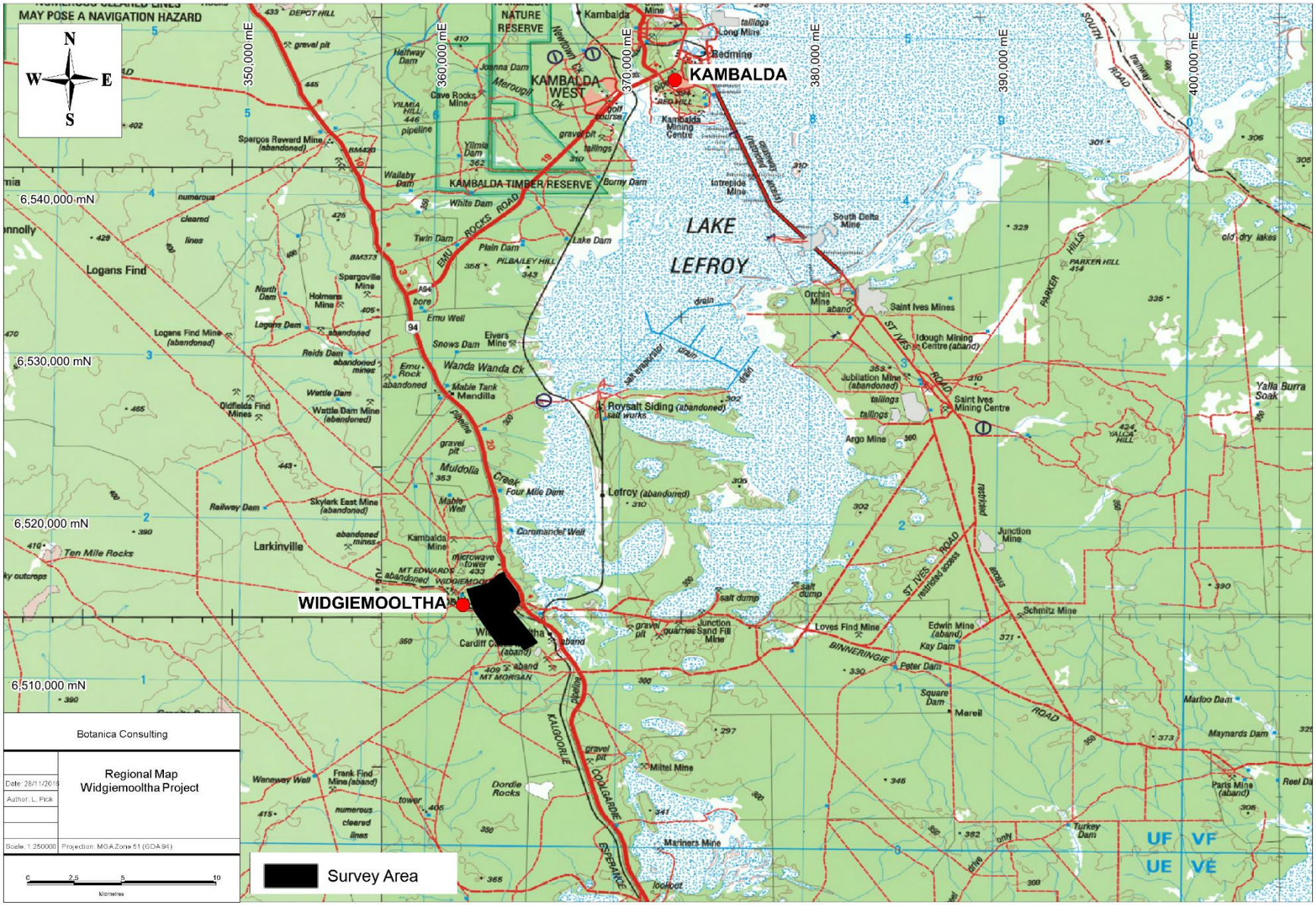

Figure 1: Regional map of the Widgiemooltha Project survey area

2 Regional Biophysical Environment

2.1 Regional Environment

The survey area lies within the Coolgardie Botanical District of the South-West Botanical Province of WA. The Coolgardie Botanical District consists of predominantly Eucalypt woodland in the valleys, with dense *Acacia* and *Allocasuarina* thickets dominating the rocky ironstone ridges found near the South-West Province border (Beard, 1990).

Based on the Interim Biogeographic Regionalisation of Australia (IBRA), Version 7, the South-West Botanical Province is divided into IBRA Bioregions with the survey area located within the Coolgardie Bioregion of Western Australia. The Coolgardie Bioregion is further divided into three subregions; Mardabilla (COO1), Southern Cross (COO2) and Eastern Goldfields (COO3) with the survey area located within the Eastern Goldfields Subregion (Figure 2).

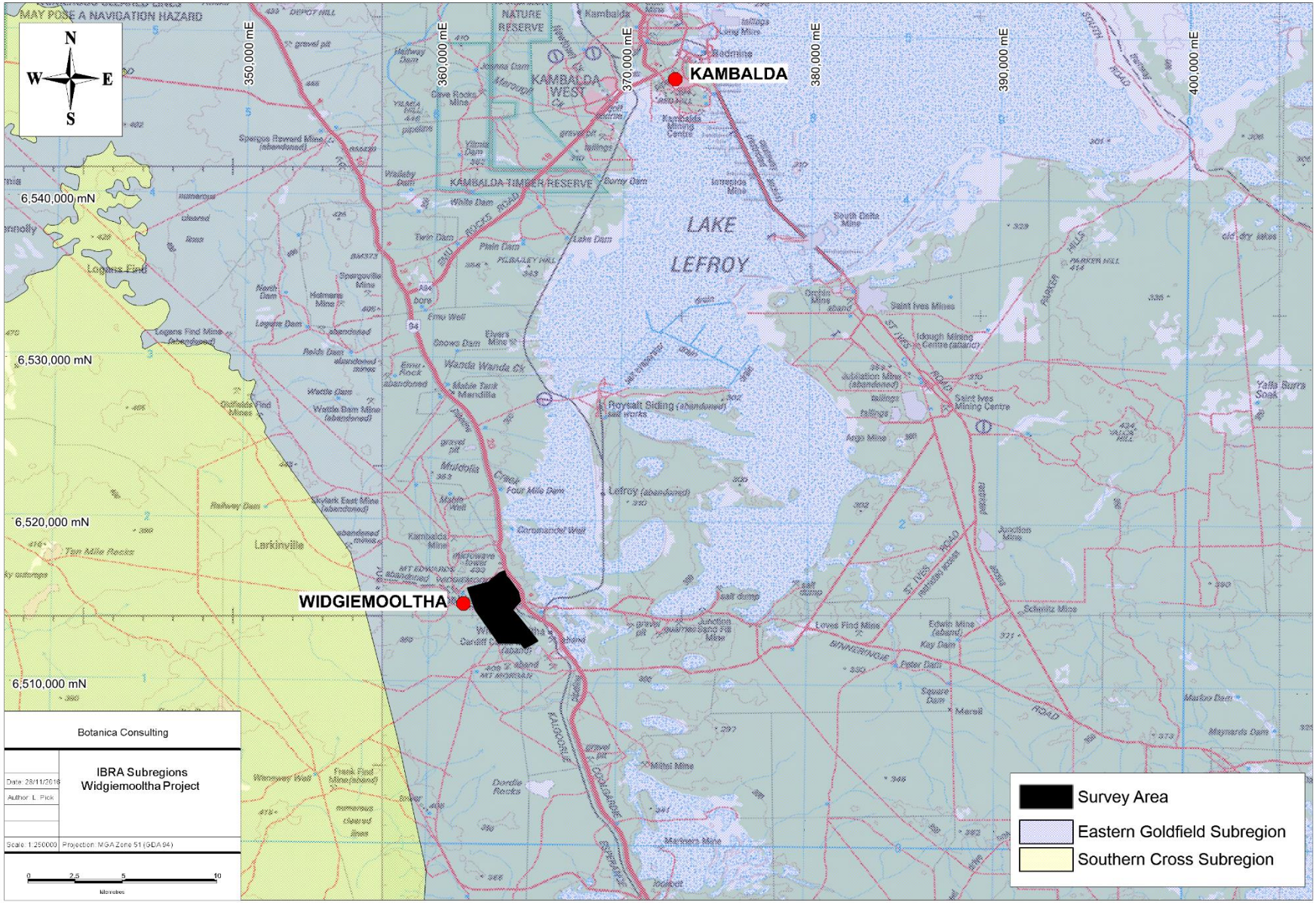

Figure 2: Map of IBRA Subregions in the vicinity of the Widgiemooltha Project survey area

2.2 Vegetation

Vegetation of the Eastern Goldfields subregion comprises of Mallees, Acacia thickets and shrub heaths on sand plains. Diverse Eucalypt woodlands occur around salt lakes, on ranges, and in valleys. Salt lakes support dwarf shrublands of samphire (Cowan, 2001). The Department of Agriculture and Food Western Australia (DAFWA) GIS file (DAFWA 2011) indicates that the survey area is located within pre-European (Beard 1990) vegetation association Binneringe 9. The extent of this vegetation association as described by the DAFWA is shown in Table 1.

Areas retaining less than 30% of their pre-European vegetation extent generally experience exponentially accelerated species loss, while areas with less than 10% are considered “endangered” (DEC, 2011). The proposed clearing within the survey area will not significantly reduce the extent of this vegetation association.

Table 1: Remaining Beard Vegetation Association within the Widgiemooltha Project survey area (DAFWA, 2011)

Vegetation association	Pre-European Extent (ha)	Current Extent (ha)	Pre-European extent remaining (%)	% of Current extent within DPaW managed lands	Vegetation Description (Beard, 1990)
Binneringe 9	101,297.06	100,103.03	98.82	4.02	Medium woodland; Coral gum (*E. torquata*) & goldfields blackbutt (*E. lesouefii*)

2.3 Topography & Soils

The Eastern Goldfields subregion lies on the Yilgarn Craton's 'Eastern Goldfields Terrains'. The relief is subdued and comprised of gently undulating plains interrupted in the west with low hills and ridges of Archaean greenstones and in the east by a horst of Proterozoic basic granulite. The underlying geology is of gneisses and granites eroded into a flat plane covered with tertiary soils and with scattered exposures of bedrock. Calcareous earths are the dominant soil group and cover much of the plains and greenstone areas. A series of large playa lakes in the western half are the remnants of an ancient major drainage line (Cowan, 2001).

The survey area lies within the Kalgoorlie Province, which consists of Undulating plains (with some sandplains, hills and salt lakes) on the granitic rocks and greenstone of the Yilgarn Craton. Calcareous loamy earths and Red loamy earths with some Salt Lake soils, Red deep sands, Yellow sandy earths, Shallow loams and Loamy duplexes. Eucalypt woodlands with some acacia-casuarina thickets, mulga shrublands, halophytic shrublands and spinifex grasslands. Located in the southern Goldfields between Payne’s Find, Menzies, Southern Cross and Balladonia (DAFWA, 2014).

The Kalgoorlie Province is on the central eastern portion of the Yilgarn Craton, mostly overlying Archaean rocks of the Southern Cross Domain and the Eastern Goldfields Superterrane. To the north-west is the Murchison Domain. The basement rocks are a mix of granite, gneiss and greenstone. Even-grained porphyritic granitic rocks (intruded by quartz veins and dolerite dykes) are most common across the north as well as in the western half and the north-east. The largest areas of migmatite and gneiss are found in the south-west (DAFWA, 2014).

The greatest concentration of greenstone belts is in the center of the eastern half, between Norseman and Kalgoorlie. They are also common along the south-western margin and to the south of Lake Barlee. These greenstone belts contain a mixture of metamorphosed mafic to ultra-mafic volcanic rocks (including basalt, amphibolite, dolerite and gabbro), felsic volcanic rocks, and metasedimentary rocks (including cherts and banded iron formations). Mesoproterozoic rocks of the Albany-Fraser Orogen are found in the south-eastern corner. These include the gneiss of the Biranup Complex and the weakly to strongly deformed granite of the Nornalup Complex. Overlying much of the Albany-Fraser Orogen is a veneer of Eocene sediments belonging to the Balladonia Shelf of the Eucla Basin. Also present north-east of Norseman, is an outcrop of Mesoproterozoic arenaceous and argillaceous metasedimentary sandstone and shale of the Woodline Formation (DAFWA, 2014b).

The Kalgoorlie Province is further divided into six soil-landscape zones, with the survey area located within the Kambalda Zone (265). The Kambalda Zone is characterised by flat to undulating plains (with hills, ranges and some salt lakes and stony plains) on greenstone and granitic rocks of the Yilgarn Craton. Soils comprise of calcareous loamy earths and red loamy earths with salt lakes soils and some redbrown hardpan shallow loams and red sandy duplexes. Vegetation includes red mallee blackbutt- Salmon gum-gimlet woodlands with Mulga and halophytic shrublands (and some spinifex grasslands). This zone is located in the south-eastern Goldfields between Menzies, Norseman and the Fraser Range (Tille, 2006).

The Kambalda Zone is further divided into soil landscape systems, with the survey area located within three soil landscape systems as shown in Table 2 and Figure 3 (DAFWA, 2014).

Table 2: Soil Landscape Systems within the Widgiemooltha Project survey area

Mapping Unit	Description
Graves System	Basalt and greenstone rises and low hills supporting eucalypt woodlands with prominent saltbush and bluebush understoreys.
Moriarty System	Low greenstone rises and stony plains supporting chenopod shrublands with patchy eucalypt overstoreys.
Red Hill System	Basalt hills and ridges supporting acacia shrublands and patchy eucalypt woodlands with mainly non-halophytic undershrubs.

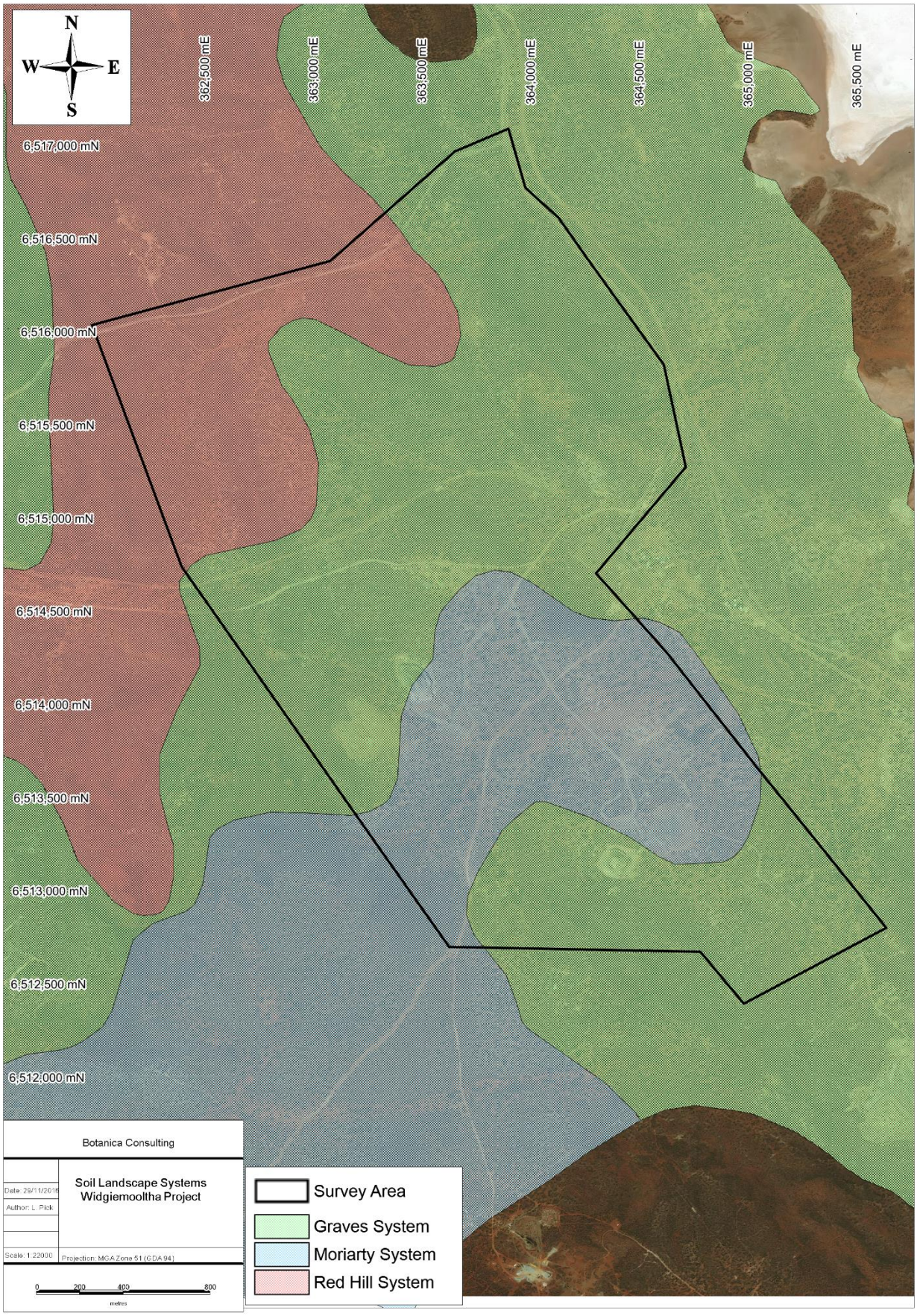

Figure 3: Soil Landscape Systems within the Widgiemooltha Project survey area

2.4 Hydrology

According to the Geoscience Australia database (2001) there is a non-perennial/ intermittent surface drainage line which intercepts the survey area and drains east into Lake Lefroy located approximately 1.4km north-east of the survey area (Figure 4). The Lefroy Palaeochannel is located approximately 1km east of the survey area (oriented north-east to south-west) covering an area of approximately 881,400 ha (Figure 4).

The Lefroy Paleochannel was excavated into the Archaean Yilgarn Craton during the Jurassic period and historically drained from the southwest to the northeast (Clarke 1994). Groundwater flows eastwards in the direction of the original drainage. The groundwater outflow is ultimately towards the Eucla Basin, which is approximately 150 km to the east of the area. The Lefroy Paleochannel contains marine sediments derived from multiple Eocene eustatic transgressions, in addition to fluvio-lacustrine sediments (Magee, 2009).

According to the Department of Water (DoW) groundwater salinity database (DoW, 2016), groundwater salinities in the survey area ranges from 14,000 mg/L to 35,000 mg/L with the Lake Lefroy Paleochannel recording a groundwater salinity >35,000 mg/L. Groundwater in the region is a local flow system in Precambrian Rocks. The survey area is located within the Yilgarn-Goldfields Groundwater Province.

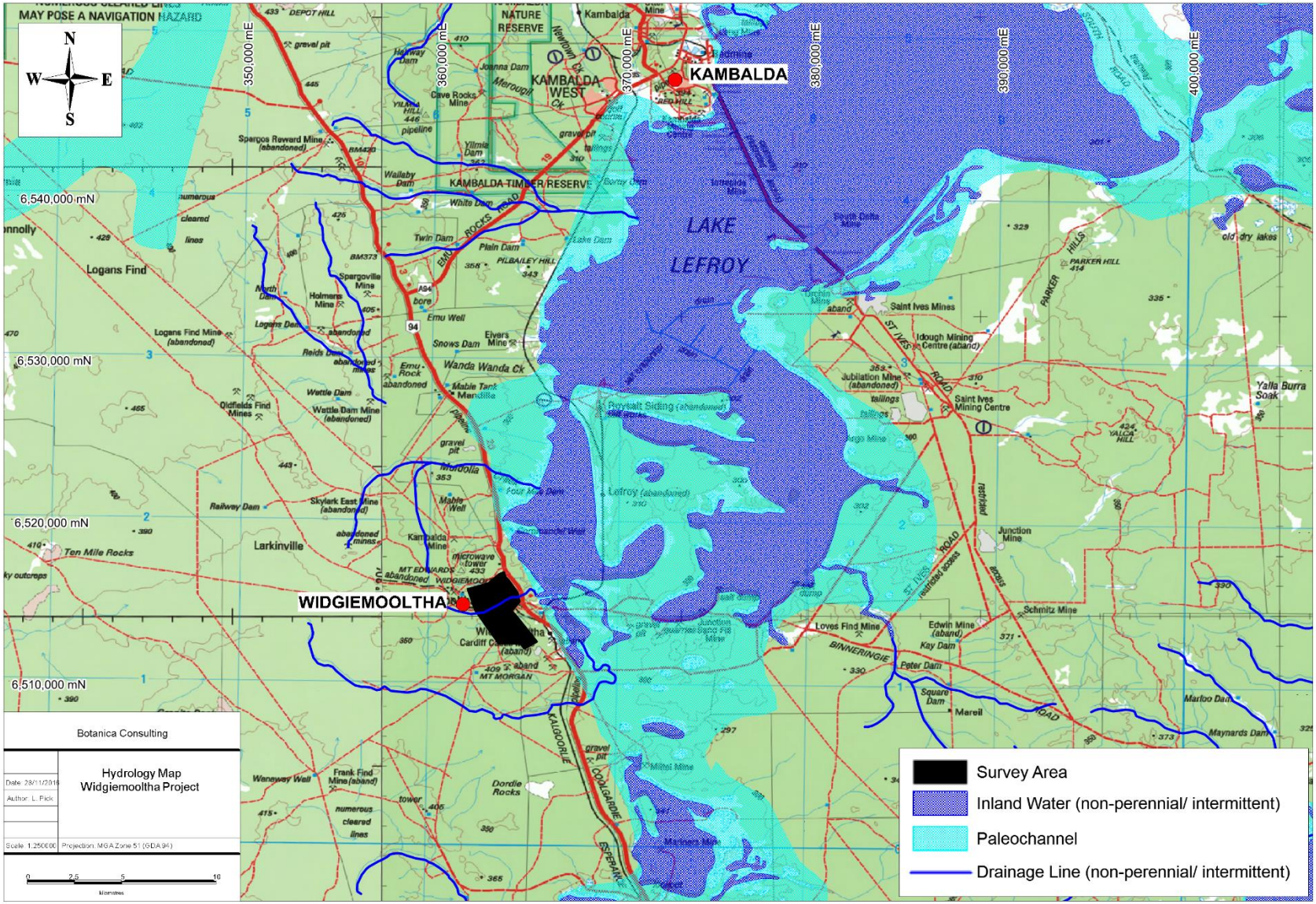

Figure 4: Hydrology of the Widgiemooltha Project survey area

2.5 Climate

The climate of the Eastern Goldfields subregion is characterised as an arid to semi-arid climate with rainfall sometimes in summer but mainly winter rainfall and annual rainfall of approximately 200-300mm (Cowan, 2001). Monthly rainfall for the nearest active BoM weather station (Kambalda West Weather Station #12117) located approximately 40km north-east of the survey area is shown in Figure 5. Rainfall received at Kambalda West in the months preceding the primary survey (June-August 2016) was above average, with the exception of September which was significantly below average. Rainfall received in the months preceding the supplementary survey (January-March 2017) was also above average, with the exception of April which was below average (BOM, 2017).

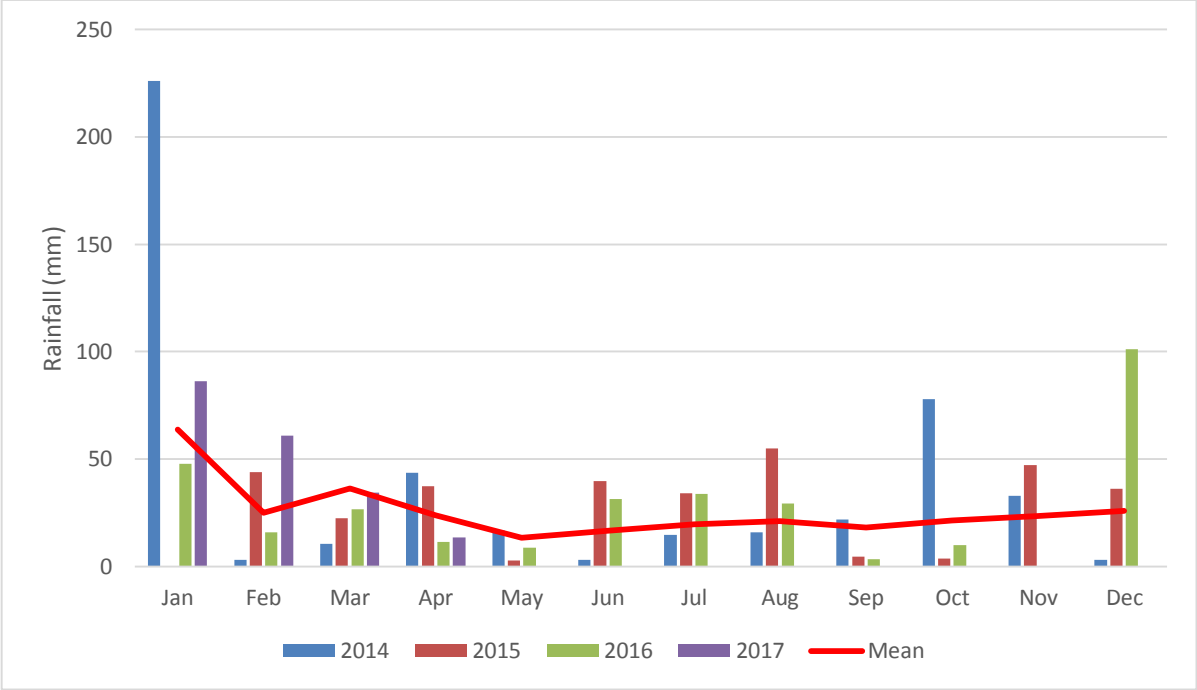

Figure 5: Monthly rainfall from January 2014 to April 2017 and mean monthly rainfall for the Kambalda West weather station #12117 (BOM, 2017)[1]

2.6 Land Use

The dominant land use for the Eastern Goldfields Subregion includes grazing – native pastures, mining and conservation (Cowan, 2001).

2.7 Great Western Woodlands

The survey area lies within the Great Western Woodlands (Figure 6). The region covers almost 16 million hectares, 160,000 square kilometers, from the southern edge of the Western Australian Wheatbelt to the pastoral lands of the Mulga country in the north, the inland deserts to the northeast, and the treeless Nullarbor Plain to the east.

The area provides an eastward connection between southwest forests and inland deserts (Gondwana Link) as well as linking the north-west passage to Shark Bay. The majority of the Great Western Woodlands is unallocated crown land (61.1%) with other interests including pastoral leases (20.4%),

[1] [1] Rainfall data from March 2016 to April 2017 has not been quality controlled.

conservation reserves (15.4%) unallocated crown land ex pastoral managed by the DPaW (2%) and private land (approximately 1%) (Watson *et. al.,* 2008).

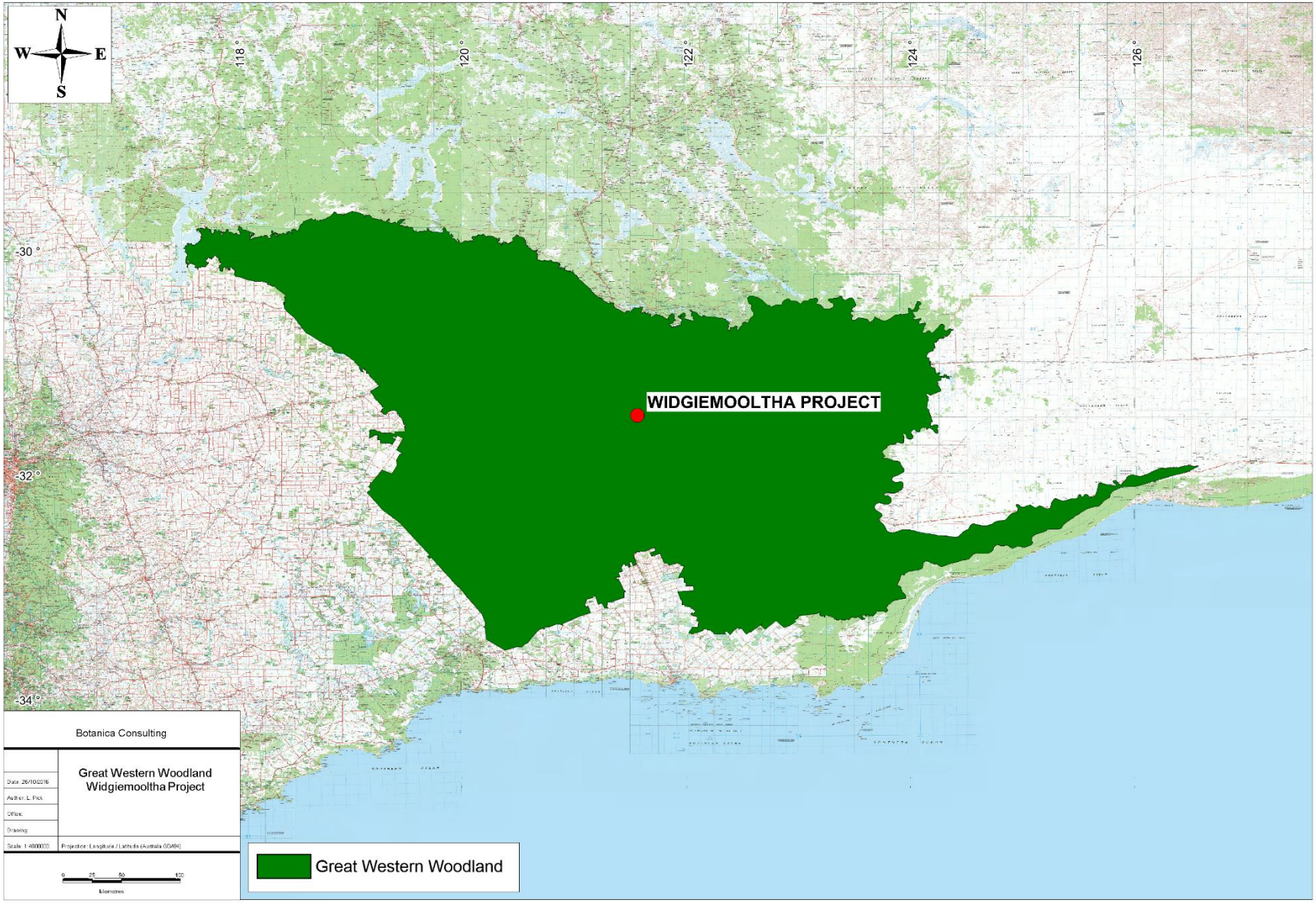

Figure 6: Location of the Widgiemooltha Project survey area within the Great Western Woodlands

3 Survey Methodology

3.1 Desktop Assessment

Searches of the following databases were undertaken to obtain background information on the flora and fauna taxa within the survey area:

- DPaW Priority/ Threatened Flora Database Search (DPaW, 2016a)
- DPaW Priority/ Threatened Ecological Communities Database Search (DPaW, 2016b)
- DPaW NatureMap Database (DPaW, 2016c);
- DotEE Protected Matters search tool (DotEE, 2016a).

The searches were conducted for an area encompassing a 40 km radius of the centre coordinates –-31.41167S 121.45806E (Appendix 1). It should be noted that these lists are based on observations from a broader area than the survey area (40km radius) and therefore may include taxa not present. The databases also often included very old records that may be incorrect or in some cases the taxa in question have become locally or regionally extinct. Information from these sources should therefore be taken as indicative only and local knowledge and information also needs to be taken into consideration when determining what actual species may be present within the specific area being investigated.

Prior to the field survey, a combined search of the DPaW Flora of Conservation Significance databases (DPaW, 2016a) was undertaken within an 40km radius of the survey area. These significant flora species were examined on the Western Australian Herbarium's (WAHERB) web page prior to the survey, to familiarise staff with their appearance. Locations of Threatened Flora and Priority Flora were overlaid on aerial photography of the area. Vegetation descriptions and available images of the Priority Flora were also obtained from Florabase.

The conservation significance of flora and fauna was assessed using data from the following sources:

- *EPBC Act*. Administered by the Australian Government (DotEE);
- *WC Act*. Administered by the WA Government (DPaW);
- Red List produced by the Species Survival Commission (SSC) of the World Conservation Union (also known as the IUCN Red List – the acronym derived from its former name of the International Union for Conservation of Nature and Natural Resources). The Red List has no legislative power in Australia but is used as a framework for State and Commonwealth categories and criteria; and
- DPaW Priority Flora/ Fauna list. A non-legislative list maintained by DPaW for management purposes.

The *EPBC Act* also requires the compilation of a list of migratory species that are recognised under international treaties including the:

- Japan Australia Migratory Bird Agreement 1981 (JAMBA)[2];
- China Australia Migratory Bird Agreement 1998 (CAMBA);
- Republic of Korea-Australia Migratory Bird Agreement 2007 (ROKAMBA); and
- Bonn Convention 1979 (The Convention on the Conservation of Migratory Species of Wild Animals).

All migratory bird species listed in the annexes to these bilateral agreements are protected in Australia as matters of national environmental significance (NES) under the *EPBC Act*.

[2] Species listed under JAMBA are also specially protected under Schedule 5 of the *WC Act.*

Table 3 and Table 4 below provide the definitions of conservation significant flora and fauna.

Table 3: **Definitions of conservation significant flora**

Code	Category
State categories of threatened and priority species (Wildlife Conservation Act, 1950)	
T	Threatened Species Flora that has been declared to be 'likely to become extinct or is rare, or otherwise in need of special protection', pursuant to section 23F (2) of the Wildlife Conservation Act.
P1	Priority One – Poorly Known Taxa "Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey."
P2	Priority Two – Poorly Known Taxa "Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but urgently need further survey."
P3	Priority Three – Poorly Known Taxa "Taxa which are known from several populations and the taxa are not believed to be under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but needs further survey."
P4	Priority Four – Rare Taxa "Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5 – 10 years."
P5	Priority Five-Conservation Dependent Taxa Taxa that are not threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.
Commonwealth categories of threatened species (Environment Protection and Biodiversity Conservation Act, 1999)	
Extinct	Taxa where there is no reasonable doubt that the last member of the species has died.
Extinct in the wild	Taxa where it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
Critically endangered	Taxa that are facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered	Taxa which are not critically endangered and is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
Vulnerable	Taxa which are not critically endangered or endangered and is facing a high risk of extinction in the wild in the medium term future, as determined in accordance with the prescribed criteria.
Conservation dependent	Taxa which are the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or (b) the following subparagraphs are satisfied: (i) the species is a species of fish;

Code	Category
	(ii) the species is the focus of a plan of management that provides for actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised; (iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory; (iv) cessation of the plan of management would adversely affect the conservation status of the species.

Table 4: **Definitions of conservation significant fauna**

Code	Category
State categories of threatened and priority species (Wildlife Conservation Act, 1950)	
Schedule 1	Critically Endangered – Threatened species considered to be facing an extremely high risk of extinction in the wild.
Schedule 2	Endangered – Threatened species considered to be facing a very high risk of extinction in the wild.
Schedule 3	Vulnerable – Threatened species considered to be facing a high risk of extinction in the wild.
Schedule 4	Species which have been adequately searched for and there is no reasonable doubt that the last individual has died.
Schedule 5	Birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and the Bonn Convention, relating to the protection of migratory birds.
Schedule 6	Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened.
Schedule 7	Fauna otherwise in need of special protection to ensure their conservation.
P1	Priority One – Poorly Known Taxa Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
P2	Priority Two – Poorly Known Taxa Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
P3	Priority Three – Poorly Known Taxa Species that are known from several locations and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
P4	Priority Four – Rare, Near Threatened and other species in need of monitoring (a) Rare: Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands.

Code	Category
	(b) Near Threatened: Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.
Commonwealth categories of threatened species (Environment Protection and Biodiversity Conservation Act, 1999)	
Extinct	Taxa where there is no reasonable doubt that the last member of the species has died.
Extinct in the wild	Taxa where it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
Critically Endangered	Taxa that are facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered	Taxa which are not critically endangered and is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
Vulnerable	Taxa which are not critically endangered or endangered and is facing a high risk of extinction in the wild in the medium term future, as determined in accordance with the prescribed criteria.
Near Threatened	Taxa which has been evaluated but does not qualify for CR, EN or VU now but is close to qualifying or likely to qualify in the near future.
Least Concern	Taxa which has been evaluated but does not qualify for CR, EN, VU, or NT but is likely to qualify for NT in the near future.
Data Deficient	Taxa for which there is inadequate information to make a direct or indirect assessment of its risk of extinction based on its distribution and/or population status.

A search of the DPaW PEC and TEC database was also conducted within a 40km radius of the survey area (DPaW, 2016b). Table 5 provides definitions for conservation significant communities.

Table 5: Definition of conservation significant communities

Category Code	Category
Threatened Ecological Communities (TEC)	
PTD	**Presumed Totally Destroyed** An ecological community will be listed as Presumed Totally Destroyed if there are no recent records of the community being extant and either of the following applies: records within the last 50 years have not been confirmed despite thorough searches or known likely habitats or; all occurrences recorded within the last 50 years have since been destroyed.
CE	**Critically Endangered** An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future, meeting any one of the following criteria:

Category Code	Category
	The estimated geographic range and distribution has been reduced by at least 90% and is either continuing to decline with total destruction imminent, or is unlikely to be substantially rehabilitated in the immediate future due to modification; The current distribution is limited i.e. highly restricted, having very few small or isolated occurrences, or covering a small area; The ecological community is highly modified with potential of being rehabilitated in the immediate future.
E	**Endangered** An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. The ecological community must meet any one of the following criteria: The estimated geographic range and distribution has been reduced by at least 70% and is either continuing to decline with total destruction imminent in the short term future, or is unlikely to be substantially rehabilitated in the short term future due to modification; The current distribution is limited i.e. highly restricted, having very few small or isolated occurrences, or covering a small area; The ecological community is highly modified with potential of being rehabilitated in the short term future.
V	**Vulnerable** An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing high risk of total destruction in the medium to long term future. The ecological community must meet any one of the following criteria: The ecological community exists largely as modified occurrences that are likely to be able to be substantially restored or rehabilitated; The ecological community may already be modified and would be vulnerable to threatening process, and restricted in range or distribution; The ecological community may be widespread but has potential to move to a higher threat category due to existing or impending threatening processes.
Priority Ecological Communities (PEC)	
P1	**Poorly-known ecological communities** Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist.
P2	**Poorly-known ecological communities** Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, State forest, un-allocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation.
P3	**Poorly known ecological communities** Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or: Communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or; Communities made up of large, and/or widespread occurrences, that may or not be represented in the reserve system, but are under threat of modification across

Category Code	Category
	much of their range from processes such as grazing and inappropriate fire regimes.
P4	**Ecological communities that are adequately known, rare but not threatened** or meet criteria for near threatened, or that have been recently removed from the threatened list. These communities require regular monitoring.
P5	**Conservation Dependent ecological communities** Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

3.1.1 Previous Surveys

Flora and fauna surveys, assessments and reviews have been undertaken in nearby areas in the past, though not all are publicly available and could not be referenced. The most significant of those available listed below have been used as the primary reference material for compiling the potential flora and floristic communities and fauna habitats for the general area:

- ATA Environmental (2006a), Vertebrate Fauna Assessment, St. Ives Gold Mine. Unpublished Report commissioned by Jim's Seeds, Weeds and Trees Pty Ltd.
- ATA Environmental (2006b), Fauna Assessment, St. Ives Caves Rock Satellite Pit, Waste Dump and Haul Road. Unpublished Report commissioned by Jim's Seeds, Weeds and Trees Pty Ltd.
- Bamford Consulting Ecologists (2010), Fauna Assessment: impacts of water discharge and general mining activity on vertebrate fauna. Unpublished report for Goldfields - St Ives Gold Mine, Kambalda.
- BC, (2007a), Flora and Vegetation Survey of the Proposed Leviathan Haul Road. Prepared for St Ives Gold Mine.
- BC, (2007b), Flora and Vegetation Survey of the Proposed Tailings Storage Facility. Prepared for St Ives Gold Mine.
- BC, (2008) Flora and Vegetation Survey of the St. Ives Gold Mine AAA Project. Prepared for St Ives Gold Mine.
- BC, (2010), Level 2 Flora survey of Diana, West Idough and Bellerophon Projects. Prepared for St Ives Gold Mine.
- BC, (2011a), Level 1 Flora & Vegetation Survey of Cave Rocks Proposed Pipeline. Prepared for St Ives Gold Mine.
- BC, (2011b), Level 1 Flora & Vegetation Survey of Proposed Workshop area. Prepared for St Ives Gold Mine.
- BC, (2011c), Level 1 Flora & Vegetation Survey Thunderer Project. Prepared for St Ives Gold Mine.
- BC, (2011d), Level 1 Flora survey of proposed 66kv Powerline Extension Athena. Prepared for St Ives Gold Mine.
- BC, (2011e), Level 2 Flora & Vegetation Survey of Cave Rocks. Prepared for St Ives Gold Mine.
- BC, (2012a), Level 1 Flora & Vegetation Survey within the Mining Tenements of St Ives Gold Mine. Prepared for St Ives Gold Mine.
- Chapman, A., Kealley, I., McMillan, D., McMillan, P. and Rolland, G. (1991), Biological Surveys of Four Goldfields Reserves. Landnote 1/91 Department of Conservation and Land Management.

- E.M. Mattiske and Associates, (1996), Kambalda Nickel Operations Western Mining Corporation Flora and Vegetation Studies. Prepared for Western Mining Corporation.
- Etten, E.V, (2010), Flora & Vegetation of St Ives Gold Mine's Newly Acquired Southern (Heron) Leases South-East of Kambalda, Western Australia. Prepared for St Ives Gold Mine.
- Halpern, Glick, Maunsell (1998), Lake Lefroy Environmental Assessment. Report ES4490C. Unpublished Report to WMC Resources Ltd.
- KLA (2007), St. Ives Gold Mining Company. Northern Tailings Storage Facility (No. 4). Spring Fauna Survey. Unpublished report for St Ives Gold Mining Company.
- KLA (2008), Australian Nickel Mines. Widgiemooltha Project. Fauna Survey. Unpublished report for Botanica Consulting.
- Mattiske Consulting, (2003), Flora and Vegetation Survey St Ives Gold Mine Kambalda. Prepared for St Ives Gold Mine.
- Mattiske Consulting (2007), Flora and Vegetation of the Widgiemooltha Town Site. Prepared for Australian Nickel Mines NL.
- Meissner, R.A & Coppen, R, (2009-2012), Flora and Vegetation of Greenstone Ranges of the Yilgarn Craton: Kangaroo Hills and other Timber Reserves. Science Division Department of Environment and Conservation.
- Ninox Wildlife Consulting (2004), St Ives Gold Delta Island Vertebrate Fauna Assessment. Unpublished Report Commissioned by St Ives Gold Mining Company Pty.
- Western Wildlife (2006), St. Ives Gold Fauna Survey; Spring 2005. Unpublished Report commissioned by Jim's Seeds, Weeds and Trees Pty. Ltd.

Some of the abovementioned reports refer to flora and fauna surveys carried a considerable distance from the survey area being assessed and therefore, as with the databases searches, some refer to species that would not occur in the survey area due it being out of their normal range or due to a lack of suitable habitat (extent and/or quality) and this fact was taken into consideration when compiling the potential flora and fauna species list for the survey area.

3.2 Flora Field Assessment

BC was commissioned by Mincor to undertake a Level 2 flora survey of the Widgiemooltha Project survey area, covering an area of approximately 836 ha. The primary flora survey was conducted in spring on the 27th and 28th October 2016 in which 30 quadrats were established. These quadrats were revisited in Autumn during the supplementary survey on the 6th and 7th May 2017 (Figure 7).

Prior to the commencement of field work, aerial photography was inspected and obvious differences in the vegetation assemblages were identified. The different floristic communities identified were then inspected during the field survey to assess their validity. A handheld GPS unit was used to record the co-ordinates of the boundaries between existing vegetation communities. At each sample point, the following information was recorded:

- GPS location;
- Photograph of vegetation;
- Dominant species;
- Collection and documentation of unknown plant specimens; and
- GPS location, photograph and collection of Threatened Flora if encountered.

Unknown specimens collected during the survey were identified with the aid of samples housed at the BC Herbarium and WAHERB. Similar floristic communities were recognised visually in the field. Floristic communities were classified in accordance with the NVIS Floristic communities' classification, using presence/absence data of taxa from sample sites to compile the representative floristic communities delineated from the statistical analysis (see Section 3.4.1).

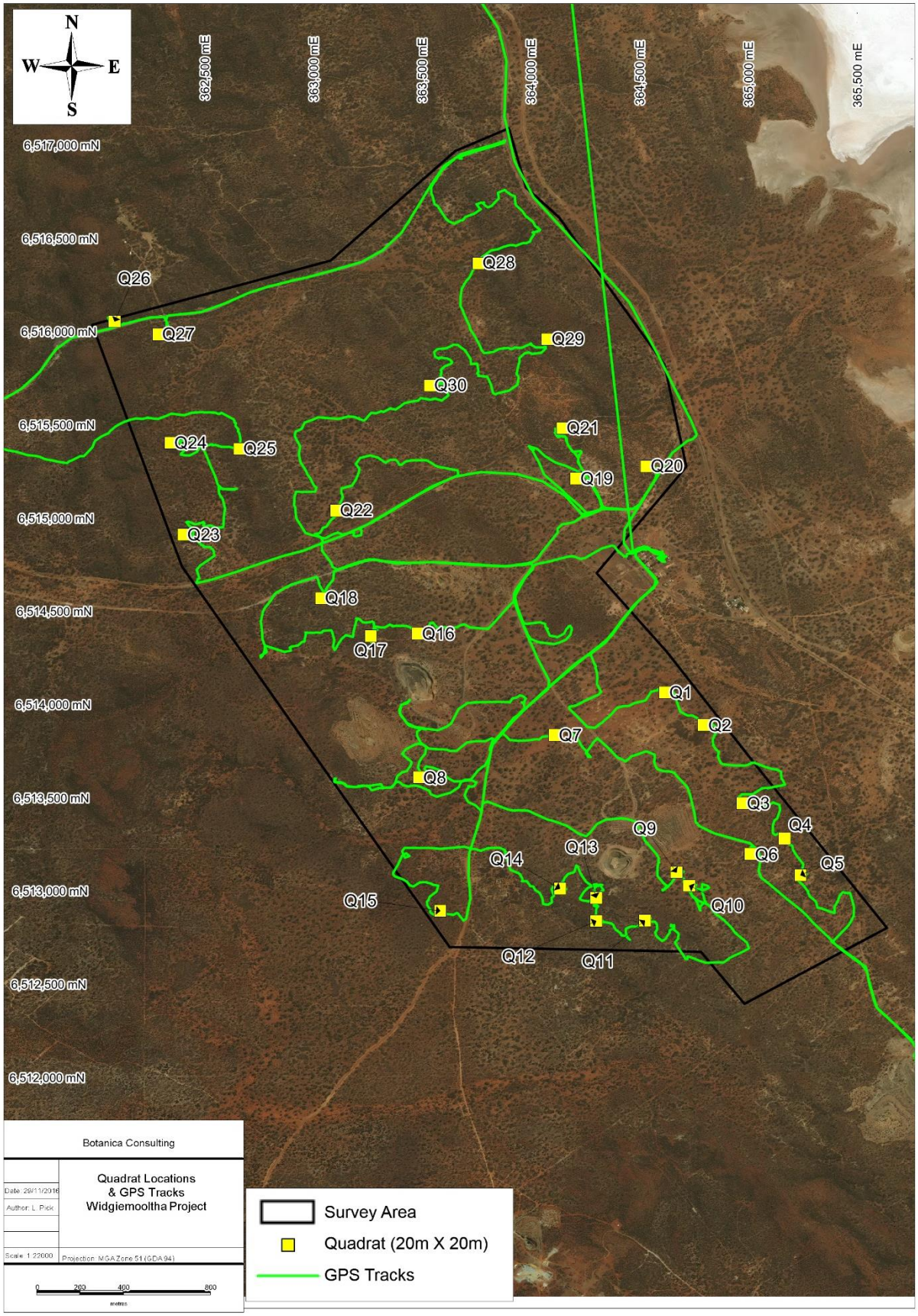

Figure 7: Quadrat locations and GPS tracks traversed throughout the Widgiemooltha Project survey area

3.2.1 Sampling Quadrats

Thirty 20m x 20m quadrats were established within the survey area (Figure 7). The objective was to have at least three quadrats per community to capture the floristic variations within the survey area. Where a community was insufficiently large to accommodate three quadrats, the maximum number of quadrats that would fit within that specific community was established. The quadrats were established by inserting metal pickets in each corner, and measuring the length of the resultant boundaries to verify the quadrats were 20m x 20m.

Following their establishment and boundary verification, the location of each quadrat was recorded by GPS (Appendix 5) photographed (Appendix 6) and all vascular plants (annuals and perennials) within the quadrat were recorded (Appendix 7). This included recording of dominant taxa from the upper, middle and lower stratum, and sampling of all unknown taxa. Unknown taxa were identified using BC's own reference herbarium and relevant taxonomical keys or by a taxonomic consultant. Data on the average heights of all vascular plants were recorded. Data on level of disturbance, presence of coarse fragments on surface, topographical position, percentage litter, percentage bare ground, percentage surface rock (bedrock and surface deposits), soil types (colour, profile, field texture and surface type), and vegetation structure were collected from each quadrat. Methods of recording data from these quadrats largely follow those outlined in CSIRO's *Australian Soil and Land Survey Field Handbook* (McDonald *et al.* 1998) and in accordance with current DPaW/ EPA Guidelines.

3.2.2 Personnel involved

Jim Williams - Environmental Consultant (Diploma of Horticulture)
Andrea Williams - Environmental Consultant (Bachelor of Science-Honours)
Hannah Vinicombe - Environmental Technician

3.2.3 Scientific licences

Table 6: Scientific Licences of Botanica Staff coordinating the survey

Licensed staff	Permit Number	Valid Until
Jim Williams	SL011826	21-05-2017
Andrea Williams	SL011825	21-05-2017

3.3 Data Analysis Tools

Once the survey was completed the data obtained was analysed to generate a vegetation map. The statistical program PATN was used to complete a pattern analysis on the data obtained from the quadrats (Appendix 8). Species accumulation curves and species richness estimates were calculated using the EstimateS program.

3.3.1 PATN Analysis

The PATN software package was used to assess the similarities/ dissimilarities between quadrats based on presence/ absence of species. Annual species were removed from the data prior to analysis. Species reconciliation eliminated those sterile species that could not be fully identified from the analysis. Singleton species were removed from the analysis. The analysis produces a quantitative estimate of the relationship between species composition of each quadrat. The classifications are

based upon a Bray-Curtis association matrix using a flexible Unweighted Pair Group Arithmetic Mean (UPGMA) method which standardises the data enabling the analysis to be completed. Semi-strong hybrid (SSH) ordination of the quadrat is then undertaken to show spatial relationships between groups and to elucidate possible environmental correlates with the classification.

The analysis also produces a stress value which is a measure of the 'strength' of the analysis (i.e. how well the quadrats are grouped together into the appropriate vegetation communities). The lower the stress value the greater the strength of the analysis with a value of less than 0.3 showing that the analysis grouped quadrats accordingly. A stress value greater than 0.3 suggests that the analysis was unable to group quadrats appropriately due to extraneous variables (i.e. other factors influencing differences in floristic communities other than species composition e.g. fire, clearing disturbance etc.).

The PATN analysis was conducted on all perennial species present in each quadrat using a Flexible UPGMA and a beta value of -0.1.

3.3.2 EstimateS

EstimateS software was used to estimate species richness present using the Chao 2 richness estimator. For any number of samples, the estimator uses the existing pattern of species accumulation to estimate the true number of species at a site. The estimators tend to under-estimate species number when sample size is small, hence the estimated number of true species can be seen to increase with sample size. This software was also used to compute Coleman rarefaction curves estimates which were used to calculate species accumulation curves.

3.4 Fauna Field Assessment

BC was commissioned by Mincor to undertake a Level 1 fauna survey of the Widgiemooltha Project survey area, covering an area of approximately 836 ha. The fauna survey was conducted on 19th November 2016.

Vegetation and landform units identified during the flora and vegetation survey have been used to define broad fauna habitat types across the site. The main aim of the habitat assessment was to determine if it was likely that any species of conservation significance would be utilising the areas that may be impacted as a consequence of the proposal proceeding. The habitat information obtained was also used to aid in finalising the overall potential fauna list.

3.4.1 Personnel involved

Greg Harewood - Zoologist (B.Sc. Zoology)

3.5 Flora and Fauna survey limitations and constraints

It is important to note that flora and fauna surveys will entail limitations notwithstanding careful planning and design. Potential limitations are listed in Table 7.

The conclusions presented in this report are based upon field data and environmental assessments and/or testing carried out over a limited period of time and are therefore merely indicative of the environmental condition of the site at the time of the field assessments. Also, it should be recognised that site conditions can change with time. Information not available at the time of this assessment which may subsequently become available may alter the conclusions presented.

Some flora and fauna species are reported as potentially occurring based on there being suitable habitat (quality and extent) within the survey area or immediately adjacent. The habitat requirements and ecology of many of the species known to occur in the wider area are however often not well understood or documented. It can therefore be difficult to exclude species from the potential list based on a lack of a specific habitats or microhabitats within the survey area. As a consequence of this limitation, the potential species lists produced are most likely an overestimation of those that actually utilise the survey area for some purpose.

In recognition of survey limitations, a precautionary approach has been adopted for this assessment. Any flora or fauna species that would possibly occur within the survey area (or immediately adjacent), as identified through ecological databases, publications, discussions with local experts/residents and the habitat knowledge of the Author, has been listed as having the potential to occur.

Table 7: Limitations and constraints associated with the flora and fauna survey.

Variable	Potential Impact on Survey	Details
Access problems	Not a constraint	The survey was conducted via 4WD, all-terrain vehicle and on foot.
Experience levels	Not a constraint	The BC personnel that conducted the survey were regarded as suitably qualified and experienced (8-20 years' experience conducting surveys). To date the survey team have completed >20 surveys within the local region. **Coordinating Scientist:** Jim Williams **Field Staff:** Jim Williams, Andrea Williams, Lauren Pick, Greg Harewood **Data Interpretation:** Jim Williams, Lauren Pick, Greg Harewood & Andrea Williams
Timing of survey, weather & season	Not a constraint	Primary fieldwork was conducted in September (Spring) within the DPaW/EPA's recommended timing for flora surveys for detecting most ephemeral flora and when the majority of species are in flower. Supplementary flora surveys were conducted in Autumn in accordance with DPaW/EPA guidelines. The timing of the survey did not represent a constraint on the fauna survey.
Sources of information	Not a constraint	BC was able to obtain information about the area from previous flora and fauna assessments conducted within the area and surrounding region which provided background information about the region.
Mapping reliability	Minor constraint	BC were able to obtain ortho aerial images of the area sufficient to reliably determine changes in vegetation/habitats within the survey area.
Area disturbance	Minor constraint	The area has been subject to disturbance from historic mining and exploration. Impacts from feral animals have been minimal.
Survey Intensity	Not a constraint	Survey intensity was high with a Level 2 quadrat based survey conducted in Spring and Autumn in accordance with Technical Guidelines. Prior to the quadrats being established a reconnaissance of the survey area was conducted in order to identify floristic communities and any Flora of Conservation Significance. Targeted fauna surveys were carried out for specific species of concern.

Variable	Potential Impact on Survey	Details
Resources	Not a constraint	Threatened flora database search provided by the DPaW were used to identify any potential locations of Threatened/Priority Flora and Fauna species. DAFWA, DPaW and DotEE databases were reviewed to obtain appropriate regional desktop information on the biophysical environment of the local region. Results of previous flora, vegetation and fauna surveys within the local area were also obtained which provided valuable background information.
Data Analysis	Minor constraint	BC staff conducting the PATN statistical analyses are not statistical analysts and have basic statistics training. These analyses are used to provide basic information on the relationships between floristic communities delineated in the field.
Completeness	Not a constraint	In the opinion of BC, the survey area was covered sufficiently in order to identify vegetation assemblages and fauna habitats. Due to the extensive experience and familiarity of the BC staff with flora within the region and multiple season survey work it is estimated that approximately 90% of the flora within the survey area was able to be fully identified including annual species. The floristic communities for this study were based on visual descriptions of locations in the field. The distribution of these communities outside the survey area is not known, however floristic communities identified were categorised via comparison to vegetation distributions throughout WA given on Natural Vegetation Information System (DotEE, 2016b). The level 1 fauna assessment was also carried out to a standard sufficient to allow for the characterisation of the likely fauna assemblage present and the identification of potential impacts.

4 Results

4.1 Desktop Assessment

4.1.1 Flora of Conservation Significance

The results of the combined search of the DPaW's Flora of Conservation Significance databases, NatureMap database and Protected Matters search tool (Appendix 1), recorded no Threatened Flora within the survey area. Four Priority Flora taxa were recorded on the DPaW database as occurring within the survey area. Database records had one Threatened Flora and 33 Priority Flora taxa listed as potentially occurring within a 40km radius of the survey area. These taxa were assessed and ranked for their likelihood of occurrence within the survey area (Table 8).
The rankings and criteria used were:

- Unlikely: Area is outside of the currently documented distribution for the species/no suitable habitat (type, quality and extent) was identified as being present during the field/desktop assessment.

- Possible: Area is within the known distribution of the species in question and habitat of at least marginal quality was identified as being present during the field/desktop assessment, supported in some cases by recent records being documented from within or near the area.

- Known to Occur: The species in question was positively identified as being present during the field survey.

Table 8: Likelihood of Occurrence – Flora Taxa of Conservation Significance

Taxon	Conservation Code	Description (WAHERB, 2016)	Likelihood of Occurrence
Acacia websteri	P1	Shrub, 1.2-5 m high, bark fibrous. Fl. Yellow. Red sand, clay or loam. Low-lying areas, flats.	Unlikely
Austrostipa sp. Carlingup Road (S. Kern & R. Jasper LCH 18459)	P1	No description available	Possible
Calandrinia sp. Widgiemooltha (F. Obbens & E. Reid FO 9/05)	P1	No description available	Possible
Diocirea acutifolia	P3	Low, dense, rounded shrub, 0.3-0.8 m high. Fl. white, Nov to Dec. Clay loam, gravelly loam. Undulating flats.	Known to occur
Eremophila perglandulosa	P1	Low, spreading, viscid shrub, ca 0.25 m high. Fl. blue-purple, Jan.	Possible
Eremophila praecox	P1	Broom-like shrub, 1.5-3 m high. Fl. purple, Oct or Dec. Red/brown sandy loam. Undulating plains.	Possible
Grevillea phillipsiana	P1	Prickly shrub, 0.8-1.5 m high. Fl. red/red & orange, Jul to Sep. Red sand, stony loam. Granite hills.	Unlikely
Lepidosperma sp. Parker Range (N. Gibson & M. Lyons 2094)	P1	No description available	Possible

Taxon	Conservation Code	Description (WAHERB, 2016)	Likelihood of Occurrence
Phebalium clavatum	P2	Upright shrub, 0.5-1.5 m high. Fl. white, Aug to Sep. Sandy soils. Sandplains.	Known to occur
Philotheca apiculata	P1	Erect shrub, 0.5-1.5 m high. Fl. white-pink, Aug to Nov. Stony clay loam. Rocky outcrops, hillsides.	Known to occur
Prostanthera splendens	P1	Erect, openly branched shrub, 0.2-1 m high. Fl. blue-purple, Aug to Oct. Stony loam, shallow soils with ironstone pebbles. Breakaways	Known to occur
Ptilotus rigidus	P1	No description available	Possible
Senecio microbasis	P1	Upright annual or perennial, herb, to 0.6 m high. Fl. yellow, Sep to Dec or Jan to Feb. Schist soils. Low hills, disturbed areas in woodlands.	Possible
Tecticornia flabelliformis	P1	Erect shrub, to 0.2 m high. Clay. Saline flats.	Unlikely
Thryptomene sp. Londonderry (R.H. Kuchel 1763)	P1	No description available	Possible
Acacia kerryana	P2	Low, spreading, domed shrub, 0.3-1 m high. Fl. yellow, Oct to Dec or Jan to Feb. Granitic loamy sand, stony clayey loam or clayey sand. Low stony ridges, undulating plains.	Unlikely
Bossiaea laxa	P2	Lax, open, spreading shrub, to 2 m high. Fl. yellow-green, May. Brown loam over deep granite. Sheltered positions around outcrops.	Unlikely
Goodenia corralina	P2	Low spreading perennial, herb, 0.1-0.7 m high. Brown loam, granite. Near large outcrop.	Unlikely
Phebalium clavatum	P2	Upright shrub, 0.5-1.5 m high. Fl. white, Aug to Sep. Sandy soils. Sandplains.	Unlikely
Trachymene pyrophila	P2	Annual, herb, 0.1-0.5 m high, indumentum of patent glandular hairs. Fl. white, Nov to Dec or Jan to Mar. Yellow or orange sand. Sandplains; germinating after fire or other disturbances such as mining.	Unlikely
Allocasuarina eriochlamys subsp. *grossa*	P3	Dioecious or monoecious shrub, 1-3 m high, bracteoles prominently exceeding cone. Stony loam, laterite clay. Granite outcrops.	Unlikely
Austrostipa blackii	P3	Tufted perennial, grass-like or herb, 1 m high. Fl. Sep to Nov.	Possible

Taxon	Conservation Code	Description (WAHERB, 2016)	Likelihood of Occurrence
Diocirea acutifolia	P3	Low, dense, rounded shrub, 0.3-0.8 m high. Fl. white, Nov to Dec. Clay loam, gravelly loam. Undulating flats.	Possible
Eremophila annosocaulis	P3	No description available	Possible
Eucalyptus frenchiana	P3	No description available	Possible
Grevillea petrophiloides subsp. *remota*	P3	Spreading shrub (with emergent flowering branches), 2.5-3 m high. Fl. pink, Jun to Oct. Loamy sand, granite. Base of outcrops, crevices.	Unlikely
Leucopogon sp. Kambalda (J. Williams s.n. PERTH 07305028)	P3	No description available	Possible
Melaleuca coccinea	P3	Much branched shrub, 1.5-2.6 m high, leaf blade elliptic to ovate, 1.5-2.2 times as long as wide. Fl. red, Sep to Nov or Jan. Sandy loam over granite. Granite outcrops, sandplain, river valleys.	Unlikely
Melaleuca macronychia subsp. *trygonoides*	P3	Multi-stemmed, spreading shrub, 1-4 m high, leaves broadly elliptic. Fl. red, Feb or Jul to Aug or Oct. Sandy soils. Granite outcrops.	Unlikely
Phlegmatospermum eremaeum	P3	Prostrate to spreading annual, herb, 0.02-0.1(-0.2) m high. Fl. white-cream, Jun or Aug to Oct. Stony loam.	Unlikely
Pityrodia scabra subsp. *dendrotricha*	P3	No description available	Possible
Stylidium choreanthum	P3	Creeping perennial, herb, 0.01-0.03 m high, to 0.3 m wide. Fl. pink/white, Sep to Nov. White/yellow or red sand. Plains	Unlikely
Eremophila caerulea subsp. *merrallii*	P4	Spreading or sprawling shrub, to 0.35 m high, to 0.8 m wide. Fl. blue-purple, Oct to Dec. Sand, clay or loam. Undulating plains.	Possible
Tetratheca spenceri	T	No description available	Unlikely

4.1.2 Vertebrate Fauna of Conservation Significance

Fauna of conservation significance identified during the literature review as previously being recorded in the general area were assessed and ranked for their likelihood of occurrence within the subject site itself (Table 9). The rankings and criteria used were:

- Would Not Occur: There is no suitable habitat for the species in the survey area and/or there is no documented record of the species in the general area since records have been kept and/or the species is generally accepted as being locally/regionally extinct (supported by a lack of recent records).
    - Locally Extinct: Populations no longer occur within a small part of the species natural range, in this case within 10 or 20km of the subject site. Populations do however persist outside of this area.
    - Regionally Extinct: Populations no longer occur in a large part of the species natural range, in this case within the southern goldfields region. Populations do however persist outside of this area.
- Unlikely to Occur: The subject site is outside of the currently documented distribution for the species in question, or no suitable habitat (type, quality and extent) was identified as being present during the field survey and/or literature review. Individuals of some species may occur occasionally as vagrants/transients especially if suitable habitat is located nearby but the subject site itself would not support a population or part population of the species.
- Possibly Occurs: The survey area is within the known distribution of the species in question and habitat of at least marginal quality was identified as likely to be present during the field survey and/or literature review, supported in some cases by recent records being documented in literature from within or near the survey area. In some cases, while a species may be classified as possibly being present at times, habitat may be marginal (e.g. poor quality, fragmented, limited in extent) and therefore the frequency of occurrence and/or population levels may be low.
- Known to Occur: The species in question has been positively identified as being present (for sedentary species) or as using the survey area as habitat for some other purpose (for non-sedentary/mobile species) during field surveys within or near the survey area. This information may have been obtained by direct observation of individuals or by way of secondary evidence (e.g. tracks, foraging debris, scats). In some cases, while a species may be classified as known to occur, habitat may be marginal (e.g. poor quality, fragmented, limited in extent) and therefore the frequency of occurrence and/or population levels may be low.

A full list of fauna species considered likely to frequent the general area (subject to suitable habitat being present) is held in Appendix 10.

Table 9: Likelihood of Occurrence – Vertebrate Fauna Species of Conservation Significance

Species	Conservation Status			Potential Habitats Within Survey Area			Likelihood of Occurrence
	EPBC Act	WC Act	DPAW Priority	Foraging Habitat	Breeding Habitat	Total Extent (ha)	
Malleefowl *Leipoa ocellata*	VU	S3	-	Clay Loam Plains & Rocky Hillslopes	Clay Loam Plains Possibly unsuitable given apparent lack of past or present nesting activity.	723 ha (86.5% of total area).	Possible though most likely occasional transients only. No recent, nearby breeding records suggests this species does not breed in the area.
Western Rosella *Platycercus icterotis xanthogenys*	-	-	P4	Clay Loam Plains & Rocky Hillslopes	Clay Loam Plains & Rocky Hillslopes	723 ha (86.5% of total area).	Would Not Occur. Rarely recorded this far north/east. No recent, nearby records.
Peregrine Falcon *Falco peregrinus*	-	S7	-	Air space above all habitats.	Clay Loam Plains & Rocky Hillslopes, Decommissioned Pits	836 ha (100% of total area).	Possible but probably only rarely.
Eastern Great Egret *Ardea modesta/alba*	Mig	S5	-	None		0 ha	Would Not Occur. No Suitable Habitat
Cattle Egret *Ardea ibis*	Mig	S5	-	None		0 ha	Would Not Occur. No Suitable Habitat
Other Migratory Shorebirds (Various species)	Mig	S5	-	None		0 ha	Would Not Occur. No Suitable Habitat
Grey Wagtail *Motacilla cinerea*	Mig	S5	-	None		0 ha	Would Not Occur. No Suitable Habitat
Fork-tailed Swift *Apus pacificus*	Mig	S5	-	Air space above all habitats.	None	836 ha (100% of total area)	Unlikely. Flyover only on very rare occasions.
Rainbow Bee-eater *Merops ornatus*	Mig	S5	-	Air space above all habitats.	None – ground conditions appear unsuitable.	836 ha (100% of total area)	Known to Occur. A common species in the general area during springing spring/summer season migration period.
Chuditch *Dasyurus geoffroii*	VU	S3	-	Clay Loam Plains & Rocky Hillslopes.		723 ha (86.5% of total area).	Would Not Occur. No recent, nearby records. Appears to be locally extinct. Very occasional transients possible on very rare occasions.
Central Long-eared Bat *Nyctophilus major tor*	-	-	P4	Air space above all habitats.	Clay Loam Plains & Rocky Hillslopes	836 ha (100% of total area)	Possible though lack of records suggests it is uncommon.

The current status of some species on site and/or in the general area is difficult to determine, however, based on the habitats present and, in some cases, direct observations or recent nearby records, the following species of conservation significance can be regarded as possibly utilising the survey area for some purpose at times, these being:

- **Malleefowl *Leipoa ocellata* – S3 *(WC Act),* Vulnerable *(EPBC Act)***
  This species is occasionally recorded in the general area and some old, inactive malleefowl mounds have been found during various surveys in nearby areas (Ninox 2004, Bamford 2010). There does however appear to be no recent records of this species breeding in the Widgiemooltha/Kambalda area in recent times. Available information therefore suggests that a breeding population of this species is very unlikely to be present in the general area, though transient non-breeding individuals, as recorded during the survey, may occasionally occur.

- **Peregrine Falcon *Falco peregrinus*** – S7 (*WC Act*)
  This species potentially utilises some sections of the survey area as part of a much larger home range, though records in this area are uncommon. It is considered unlikely to breed within the survey area given the absence of habitat suitable for this purpose.

- **Rainbow Bee-eater *Merops ornatus*** – S5 (*WC Act*), Migratory (*EPBC Act*)
  Recorded during the field survey. This species is a common seasonal visitor to southern half of WA and is likely to utilise the more open sections of the survey area during its spring/summer season migration period. Ground conditions appear unsuitable for breeding.

- **Central Long-eared Bat *Nyctophilus major tor*** – P4 (DPaW Priority Species)
  Recorded by ATA in the St Ives area (ATA 2006a) and the survey area contains some suitable habitat for this species to use for foraging and possibly roosting. It would however appear to be uncommon given the lack of documented records in the general vicinity.

It should be noted that while habitats onsite for one or more of the species listed above are considered possibly suitable, some or all may be marginal in extent/quality and therefore the fauna species considered as possibly occurring may in fact only visit the area for short periods as infrequent vagrants.

A number of other species of conservation significance, while possibly present in the general area and/or the Goldfields region are not listed as potential species due to the survey area being outside of their currently recognised range, a lack of suitable habitat or known/very likely local or regional extinction (and no subsequent recruitment from adjoining areas).

4.2 Field Assessment

4.2.1 Flora of conservation significance

Flora of conservation significance identified in the desktop assessment were targeted during the field assessment. The location of the following four taxa recorded within the survey area on the DPaW database were visited:

1. *Diocirea acutifolia (P3);*
2. *Phebalium clavatum (P2);*

3. *Philotheca apiculata (P1);* and
4. *Prostanthera splendens (P1)*

Only one location of the taxon *Philotheca apiculata* (P1) was confirmed during the field assessment. Two additional taxa not listed on the DPaW database as occurring within the survey area were also identified: *Austrostipa blackii* (P3) and *Austrostipa* sp. Carlingup Road (S. Kern & R. Jasper LCH 18459) (P1). Descriptions of the three Priority Flora taxa identified within the survey area are provided below. A map of the Priority Flora locations recorded by BC are provided in Figure 8. GPS coordinates of the recorded locations are provided in Appendix 2. No Threatened Flora pursuant to subsection (2) of section 23F of the WC Act and the EPBC Act were identified within the survey area.

***Austrostipa blackii* (P3)**

This taxon is described as a tufted perennial, grass-like or herbaceous plant, which grows to 1 m high (Plate 1). It produces flowers from September to November (WAHERB, 2017). This taxon was identified at one location within the survey area as shown in Figure 8.

Plate 1: *Austrostipa blackii* (P3)

***Austrostipa* sp. Carlingup Road (S. Kern & R. Jasper LCH 18459) (P1)**

No description for this taxon is available on Florabase (WAHERB, 2017). A record of this taxon was recorded by DEC during flora and vegetation surveys of the Greenstone Ranges of the Yilgarn Craton-Kangaroo Hills and other Timber Reserves which was located approximately 170m north of the survey area. The specimen was described as a bunch grass approximately 0.4m high, located on a gently inclined crest of basalt and minor quartz with red-brown shallow sandy clay loam soils (Meissner, & Coppen, 2009-2012). This taxon was identified at one location within the survey area as shown in Figure 8.

Plate 2: *Austrostipa* sp. Carlingup Road (S. Kern & R. Jasper LCH 18459) (P1)

***Philotheca apiculata* (P1)**

This taxon is described as an erect shrub, which grows between 0.5-1.5 m high. It produces white-pink flowers from August to November (Plate 3). It occurs on stony clay loam soils of rocky outcrops and hillsides (WAHERB, 2017). This taxon was identified at three locations within the survey area (Figure 8).

Plate 3: *Philotheca apiculata* (P1)

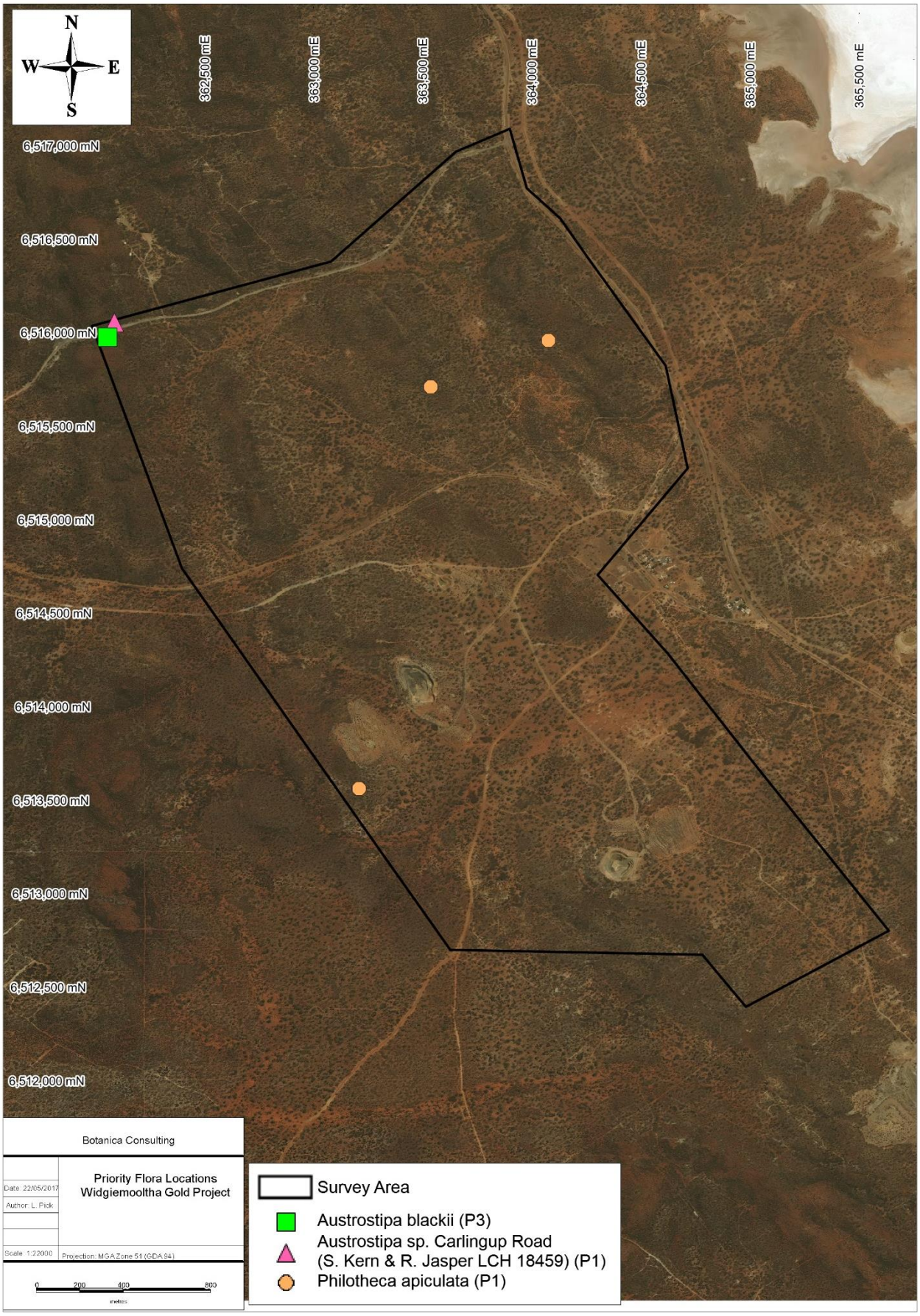

Figure 8: Priority Flora recorded within the Widgiemooltha Project survey area

4.2.2 Fauna of Conservation Significance

Fauna of conservation significance identified in the desktop assessment as potentially occurring within the survey area were targeted to varying degrees during the field assessment. No Threatened Fauna/ Schedule Fauna taxa pursuant to the WC Act and the EPBC Act were identified within the survey area. No Priority Fauna taxa were identified within the survey area. The state and federally listed migratory bird, the rainbow bee-eater was observed on several occasions during the survey period. This species is common in the southern part of the state during its spring/summer migration period. It is not a threatened species and is therefore not of specific concern.

4.3 Floristic Communities

Seven floristic communities were identified within the survey area. These communities comprised of two landform types and two NVIS major vegetation groups as listed in Table 10 below. These communities were represented by 24 plant families, 45 genera and 88 taxa (including 12 annual taxa) as listed in Appendix 4. A map showing the floristic communities present in the survey area is provided in Figure 9.

Table 10: Floristic Communities identified within the Widgiemooltha Project survey area

Landform	NVIS Group	Floristic Community	Vegetation Code	Area (ha)	Area (%)
Clay-Loam Plain	Eucalypt Woodlands (MVG 5)	Open low woodland of *Eucalyptus salmonophloia* over low scrub of *Eremophila scoparia/ Exocarpos aphyllus* and dwarf scrub of *Atriplex vesicaria* on clay-loam plain	CLP-EW1	117	14.0
		Low woodland of *Eucalyptus lesouefii* over low scrub of *Eremophila interstans/ Eremophila scoparia* and dwarf scrub of *Atriplex vesicaria/ Tecticornia disarticulata* on clay-loam plain	CLP-EW2	50	6.0
		Low forest of *Eucalyptus ravida* over low scrub of *Eremophila dempsteri/ Eremophila interstans* and low heath of *Atriplex vesicaria/Tecticornia disarticulata* on clay-loam plain	CLP-EW3	103	12.3
Rocky Hillslope	Acacia Forests and Woodlands (MVG 6)	Thicket of *Acacia burkittii/ Acacia collegialis* over heath of *Prostanthera grylloana/ Thryptomene australis* and mixed dwarf scrub on greenstone hill	RH-AFW1	41	4.9
	Eucalypt Woodlands (MVG 5)	Low woodland of *Eucalyptus lesouefii* over heath of *Dodonaea lobulata/Santalum acuminatum* and low scrub of *Eremophila caerulea/ Westringia rigida* on greenstone hill	RH-EW1	238	28.5
		Low woodland of *Eucalyptus lesouefii* over shrub mallee of *Eucalyptus griffithsii* and mixed low heath on greenstone hill	RH-EW2	141	16.9
		Low woodland of *Eucalyptus torquata* over heath of *Acacia hemiteles/ Allocasuarina helmsii* and low scrub of *Dodonaea stenozyga/Westringia rigida* on greenstone hill	RH-EW3	33	3.9
N/A	N/A	Cleared Vegetation	CV	113	13.5
TOTAL				**836**	**100**

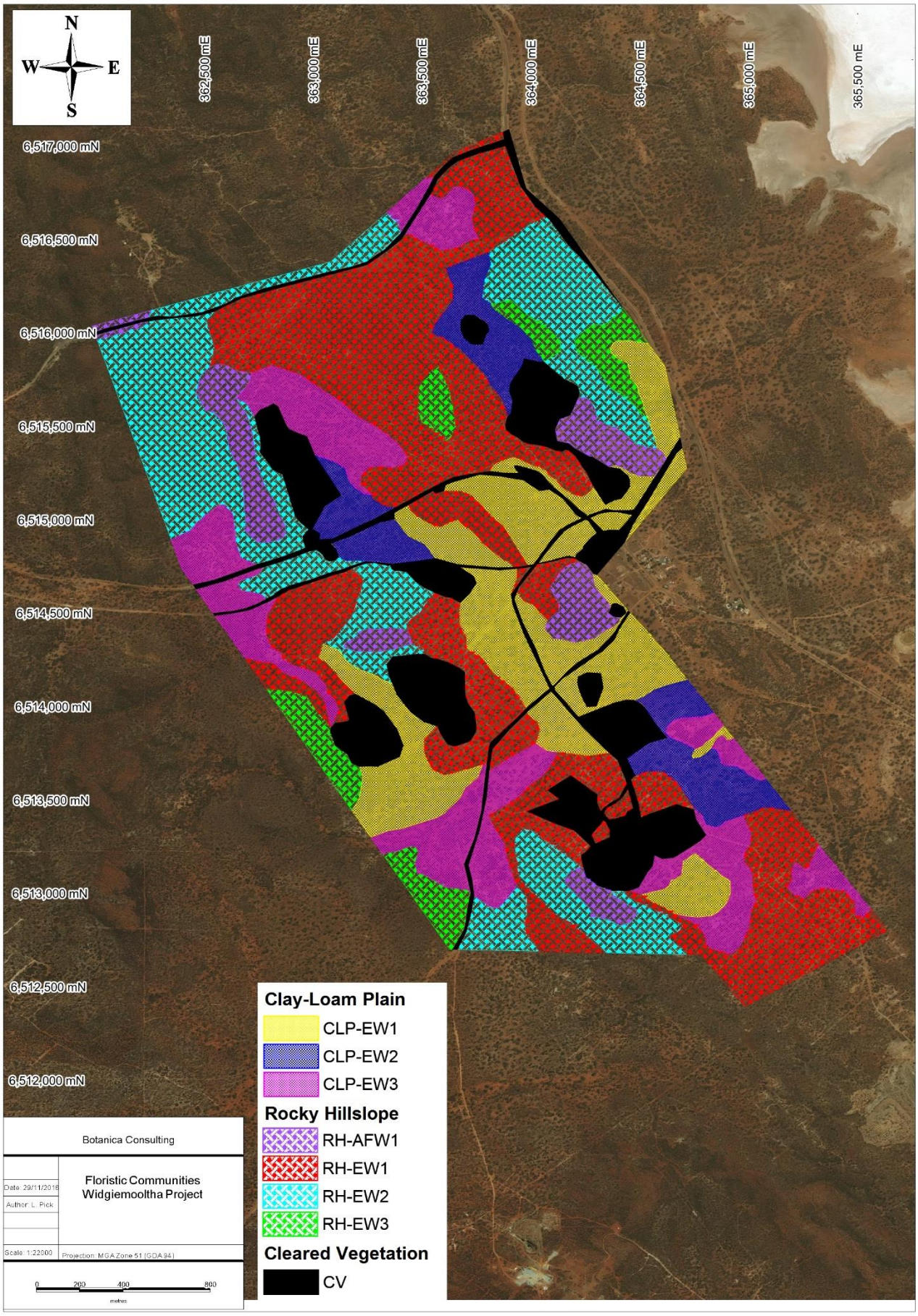

Figure 9: Floristic communities of the Widgiemooltha Project survey area

Clay-Loam Plain: Eucalypt Woodlands

4.3.1 Open low woodland of *Eucalyptus salmonophloia* over low scrub of *Eremophila scoparia/ Exocarpos aphyllus* and dwarf scrub of *Atriplex vesicaria* on clay-loam plain (CLP-EW1)

The total flora recorded within this community was represented by a total of 15 families, 22 genera and 36 taxa (Plate 4). Dominant taxa from the vegetation assemblage are shown in Table 11. No Priority Flora or Threatened Flora taxa were recorded within this community. Two introduced flora taxa were recorded within this community; *Carrichtera annua* (Wards Weed) and *Centaurea melitensis* (Maltese Cockspur). According to the NVIS, this floristic community is best represented by the MVG 5-Eucalypt Woodlands (DotEE, 2016b).

Table 11: Vegetation assemblage for Open low woodland of *Eucalyptus salmonophloia* over low scrub of *Eremophila scoparia/ Exocarpos aphyllus* and dwarf scrub of *Atriplex vesicaria* on clay-loam plain

Life Form/Height Class	Canopy Cover	Dominant taxa present
Tree 5-15m	2-10%	*Eucalyptus salmonophloia*
Shrub 1-1.5m	10-30%	*Eremophila scoparia* *Exocarpos aphyllus*
Shrub <0.5m	10-30%	*Atriplex vesicaria*

Plate 4: Open low woodland of *Eucalyptus salmonophloia* over low scrub of *Eremophila scoparia/ Exocarpos aphyllus* and dwarf scrub of *Atriplex vesicaria* on clay-loam plain

4.3.2 Low woodland of *Eucalyptus lesouefii* over low scrub of *Eremophila interstans/ Eremophila scoparia* and dwarf scrub of *Atriplex vesicaria/ Tecticornia disarticulata* on clay-loam plain (CLP-EW2)

The total flora recorded within this community was represented by a total of 13 families, 17 genera and 26 taxa (Plate 5). Dominant taxa from the vegetation assemblage are shown in Table 12. No Priority Flora or Threatened Flora taxa were recorded within this community. Two introduced flora taxa were recorded within this community; *Carrichtera annua* (Wards Weed) and *Centaurea melitensis* (Maltese Cockspur). According to the NVIS, this floristic community is best represented by the MVG 5-Eucalypt Woodlands (DotEE, 2016b).

Table 12: Vegetation assemblage for Low woodland of *Eucalyptus lesouefii* over low scrub of *Eremophila interstans/ Eremophila scoparia* and dwarf scrub of *Atriplex vesicaria/ Tecticornia disarticulata* on clay-loam plain

Life Form/Height Class	Canopy Cover	Dominant taxa present
Tree 5-15m	2-10%	*Eucalyptus lesouefii*
Shrub 1-1.5m	10-30%	*Eremophila interstans* subsp. *virgata* *Eremophila scoparia*
Shrub <0.5m	10-30%	*Atriplex vesicaria* *Tecticornia disarticulata*

Plate 5: Low woodland of *Eucalyptus lesouefii* over low scrub of *Eremophila interstans/ Eremophila scoparia* and dwarf scrub of *Atriplex vesicaria/ Tecticornia disarticulata* on clay-loam plain

4.3.3 Low forest of *Eucalyptus ravida* over low scrub of *Eremophila dempsteri/ Eremophila interstans* and low heath of *Atriplex vesicaria/Tecticornia disarticulata* on clay-loam plain (CLP-EW3)

The total flora recorded within this community was represented by a total of 8 families, 13 genera and 22 taxa (Plate 6). Dominant taxa from the vegetation assemblage are shown in Table 13. No Priority Flora or Threatened Flora taxa were recorded within this community. One introduced flora taxon was recorded within this community; *Carrichtera annua* (Wards Weed). According to the NVIS, this floristic community is best represented by the MVG 5-Eucalypt Woodlands (DotEE, 2016b).

Table 13: Vegetation assemblage for Low forest of *Eucalyptus ravida* over low scrub of *Eremophila dempsteri/ Eremophila interstans* and low heath of *Atriplex vesicaria/Tecticornia disarticulata* on clay-loam plain

Life Form/Height Class	Canopy Cover	Dominant taxa present
Tree 5-15m	30-70%	*Eucalyptus ravida*
Shrub 1-1.5m	10-30%	*Eremophila dempsteri* *Eremophila interstans* subsp. *virgata*
Shrub <0.5m	30-70%	*Atriplex vesicaria* *Tecticornia disarticulata*

Plate 6: Low forest of *Eucalyptus ravida* over low scrub of *Eremophila dempsteri/ Eremophila interstans* and low heath of *Atriplex vesicaria/Tecticornia disarticulata* on clay-loam plain

Rocky Hillslope: Acacia Forests and Woodlands

4.3.4 Thicket of *Acacia burkittii/ Acacia collegialis* over heath of *Prostanthera grylloana/ Thryptomene australis* over mixed dwarf scrub on greenstone hill (RH-AFW1)

The total flora recorded within this community was represented by a total of 20 families, 28 genera and 34 taxa (Plate 7). Dominant taxa from the vegetation assemblage are shown in Table 14. No Threatened Flora taxon were recorded within this community. Two Priority Flora taxa were recorded within this community; *Austrostipa blackii* (P3) and *Austrostipa* sp. Carlingup Road (S. Kern & R. Jasper LCH 18459) (P1). No introduced flora taxa were recorded within this community. According to the NVIS, this floristic community is best represented by the MVG 6-Acacia Forests and Woodlands (DotEE, 2016b).

Table 14: Vegetation assemblage for Thicket of *Acacia burkittii/ Acacia collegialis* over heath of *Prostanthera grylloana/ Thryptomene australis* and mixed dwarf scrub on greenstone hill

Life Form/Height Class	Canopy Cover	Dominant taxa present
Shrub >2m	30-70%	*Acacia collegialis* *Acacia burkittii*
Shrub 1-1.5m	30-70%	*Prostanthera grylloana* *Thryptomene australis* subsp. *brachyandra*
Shrub <0.5m	10-30%	*Dampiera latealata* *Ptilotus obovatus* *Solanum lasiophyllum*
Fern <0.5m	30-70%	*Cheilanthes sieberi* subsp. *sieberi*

Plate 7: Thicket of *Acacia burkittii/ Acacia collegialis* over heath of *Prostanthera grylloana/ Thryptomene australis* and mixed dwarf scrub on greenstone hill

Rocky Hillslope: Eucalypt Woodlands

4.3.5 Low woodland of *Eucalyptus lesouefii* over heath of *Dodonaea lobulata/ Santalum acuminatum* and low scrub of *Eremophila caerulea/ Westringia rigida* on greenstone hill (RH-EW1)

The total flora recorded within this community was represented by a total of 13 families, 19 genera and 35 taxa (Plate 8). Dominant taxa from the vegetation assemblage are shown in Table 15. No Threatened Flora or Priority Flora taxa were recorded within this community. No introduced flora taxa were recorded within this community. According to the NVIS, this floristic community is best represented by the MVG 5-Eucalypt Woodlands (DotEE, 2016b).

Table 15: Vegetation assemblage for Low woodland of *Eucalyptus lesouefii* over heath of *Dodonaea lobulata/ Santalum acuminatum* and low scrub of *Eremophila caerulea/ Westringia rigida* on greenstone hill

Life Form/Height Class	Canopy Cover	Dominant taxa present
Tree 5-15m	10-30%	*Eucalyptus lesouefii*
Shrub 1-1.5m	30-70%	*Dodonaea lobulata* *Santalum acuminatum*
Shrub 0.5-1m	10-30%	*Eremophila caerulea* subsp. *caerulea*
Shrub <0.5m	10-30%	*Westringia rigida*

Plate 8: Low woodland of *Eucalyptus lesouefii* over heath of *Dodonaea lobulata/ Santalum acuminatum* and low scrub of *Eremophila caerulea/ Westringia rigida* on greenstone hill

4.3.6 Low woodland of *Eucalyptus lesouefii* over shrub mallee of *Eucalyptus griffithsii* and mixed low heath on greenstone hill (RH-EW2)

The total flora recorded within this community was represented by a total of 15 families, 21 genera and 35 taxa (Plate 9). Dominant taxa from the vegetation assemblage are shown in Table 16. No Threatened Flora or Priority Flora taxa were recorded within this community. No introduced flora taxa were recorded within this community. According to the NVIS, this floristic community is best represented by the MVG 5-Eucalypt Woodlands (DotEE, 2016b).

Table 16: Vegetation assemblage for Low woodland of *Eucalyptus lesouefii* over shrub mallee of *Eucalyptus griffithsii* and mixed low heath on greenstone hill

Life Form/Height Class	Canopy Cover	Dominant taxa present
Tree 5-15m	10-30%	*Eucalyptus lesouefii*
Shrub Mallee <8m	10-30%	*Eucalyptus griffithsii*
Shrub 1-1.5m	30-70%	*Acacia acuminata* *Eremophila oldfieldii* subsp. *oldfieldii* *Senna artemisioides* subsp. *filifolia*
Shrub 0.5-1m	30-70%	*Eremophila caerulea* subsp. *caerulea* *Scaevola spinescens*
Shrub <0.5m	30-70%	*Olearia muelleri*

Plate 9: Low woodland of *Eucalyptus lesouefii* over shrub mallee of *Eucalyptus griffithsii* and mixed low heath on greenstone hill

4.3.7 Low woodland of *Eucalyptus torquata* over heath of *Acacia hemiteles/ Allocasuarina helmsii* and low scrub of *Dodonaea stenozyga/Westringia rigida* on greenstone hill (RH-EW3)

The total flora recorded within this community was represented by a total of 12 families, 13 genera and 16 taxa (Plate 10). Dominant taxa from the vegetation assemblage are shown in Table 17. No Threatened Flora taxa were recorded within this community. One Priority Flora taxon was recorded within this community; *Philotheca apiculata* (P1). No introduced flora taxa were recorded within this community. According to the NVIS, this floristic community is best represented by the MVG 5-Eucalypt Woodlands (DotEE, 2016b).

Table 17: Vegetation assemblage for Low woodland of *Eucalyptus torquata* over heath of *Acacia hemiteles/ Allocasuarina helmsii* and low scrub of *Dodonaea stenozyga/Westringia rigida* on greenstone hill

Life Form/Height Class	Canopy Cover	Dominant taxa present
Tree 5-15m	10-30%	*Eucalyptus torquata*
Shrub 1.5-2m	30-70%	*Allocasuarina helmsii*
Shrub 1-1.5m	30-70%	*Acacia hemiteles*
Shrub 0.5-1m	10-30%	*Dodonaea stenozyga*
Shrub <0.5m	10-30%	*Westringia rigida*

Plate 10: Low woodland of *Eucalyptus torquata* over heath of *Acacia hemiteles/ Allocasuarina helmsii* and low scrub of *Dodonaea stenozyga/Westringia rigida* on greenstone hill

4.3.8 Floristic Composition of the Widgiemooltha Project Quadrats

PATN analysis was used to determine the similarities or differences between floristic communities within the survey area. Appendix 8 provides the dendrogram, two-way table and ordination graph generated from the PATN statistical analysis. A list of the 30 quadrats and their respective floristic communities are provided in Table 18 below. The PATN analysis produced a stress value of 0.1977.

Table 18: **Widgiemooltha Project Floristic communities with corresponding quadrats**

Landform	Major Vegetation Group	Floristic Community	Vegetation Code	Quadrat
Clay-Loam Plain	Eucalypt Woodlands (MVG 5)	Open low woodland of *Eucalyptus salmonophloia* over low scrub of *Eremophila scoparia/ Exocarpos aphyllus* and dwarf scrub of *Atriplex vesicaria* on clay-loam plain	CLP-EW1	Q7, Q8, Q10
		Low woodland of *Eucalyptus lesouefii* over low scrub of *Eremophila interstans/ Eremophila scoparia* and dwarf scrub of *Atriplex vesicaria/ Tecticornia disarticulata* on clay-loam plain	CLP-EW2	Q1, Q3, Q22, Q28
		Low forest of *Eucalyptus ravida* over low scrub of *Eremophila dempsteri/ Eremophila interstans* and low heath of *Atriplex vesicaria/Tecticornia disarticulata* on clay-loam plain	CLP-EW3	Q2, Q5, Q9, Q23
Rocky Hillslope	Acacia Forests and Woodlands (MVG 6)	Thicket of *Acacia burkittii/ Acacia collegialis* over heath of *Prostanthera grylloana/ Thryptomene australis* and mixed dwarf scrub on greenstone hill	RH-AFW1	Q13, Q17, Q20, Q21, Q25, Q26
	Eucalypt Woodlands (MVG 5)	Low woodland of *Eucalyptus lesouefii* over heath of *Dodonaea lobulata/Santalum acuminatum* and low scrub of *Eremophila caerulea/ Westringia rigida* on greenstone hill	RH-EW1	Q4, Q6, Q16, Q18, Q19
		Low woodland of *Eucalyptus lesouefii* over shrub mallee of *Eucalyptus griffithsii* and mixed low heath on greenstone hill	RH-EW2	Q11, Q12, Q14, Q24, Q27
		Low woodland of *Eucalyptus torquata* over heath of *Acacia hemiteles/ Allocasuarina helmsii* and low scrub of *Dodonaea stenozyga*/*Westringia rigida* on greenstone hill	RH-EW3	Q15, Q29, Q30

Two ‘super groups’ were identified in the PATN analysis:
1. Eucalypt Woodlands group; and
2. Acacia Forests and Woodlands group.

The Eucalypt Woodlands super group was divided into five groups, with the first group comprising all three of the CLP-EW1 quadrats, all four CLP-EW2 quadrats and four of the five RH-EW1 quadrats. These communities were distributed across the survey area and were closely associated with one another. CLP-EW1 and CLP-EW2 comprised of similar dominant mid-storey and lower storey *(Eremophila* spp. mid stratum and *Atriplex vesicaria/ Tecticornia disarticulata* lower stratum) and landform. The dominant taxa of the mid-storey and lower storey of RH-EW1 differed to the CLP-EW1 and CLP-EW2 communities and occurred on a different landform, however the upper storey taxa were similar.

The second Eucalypt Woodlands group included the three of the four CLP-EW3 quadrats. The remaining quadrat from this community (Q23) was grouped separately from all other quadrats in the fifth group. Quadrat 23 is located within an isolated clay-loam plain surrounded by greenstone hills in north-west region of the survey area. The remaining quadrats in this community are located in a clay-loam plain (located in close proximity to all clay-loam plain communities) of the south-east region of the survey area. Despite similarities in the dominant taxa in each stratum between the CLP-EW3 quadrats, the different spatial distribution of the CLP-EW3 quadrats has resulted in species composition of Q23 differing from all other quadrats. As shown in the dendrogram in Appendix 8, species composition of Quadrat 23 was found to be more closely associated with species composition of the RH-EW1 and RH-EW3 communities (fourth group).

The third Eucalypt Woodlands group included one RH-EW1 quadrat (Q4) and all five RH-EW2 quadrats. As shown in the two-way table (Appendix 8) these two communities comprised of the same dominant upper stratum (*Eucalyptus lesouefii*) and shared a similar composition of mid-storey and lower storey species.

The fourth Eucalypt Woodlands included) all three RH-EW3 quadrats. As stated previously, the fifth Eucalypt Woodlands group comprised of one quadrat (Q23) from the CLP-EW3 community.

The Acacia Forests and Woodlands super group comprised of two separate groups (sixth and seventh group), with quadrats from the RH-AFW1 community. The sixth group included four of the six RH-AFW1 quadrats. These quadrats were established in isolated patches of this community along the western region of the survey area. The remaining two quadrats of RH-AFW1 were grouped together in the seventh group. These two quadrats are located in the same patch of this community in the eastern region of the survey area.

Based on the results of the PATN analysis, there was minimal heterogeneity in species composition across the survey area, with majority of floristic communities intermixed despite differences in both dominant stratum taxa and landform. The main distinguishing factor between floristic communities was a result of differences in Major Vegetation Group (*i.e*. Eucalypt Woodlands and Acacia Forests and Woodlands).

4.3.9 Species Richness and Accumulation Estimates

The Chao 2 richness estimator provided an estimated species richness of 85 species in 30 sample sites (quadrats). Species richness recorded for the 30 quadrats surveyed was 90 species (including annuals) which indicates survey intensity was adequate (exceeds the estimated species richness).

A species accumulation curve was created to display the rate of species accumulation. The R^2 value (0.99) suggests that the data “fits” the species accumulation curve shown in Figure 10. By the twenty-fourth quadrat the rate of species accumulation was calculated at one species per quadrat up to 32 quadrats. Species accumulation for the 30 quadrats was calculated at 85 species (actual value recorded 90 species). Beyond 32 quadrats the rate of species accumulation was calculated to <1 species per quadrat as quadrat number increased to between 32 to 40 quadrats. BC has determined that according to this data a sufficient number of quadrats were established in the survey area to adequately assess the floristic composition of the area.

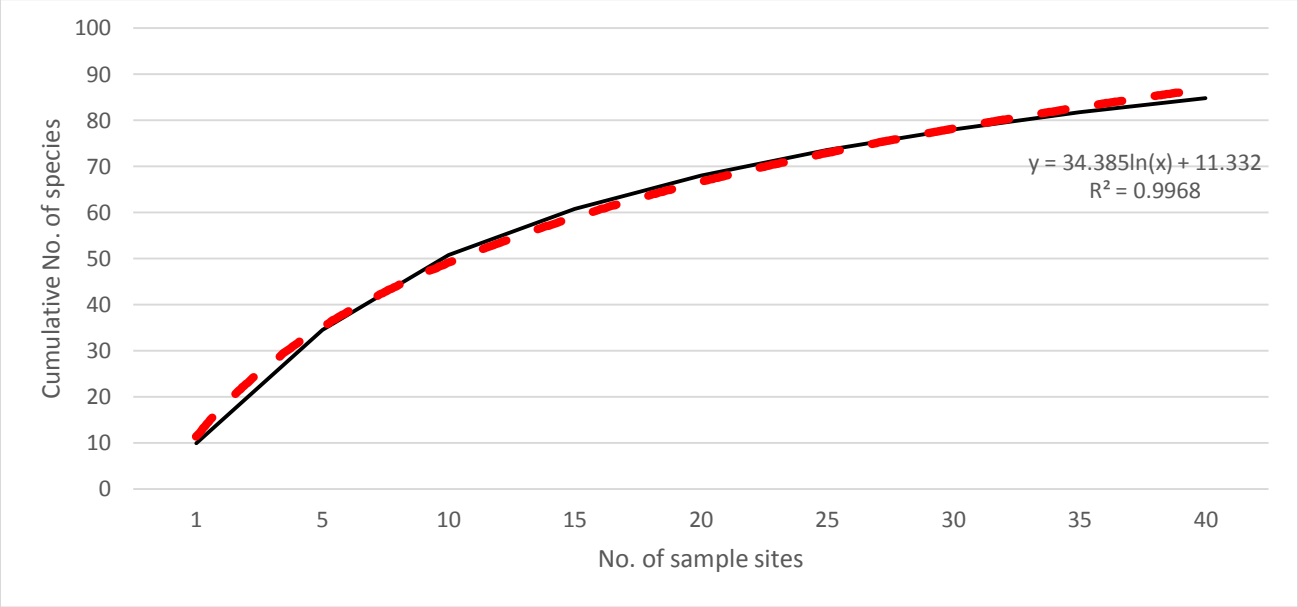

Figure 10: Species accumulation curve with the trend line (red) and the number of species recorded in the quadrats (black)

4.4 Fauna Habitats

The broad scale terrestrial fauna habitats within the survey area presented below are based on vegetation and associated landforms identified during the flora and vegetation assessment. The extent of the identified fauna habitats and a summary description of each are provided in Table 19 below.

Table 19: Main Terrestrial Fauna Habitats within the Widgiemooltha Project survey area

No.	Fauna Habitat Description	Example Image
1	<u>Clay-Loam Plains:</u> Eucalypt Woodlands (approximate area = 270ha; 32.3%)	

No.	Fauna Habitat Description	Example Image
2	Rocky Hillslope: Acacia Forests and Woodlands, Eucalypt Woodlands. (approximate area = 453ha; 54.2%)	
3	Existing Areas Cleared of Vegetation Decommissioned mine pits, paddocks and tracks. (approximate area = 113ha; 13.5%)	

Based on the habitats present within the survey area a list of expected vertebrate fauna species likely to occur in the survey area was compiled from information obtained during the literature review and is presented in Appendix 10. The results of some previous fauna surveys carried out in the general area are also summarised in this species listing as are the DPaW NatureMap database search results. The raw database search results from NatureMap (DPaW, 2016c) and the Protected Matters Search Tool (DotEE, 2016a) are contained within Appendix 1.

Not all species listed in existing databases and publications as potentially occurring within the region (i.e. EPBC Act's Threatened Fauna and Migratory species lists, DPAW's NatureMap database and various publications) are considered likely to be present within the survey area. The list of potential fauna takes into consideration that firstly the species in question is not known to be locally/regionally extinct and secondly that suitable habitat for each species, as identified during the habitat assessment, is present within the survey area, though compiling an accurate list has limitations (see **Section 3.3 Survey limitations and constraints**)

Despite the omission of some species it should be noted that the list provided is still very likely an over estimation of the fauna species utilising the survey area (either on a regular or infrequent basis) as a result of the precautionary approach adopted for the assessment. At any one time, only a subset of the listed potential species is likely to be present within the bounds of the survey area.

Table 20 summarises the numbers of potential species based on vertebrate class considered likely to be present in the general vicinity of the survey area based on the complete list held Appendix 10.

Table 20: Summary of Potential Vertebrate Fauna Species

Group	Total number of potential species	Potential number of specially protected species	Potential number of migratory species	Potential number of priority species
Amphibians	5	0	0	0
Reptiles	79	0	0	0
Birds	109	2	1	0
Non-Volant Mammals	22[7]	0	0	0
Volant Mammals (Bats)	9	0	0	1
Total	**224[7]**	**2**	**1**	**1**

Superscript = number of introduced species included in the total. Note: Where a species state and federal conservation status is different, the highest category is used.

4.5 Vegetation/ Habitat of Conservation Significance

None of the floristic communities within the survey area were found to have National Environmental Significance as defined by the Commonwealth EPBC Act. No TEC pursuant to Commonwealth or State legislation were recorded within the survey area (DotEE, 2016a; DPaW, 2016c). No PEC listed by the DPaW were recorded within the survey area. Two floristic communities contained populations of Priority 1 Flora taxa; *Austrostipa* sp. Carlingup Road (S. Kern & R. Jasper LCH 18459) (P1) was identified in RH-AFW1; and *Philotheca apiculata* (P1) was identified in RH-EW3.

The survey area is not located within an ESA as listed under the EP Act. There are no conservation areas/DPaW managed land located within the survey area. A regional map of the survey area in relation to surrounding areas of conservation significance is provided in Appendix 3.

4.6 Vegetation/ Habitat Condition

Based on the vegetation health condition scale (Appendix 9) adapted from Keighery, 1994 and Trudgen, 1988 specified in the *Technical Guide - Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment – December 2015* (DPaW & EPA, 2015), two communities had a health rating of '4' which depicts that vegetation structure has been significantly altered by very obvious signs of multiple disturbances; however, it retains its basic vegetation structure or has ability to regenerate it. Disturbance to vegetation structure may be caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.

The remaining five vegetation communities has a health rating of '3' which depicts that vegetation structure has been altered by obvious signs of disturbance. Disturbance to vegetation structure may be caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing. A list of the health rating for each floristic community is provided in Table 21. A map of the health condition within the survey area is provided in Figure 11.

Table 21: Vegetation Health Condition of the Widgiemooltha Project survey area

Landform	Major Vegetation Group	Floristic Community	Vegetation Code	Health Rating
Clay-Loam Plain	Eucalypt Woodlands (MVG 5)	Open low woodland of *Eucalyptus salmonophloia* over low scrub of *Eremophila scoparia/ Exocarpos aphyllus* and dwarf scrub of *Atriplex vesicaria* on clay-loam plain	CLP-EW1	3
		Low woodland of *Eucalyptus lesouefii* over low scrub of *Eremophila interstans/ Eremophila scoparia* and dwarf scrub of *Atriplex vesicaria/ Tecticornia disarticulata* on clay-loam plain	CLP-EW2	3
		Low forest of *Eucalyptus ravida* over low scrub of *Eremophila dempsteri/ Eremophila interstans* and low heath of *Atriplex vesicaria/Tecticornia disarticulata* on clay-loam plain	CLP-EW3	4
Rocky Hillslope	Acacia Forests and Woodlands (MVG 6)	Thicket of *Acacia burkittii/ Acacia collegialis* over heath of *Prostanthera grylloana/ Thryptomene australis* and mixed dwarf scrub on greenstone hill	RH-AFW1	4
	Eucalypt Woodlands (MVG 5)	Low woodland of *Eucalyptus lesouefii* over heath of *Dodonaea lobulata/Santalum acuminatum* and low scrub of *Eremophila caerulea/ Westringia rigida* on greenstone hill	RH-EW1	4
		Low woodland of *Eucalyptus lesouefii* over shrub mallee of *Eucalyptus griffithsii* and mixed low heath on greenstone hill	RH-EW2	4
		Low woodland of *Eucalyptus torquata* over heath of *Acacia hemiteles/ Allocasuarina helmsii* and low scrub of *Dodonaea stenozyga*/*Westringia rigida* on greenstone hill	RH-EW3	4
N/A	N/A	Cleared Vegetation	CV	7

Figure 11: Vegetation Health Condition of the Widgiemooltha Project survey area

4.7 Introduced Plant Species

Two introduced species was identified within the survey area:

1. *Carrichtera annua* (Wards Weed); and
2. *Centaurea melitensis* (Maltese Cockspur).

According to the DAFWA none of these species are listed as a Declared Plant under Section 22 of the *Biosecurity and Agriculture Management (BAM) Act 2007.*

4.7.1 *Carrichtera annua* (Wards Weed)

This taxon is described as an erect annual herb that grows anywhere from 0.05 to 0.4m high (Plate 11). It has yellow flowers from September to November and its preferred habitat is anywhere in semi-arid regions (WAHERB, 2016). *Carrichtera annua* was recorded within three floristic communities:

1. CLP-EW1;
2. CLP-EW2; and
3. CLP-EW3

Plate 11: *Carrichtera annua* (Wards Weed)

4.7.2 *Centaurea melitensis* (Maltese Cockspur)

This taxon is described as an erect annual or biennial herb that grows anywhere between 0.2 to 1m high (Plate 12). It produces yellow flowers from September to December or from January to March. It can be found along roadsides, cultivated areas or any other disturbed areas (WAHERB, 2016). *Centaurea melitensis* was recorded within two floristic communities:

1. CLP-EW1; and
2. CLP-EW2.

Plate 12: *Centaurea melitensis* (Maltese Cockspur)

4.8 Introduced Fauna Species

One introduced fauna species was recorded during the survey, this being the rabbit (Oryctolagus cuniculus).

Other potential species of primary concern are the two carnivorous species, the red fox and cat, both of which are known to have significant impacts on native fauna species. Other introduced fauna species likely to be present but not recorded are the house mouse, wild dogs and possibly goats and camels.

5 Relevant Legislation and Compliance with Recognised Standards

5.1 Commonwealth Legislation

5.1.1 Commonwealth Environment Protection and Biodiversity Conservation Act 1999

The aim of this Act is to protect matters of national environmental significance and is used by the Commonwealth DoE to list threatened species and ecological communities into categories based on the criteria set out in the Act (www.environment.gov.au/epbc/index.html). The Act provides a national environmental assessment and approval system for proposed developments and enforces strict penalties for unauthorised actions that may affect matters of national environmental significance.

The survey area does not have national environmental significance under the EPBC Act. There were no TEC or Threatened Flora or Fauna as listed under the EPBC Act identified within the survey area. The state and federally listed migratory bird, the rainbow bee-eater was observed on several occasions during the survey period. This species is common in the southern part of the state during its spring/summer migration period. It is not a threatened species and is therefore not of specific concern.

No evidence of the malleefowl (a state and ferally listed Vulnerable species) being present within survey area was found and available evidence suggests that the general area is frequented by transient non-breeding individuals only.

5.2 State Legislation

5.2.1 Clearing of Native Vegetation

Under Section 51C of the *Environmental Protection (EP) Act 1986* and the *Environmental Protection (Clearing of Native Vegetation) Regulations (Regulations) WA 2004* any clearing of native vegetation in Western Australia that is not eligible for exemption under Schedule 6 of the *EP Act 1986* or under the *Regulations 2004* requires a clearing permit from the Department of Environment and Regulation (DER) or Department of Mines and Petroleum (DMP). Under Section 51A of the *EP Act 1986* native vegetation includes aquatic and terrestrial vegetation indigenous to Western Australia, and intentionally planted vegetation declared by regulation to be native vegetation, but not vegetation planted in a plantation or planted with commercial intent. Section 51A of the *EP Act 1986* defines clearing as "*the killing or destruction of; the removal of; the severing or ringbarking of trunks or stems of; or the doing of substantial damage to some or all of the native vegetation in an area, including the flooding of land, the burning of vegetation, the grazing of stock or an act or activity that results in the above*".

Exemptions under Schedule 6 of the *EP Act 1986* and the *Regulations 2004* do not apply in ESA's as declared under Section 51B of the *EP Act 1986* or within Schedule 1 Areas as described in Regulation 6 and Schedule 1, clause 4 of the *Environmental Protection (Clearing of Vegetation) Regulation 2004.*

The eastern boundary of the survey area is located within a Schedule 1 Area. A clearing permit will be required.

5.2.2 Environmental Protection Act WA 1986

The *EP Act 1986* includes requirements relating to the protection of Threatened Flora, Fauna and TEC, and to the assessment of applications for clearing permits. TEC are protected even where exemptions for a clearing permit may apply. The *EP Act 1986* enforces both financial and/or imprisonment penalties on those who unlawfully damage a TEC. Under Schedule 5 of the *EP Act 1986* there are ten principles for clearing of native vegetation.

The survey area does not contain any TEC or Threatened Flora. While some listed threatened fauna species may occur in the area development of the project is considered unlikely to significantly impact on any species given the large expanses of similar habitat in adjoining areas.

5.2.3 Wildlife Conservation Act WA 1950

The DPaW uses the provisions of this Act to list flora and fauna taxa as protected and the level of protection assigned to such flora and fauna. Flora species are classified as Threatened when their populations are geographically restricted or are threatened by local processes. Under this Act, all native flora (spermatophytes, pteridophytes, bryophytes and thallophytes) and fauna are protected throughout the State. Financial penalties pursuant to the Act can be imposed if threatened plant or animal species are collected/handled without an appropriate licence.

No Threatened Flora or Fauna listed under the WC Act were identified within the survey area. Beside the malleefowl which is discussed above one other fauna species listed under the WC Act 1950 may occur. The peregrine falcon (listed as fauna in need of special protection) potentially utilises some sections of the survey area as part of a much larger home range, though records in this area of its range are rare. It is unlikely to breed in the survey area and probably only occurs rarely. No significant impact on this species or its preferred habitat is anticipated.

5.2.4 DPaW Priority lists

The DPaW lists 'Priority' flora and fauna taxa which are under consideration for declaration as Rare Flora or Fauna. Taxa classed as Priority 1-3 are in urgent need of further survey, whereas Priority 4 taxa are considered to have been adequately surveyed but may become vulnerable or rare in future years. Priority 4 taxa are also taxa that have been removed from the threatened taxa list in the past 5 years. Priority 5 taxa are those taxa which are not currently threatened but are subject to a specific conservation program, the cessation of which would result in the taxon likely to become threatened within 5 years The DPaW also lists PECs, which identifies those communities that may need monitoring before possible nomination for TEC status. These priority taxa and communities have no formal legal protection until they are endorsed by the Minister as being Declared Rare Flora and TEC's respectively.

Results from the DPaW database searches identified one Threatened Flora and 33 Priority Flora taxa were listed by on the databases as occurring within 40km radius of the survey area. Four Priority Flora taxon were listed on the DPaW database as occurring within the survey area. Two Priority Flora taxa were identified within the survey area during the field assessment.

No Priority Ecological Communities were identified within the survey area.

DPaW also rank some fauna species as Priority based on criteria listed in Table 4. The only priority fauna species considered likely to utilise some sections of the survey area is the Priority 4 central long-eared bat (Nyctophilus major tor). This species has however only been infrequently recorded in this part of its range and therefore may only occur occasionally/low numbers. No significant impact on this species or its preferred habitat is anticipated.

5.3 EPA Position Statements

The EPA develops Position Statements to inform the public about environmental issues facing Western Australia and the plans for the future to ensure protection and ecological sustainability of environmentally important ecosystems. It provides a set of principles to assist the public and decision-makers on their responsibilities for managing land with care.

These principles also provide the basis for the EPA to evaluate and report upon achieving environmental and ecological sustainability and the protection of natural resources.

5.3.1 Position Statement No. 2

Environmental Protection of Native Vegetation in Western Australia (EPA 2000) outlines EPA policy on the protection of native vegetation in Western Australia, particularly in the agricultural area. It identifies basic elements that the EPA should consider when assessing proposals that impact on biological diversity. These include comparison of all proposal options; avoidance of species and community extinctions; an expectation that implementing the proposal will not take a vegetation type below the "threshold level" of 30%; and that proponents should demonstrate that on- and off-site impacts can be managed.

According to DAFWA (2011), the survey area occurs in pre-European Beard vegetation association Binneringe 9, which retains approximately >98% of the original vegetation extent.

5.3.2 Position Statement No. 3

Terrestrial Biological Surveys as an Element of Biodiversity Protection establishes that the EPA has adopted the definition and principles of biological diversity as defined in the *National Strategy for the Conservation of Australia's Biological Diversity* (Commonwealth of Australia, 1996), and has stipulated the following requirements:

- The quality of information and scope of field surveys should meet standards, requirements and protocols as determined and published by the EPA; and
- The IBRA regionalisation's should be used as the largest unit for environmental impact assessment (EIA) decision-making in relation to the conservation of biodiversity.

Pursuant to the IBRA regionalisation's, 26 bioregions in WA, which are affected by a range of different threatening processes and have varying levels of sensitivity to impact, have been identified. Terrestrial biological surveys should provide sufficient information to address both biodiversity conservation and ecological functional values within the context of proposals and the results of surveys should be publicly available.

The flora and fauna survey of the survey area was planned and implemented as far as practicable according to the DPaW/ EPA Technical Guidelines. Also, the IBRA regionalisation's have been used in preparing the report to identify the conservation status of the area and identify the main threats to the biodiversity of plant species in the region.

5.4 Native Vegetation Clearing Principles

Based on the outcomes from the assessment undertaken, as presented in this report, BC provides the following comments regarding the native vegetation clearing principles listed under Schedule 5 of the EP Act (Table 22).

Table 22: Assessment of development within the survey area against native vegetation clearing principles

Letter	Principle	Assessment	Outcome
(a)	Native vegetation should not be cleared if it comprises a high level of biological diversity.	Vegetation identified within the survey area is not considered to be of high biological diversity, and is well represented outside of the proposed impact area.	Development within the survey area is unlikely to be at variance to this principle
(b)	Native vegetation should not be cleared it comprises the whole or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to WA.	No significant fauna habitat identified within the project area. Fauna habitats are well represented outside of the project area.	Development within the survey area is unlikely to be at variance to this principle
(c)	Native vegetation should not be cleared if it includes, or is necessary for the continued existence of rare flora.	No Threatened Flora taxa, pursuant to subsection (2) of section 23F of the WC Act 1950 and the EPBC Act 1999 were identified within the survey area	Development within the survey area is unlikely to be at variance to this principle
(d)	Native vegetation should not be cleared if it comprises the whole or part of, or is necessary for the maintenance of a threatened ecological community (TEC).	No TEC listed under State and Commonwealth legislation occur within the survey area.	Development within the survey area is unlikely to be at variance to this principle
(e)	Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared	According to DAFWA (2011) the survey area occurs within the pre-European Beard vegetation association Binneringe 9 which retains approximately >98% of the original pre-European vegetation extent.	Development within the survey area is unlikely to be at variance to this principle
(f)	Native vegetation should not be cleared if it is growing, in, or in association with, an	According to the Geoscience Australia database (2001) a non-perennial/ intermittent surface drainage line intercepts the survey area and drains	Development within the survey area may

Letter	Principle	Assessment	Outcome
	environment associated with a watercourse or wetland	east into Lake Lefroy located approximately 1.4km north-east of the survey area. No riparian vegetation was identified within this survey area/ associated with this drainage line.	be at variance to this principle
(g)	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	According to DAFWA (2011) the survey area occurs within the pre-European Beard vegetation association Binneringe 9 which retains approximately >98% of the original pre-European vegetation extent. Clearing within these vegetation associations is not likely to lead to land degradation issues such as salinity, water logging or acidic soils.	Development within the survey area is unlikely to be at variance to this principle

6 Conclusions

Seven vegetation communities were identified within the survey area. These communities comprised of two landform types and two major vegetation groups according to the NVIS definition. The communities were represented by a total 24 families, 45 genera and 88 taxa, (including 12 annual taxa). Broad scale terrestrial fauna habitats within the survey area have been identified as clay-loam plains, rocky hillslopes and existing cleared areas. Results of the literature review identified 31 mammals (including nine bat species), 109 bird, 79 reptiles and five frog species that have previously been recorded in the general area, some of which have the potential to occur subject to the identified habitats being suitable.

No Threatened Flora, pursuant to subsection (2) of section 23F of the State WC Act, and/or listed under the Commonwealth EPBC Act was identified within the survey area. Three Priority Flora taxa, as listed by DPaW, was identified within the survey area. A review of the EPBC Act threatened fauna list, DPAW's Threatened Fauna Database and Priority List, unpublished reports and scientific publications identified a number of specially protected, migratory or priority fauna species as having been previously recorded or as being potentially present in the general vicinity of the survey area. Most species are considered unlikely to occur mainly due to a lack of suitable habitat and no fauna of conservation significance is likely to be significantly impacted on by the proposed clearing. This conclusion is primarily based on the relatively small size of the impact footprint and the extensive habitat connectivity with adjoining areas. Impacts on fauna and fauna habitat are therefore anticipated to be localised, small/negligible and as a consequence manageable.

None of the vegetation communities within the survey area were found to have National Environmental Significance as defined by the Commonwealth EPBC Act. No TEC pursuant to Commonwealth or State legislation was recorded within the survey area. No PEC as listed by the DPaW were recorded within the survey area.

The survey area is not located within an ESA listed under the EP Act 1986. There are no conservation areas/DPaW managed land located within the survey area.

Based on the vegetation health condition scale adapted from Keighery, 1994 and Trudgen, 1988 (rating 1 'pristine' to rating 7 'completed degraded'), two floristic communities had a health rating of '4'. The remaining five communities had a health rating of '3'. Two introduced taxa were identified within the survey area. Neither of these taxa are listed as a Declared Plant under the BAM Act 2007.

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NatureMap Species Report

Created by Guest user on 03/10/2016

Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 121° 27' 29'' E,31° 24' 42'' S
Buffer 40km
Group By Kingdom

Kingdom Species Records

Animalia 336 1457
Fungi 69 123
Plantae 771 3406
Protozoa 1 1

TOTAL 1177 4987

Name ID Species Name Naturalised Conservation Code [1]Endemic to Query Area

Animalia

1. 24559 *Acanthagenys rufogularis (Spiny-cheeked Honeyeater)*
2. 24260 *Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)*
3. 24261 *Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*
4. 24265 *Acanthiza uropygialis (Chestnut-rumped Thornbill)*
5. *Acanthocnemus nigricans*
6. 25535 *Accipiter cirrocephalus (Collared Sparrowhawk)*
7. 25536 *Accipiter fasciatus (Brown Goshawk)*
8. 25544 *Aegotheles cristatus (Australian Owlet-nightjar)*
9. *Agrotis infusa*
10. *Agrotis ipsilon* Y
11. *Ahamitermes hillii*
12. *Allodessus bistrigatus*
13. *Amblyopone longidens* Y
14. *Amitermes dentosus*
15. *Amitermes modicus*
16. *Amitermes xylophagus*
17. *Aname sp.*
18. 24316 *Anas superciliosa (Pacific Black Duck)*
19. *Anestia ombrophanes*
20. *Anidiops sp.*
21. *Anidiops villosus*
22. 24561 *Anthochaera carunculata (Red Wattlebird)*
23. *Antiporus gilbertii*
24. *Aphaenogaster mediterrae*
25. *Apsenterotermes iridipennis*
26. 24285 *Aquila audax (Wedge-tailed Eagle)*
27. 24286 *Aquila morphnoides subsp. morphnoides (Little Eagle)*
28. *Araneus eburneiventris*
29. *Araneus senicaudatus*
30. 25566 *Artamus cinereus (Black-faced Woodswallow)*
31. 24353 *Artamus cyanopterus (Dusky Woodswallow)*
32. 24355 *Artamus minor (Little Woodswallow)*
33. 24356 *Artamus personatus (Masked Woodswallow)*
34. *Australothis rubrescens*
35. *Austrolestes aridus*
36. *Backobourkia heroine*
37. *Barnardius zonarius*
38. *Barnardius zonarius subsp. zonarius*
39. *Biphyllocera kirbyana*
40. *Blackburnium sp.*
41. 42380 *Brachyurophis fasciolatus subsp. fasciolatus (Narrow-banded Shovel-nosed Snake)*
42. 42381 *Brachyurophis semifasciatus (Southern Shovel-nosed Snake)*
43. 33933 *Branchinella basispina (fairy shrimp)* P1

Name ID Species Name Naturalised Conservation Code [1]Endemic To Query Area

44. 25598 *Cacomantis flabelliformis (Fan-tailed Cuckoo)*
45. 42307 *Cacomantis pallidus (Pallid Cuckoo)*
46. *Campion tenuistrigus*
47. *Camponotus ephippium subsp. narses*
48. *Camponotus novaehollandiae*
49. *Camponotus postcornutus*
50. *Candalides hyacinthinus subsp. simplex*
51. 25454 *Canis lupus (Dog, Dingo)* Y
52. *Castiarina cincta*
53. *Catasarcus obesus*
54. 24086 *Cercartetus concinnus (Western Pygmy-possum, Mundarda)*
55. 24564 *Certhionyx variegatus (Pied Honeyeater)*
56. *Chalcopteroides sp.*
57. 24186 *Chalinolobus gouldii (Gould's Wattled Bat)*
58. 24488 *Cheramoeca leucosternus (White-backed Swallow)*
59. 24980 *Christinus marmoratus (Marbled Gecko)*
60. 24431 *Chrysococcyx basalis (Horsfield's Bronze Cuckoo)*
61. *Cicindela (Rivacindela) salicursoria* Y
62. 30956 *Cinclosoma castanotus (Chestnut Quail-thrush)*

63. 24396 *Climacteris rufa (Rufous Treecreeper)*
64. *Clubiona sp.*
65. *Clynotis albobarbatus*
66. *Coccinella transversalis*
67. 25675 *Colluricincla harmonica (Grey Shrike-thrush)*
68. *Commonia hesychima*
69. *Coptotermes acinaciformis*
70. *Coptotermes frenchi*
71. 25568 *Coracina novaehollandiae (Black-faced Cuckoo-shrike)*
72. *Cormocephalus turneri*
73. 24416 *Corvus bennetti (Little Crow)*
74. 25592 *Corvus coronoides (Australian Raven)*
75. 25593 *Corvus orru (Torresian Crow)*
76. *Corvus sp.*
77. 24420 *Cracticus nigrogularis (Pied Butcherbird)*
78. 25595 *Cracticus tibicen (Australian Magpie)*
79. 25596 *Cracticus torquatus (Grey Butcherbird)*
80. 24918 *Crenadactylus ocellatus subsp. ocellatus (Clawless Gecko)*
81. 30893 *Cryptoblepharus buchananii*
82. 25020 *Cryptoblepharus plagiocephalus*
83. *Cryptophlebia ombrodelta*
84. *Cryptophlebia sp.*
85. 24871 *Ctenophorus cristatus (Bicycle Dragon)*
86. 24873 *Ctenophorus fordi (Mallee Sand Dragon)*
87. 24883 *Ctenophorus ornatus (Ornate Crevice-Dragon)*
88. 24886 *Ctenophorus reticulatus (Western Netted Dragon)*
89. 24888 *Ctenophorus salinarum (Salt Pan Dragon)*
90. 24889 *Ctenophorus scutulatus (Lozenge-marked Dragon)*
91. 25026 *Ctenotus atlas*
92. 25052 *Ctenotus leonhardii*
93. 25074 *Ctenotus schomburgkii*
94. 25465 *Ctenotus uber (Spotted Ctenotus)*
95. 25089 *Cyclodomorphus melanops subsp. elongatus (Slender Blue-tongue)*
96. 24322 *Cygnus atratus (Black Swan)*
97. 25673 *Daphoenositta chrysoptera (Varied Sittella)*
98. 24092 *Dasyurus geoffroii (Chuditch, Western Quoll)* T
99. 24995 *Delma australis*
100. 24997 *Delma butleri*
101. 25766 *Delma fraseri (Fraser's Legless Lizard)*
102. 25247 *Demansia psammophis subsp. psammophis (Yellow-faced Whipsnake)*
103. *Destolmia lineata*
104. *Diaprograpta peterandrewsi* Y
105. 25607 *Dicaeum hirundinaceum (Mistletoebird)*
106. 24929 *Diplodactylus granariensis subsp. granariensis*
107. 24940 *Diplodactylus pulcher*
108. 24470 *Dromaius novaehollandiae (Emu)*
109. 24650 *Drymodes brunneopygia (Southern Scrub-robin)*
110. *Dysbatus sp.*
111. 25092 *Egernia depressa (Southern Pygmy Spiny-tailed Skink)*
112. 25094 *Egernia formosa*
113. 24651 *Eopsaltria australis subsp. griseogularis (Western Yellow Robin)*

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114. *Ephelotermes persimilis*
115. 24567 *Epthianura albifrons (White-fronted Chat)*
116. 25109 *Eremiascincus richardsonii (Broad-banded Sand Swimmer)*
117. *Eretes australis*
118. *Eriophora biapicata*
119. *Eudesmeola lawsoni*
120. *Euhesma (Euhesma) atra* Y
121. *Euhesma (Euhesma) scoparia*
122. *Euryglossa sp.*
123. *Euryglossina sp.*
124. 25621 *Falco berigora (Brown Falcon)*
125. 25622 *Falco cenchroides (Australian Kestrel)*
126. 25623 *Falco longipennis (Australian Hobby)*
127. 25624 *Falco peregrinus (Peregrine Falcon)* S
128. 24041 *Felis catus (Cat)* Y
129. *Fergusonina sp.*
130. 25301 *Furina ornata (Moon Snake)*
131. 24957 *Gehyra purpurascens*
132. 24959 *Gehyra variegata*
133. 25530 *Gerygone fusca (Western Gerygone)*
134. 24735 *Glossopsitta porphyrocephala (Purple-crowned Lorikeet)*
135. *Heliothis punctifera*
136. 25474 *Hemiergis initialis*
137. 25115 *Hemiergis initialis subsp. initialis*
138. 25117 *Hemiergis peronii subsp. peronii*
139. 24961 *Heteronotia binoei (Bynoe's Gecko)*
140. *Heterotermes intermedius*
141. *Heterotermes occiduus*
142. 25734 *Himantopus himantopus (Black-winged Stilt)*
143. 24489 *Hirundo ariel (Fairy Martin)*
144. 25629 *Hirundo nigricans (Tree Martin)*
145. *Hoggicosa castanea*
146. *Hoggicosa storri*
147. *Hogna pexa*
148. *Hogna salifodina*
149. *Holoplatys sp.* Y
150. 24277 *Hylacola cauta (Shy Groundwren, Shy Heathwren)*
151. *Hylaeus (Rhodohylaeus) proximus*
152. *Hyphesma sp.*
153. *Iridomyrmex brennani*
154. *Iridomyrmex brunneus*
155. *Iridomyrmex chasei*
156. *Iridomyrmex dromus*
157. *Iridomyrmex purpureus*
158. *Iridomyrmex suchieri*
159. *Isometroides vescus*
160. *Isopeda magna*

161. *Isopedella cana*
162. *Lasioglossum (Chilalictus) adustum*
163. *Lasioglossum (Chilalictus) amplexum* Y
164. *Lasioglossum (Chilalictus) erythrurum*
165. *Lasioglossum (Chilalictus) fasciatum*
166. *Lasioglossum (Chilalictus) florale*
167. *Lasioglossum (Chilalictus) greavesi* Y
168. *Lasioglossum (Chilalictus) hemichalceum*
169. *Lasioglossum (Chilalictus) mesostenoideum*
170. *Lasioglossum (Chilalictus) mundulum*
171. *Lasioglossum (Chilalictus) triangulatum* Y
172. *Lasioglossum (Chilalictus) veronicae*
173. *Latrodectus hasseltii*
174. *Leioproctus (Leioproctus) nasutus*
175. 24557 *Leipoa ocellata (Malleefowl)* T
176. 25131 *Lerista distinguenda*
177. *Lerista kingi*
178. 25155 *Lerista muelleri*
179. 25162 *Lerista picturata*
180. 25173 *Lerista taeniata*
181. 42411 *Lerista timida*
182. 25005 *Lialis burtonis*
183. 24573 *Lichenostomus cratitius (Purple-gaped Honeyeater)*

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184. 25659 *Lichenostomus leucotis (White-eared Honeyeater)*
185. 25661 *Lichmera indistincta (Brown Honeyeater)*
186. 41411 *Liopholis inornata (Desert Skink)*
187. 41413 *Liopholis multiscutata (Bull Skink)*
188. *Lipogya leucoprosopa* Y
189. *Lipogya sp.*
190. *Lipotriches (Austronomia) flavoviridis*
191. *Lipotriches sp.*
192. *Lophoictinia isura*
193. 30935 *Lucasium maini*
194. *Lycosa salifodina* Y
195. *Lycosa sp.*
196. 24132 *Macropus fuliginosus (Western Grey Kangaroo)*
197. *Maechidius mellianus*
198. *Mainosa longipes*
199. 25652 *Malurus leucopterus (White-winged Fairy-wren)*
200. 24551 *Malurus pulcherrimus (Blue-breasted Fairy-wren)*
201. 25654 *Malurus splendens (Splendid Fairy-wren)*
202. 24583 *Manorina flavigula (Yellow-throated Miner)*
203. *Maratus sp.*
204. *Marteena rubricincta* Y
205. *Masasteron piankai*
206. *Megacephala blackburni*
207. *Megachile (Hackeriapis) oblonga*
208. *Megachile atrella*
209. *Megachile clypeata*
210. 25663 *Melithreptus brevirostris (Brown-headed Honeyeater)*
211. 24736 *Melopsittacus undulatus (Budgerigar)*
212. 25184 *Menetia greyii*
213. *Merimna atrata*
214. 24598 *Merops ornatus (Rainbow Bee-eater)* IA
215. *Metallarcha pseliota* Y
216. *Metallarcha tetraplaca* Y
217. *Microcarbo melanoleucos*
218. *Microcerotermes distinctus*
219. *Microcerotermes serratus*
220. 25693 *Microeca fascinans (Jacky Winter)*
221. *Missulena occatoria*
222. 24904 *Moloch horridus (Thorny Devil)*
223. 25240 *Morelia spilota subsp. imbricata (Carpet Python)* S
224. 25190 *Morethia butleri*
225. 25192 *Morethia obscura*
226. *Motasingha trimaculata subsp. occidentalis*
227. 24223 *Mus musculus (House Mouse)* Y
228. *Myandra bicincta*
229. *Myrmecia callima*
230. *Myrmecia cephalotes* Y
231. *Myrmecia chasei*
232. *Myrmecia clarki*
233. *Myrmecia mandibularis*
234. *Myrmecia picta*
235. *Myrmecia sp.*
236. *Myrmecia tepperi*
237. *Myrmecia varians*
238. *Myrmecia vindex*
239. 25425 *Neobatrachus kunapalari (Kunapalari Frog)*
240. *Neolucia agricola subsp. occidens*
241. *Nephila edulis*
242. 24966 *Nephrurus laevissimus*
243. 24096 *Ningaui yvonneae (Southern Ningaui)*
244. 25748 *Ninox novaeseelandiae (Boobook Owl)*
245. *Nomindra flavipes*
246. *Nothorhaphium sp.*
247. 24229 *Notomys mitchellii (Mitchell's Hopping-mouse)*
248. *Ochrogaster sp.*
249. 24407 *Ocyphaps lophotes (Crested Pigeon)*
250. *Oecetis pechana*
251. *Oligodectes mallee*
252. *Omphaliodes obscura*
253. *Opisthopsis rufithorax*

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254. 24618 *Oreoica gutturalis (Crested Bellbird)*

255. 24085 *Oryctolagus cuniculus (Rabbit)* Y
256. *Oxyopes amoenus*
257. 24619 *Pachycephala inornata (Gilbert's Whistler)*
258. 25679 *Pachycephala pectoralis (Golden Whistler)*
259. 25680 *Pachycephala rufiventris (Rufous Whistler)*
260. *Pachyprosopis sp.*
261. *Paraspathulina eremostigma*
262. 25253 *Parasuta gouldii*
263. 25254 *Parasuta monachus*
264. 25255 *Parasuta nigriceps*
265. 25681 *Pardalotus punctatus (Spotted Pardalote)*
266. 24625 *Pardalotus punctatus subsp. punctatus (Spotted Pardalote)*
267. 25682 *Pardalotus striatus (Striated Pardalote)*
268. *Pardosa pexa* Y
269. 24659 *Petroica goodenovii (Red-capped Robin)*
270. 24667 *Phalacrocorax sulcirostris (Little Black Cormorant)*
271. 24409 *Phaps chalcoptera (Common Bronzewing)*
272. *Philophloeus sp.* Y
273. *Phoracantha obscurus*
274. *Phoracantha rugithoracica*
275. *Phorticosomus sp.*
276. *Platycercus (Violania) icterotis subsp. xanthogenys*
277. 24746 *Platycercus icterotis subsp. xanthogenys (Western Rosella (inland))* P4
278. 24748 *Platycercus varius (Mulga Parrot)*
279. 25721 *Platycercus zonarius (Australian Ringneck, Ring-necked Parrot)*
280. 25510 *Pogona minor (Dwarf Bearded Dragon)*
281. 24907 *Pogona minor subsp. minor (Dwarf Bearded Dragon)*
282. 24681 *Poliocephalus poliocephalus (Hoary-headed Grebe)*
283. 24683 *Pomatostomus superciliosus (White-browed Babbler)*
284. 25261 *Pseudechis australis (Mulga Snake)*
285. 24232 *Pseudomys bolami (Bolam's Mouse)*
286. 25259 *Pseudonaja affinis subsp. affinis (Dugite)*
287. 42416 *Pseudonaja mengdeni (Western Brown Snake)*
288. 25263 *Pseudonaja modesta (Ringed Brown Snake)*
289. 25264 *Pseudonaja nuchalis (Gwardar, Northern Brown Snake)*
290. 25434 *Pseudophryne occidentalis (Western Toadlet)*
291. *Pseudophryne sp.*
292. *Pterohelaeus sp.* Y
293. 42344 *Purnella albifrons (White-fronted Honeyeater)*
294. 25008 *Pygopus lepidopodus (Common Scaly Foot)*
295. 24278 *Pyrrholaemus brunneus (Redthroat)*
296. 25614 *Rhipidura leucophrys (Willie Wagtail)*
297. *Schedorhinotermes reticulatus*
298. *Scolopendra laeta*
299. *Semanopterus sp.* Y
300. 25534 *Sericornis frontalis (White-browed Scrubwren)*
301. 25266 *Simoselaps bertholdi (Jan's Banded Snake)*
302. *Simoselaps semifasciatus*
303. 30948 *Smicrornis brevirostris (Weebill)*
304. 24109 *Sminthopsis dolichura (Little long-tailed Dunnart)*
305. 24117 *Sminthopsis ooldea (Ooldea Dunnart)*
306. *Storena formosa*
307. 25597 *Strepera versicolor (Grey Currawong)*
308. 24923 *Strophurus assimilis (Goldfields Spiny-tailed Gecko)*
309. 24927 *Strophurus elderi*
310. 42310 *Sugomel niger (Black Honeyeater)*
311. *Supunna sp.*
312. 25269 *Suta fasciata (Rosen's Snake)*
313. *Synsphyronus dorothyae*
314. *Synsphyronus lathrius*
315. *Synsphyronus mimulus*
316. 25705 *Tachybaptus novaehollandiae (Australasian Grebe, Black-throated Grebe)*
317. 24331 *Tadorna tadornoides (Australian Shelduck, Mountain Duck)*
318. *Tasmanicosa leuckartii*
319. *Tetralycosa alteripa*
320. *Teyl sp.*
321. *Theclinesthes miskini subsp. miskini*
322. *Thereuopoda lesueurii*
323. 25549 *Todiramphus sanctus (Sacred Kingfisher)*

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324. *Tribonyx ventralis*
325. *Trichocyclus balladong*
326. 30814 *Tympanocryptis cephalus (Pebble Dragon)*
327. 24983 *Underwoodisaurus milii (Barking Gecko)*
328. *Uracanthus discicollis*
329. *Uracanthus fuscus*
330. *Uracanthus strigosus* Y
331. *Urodacus novaehollandiae*
332. *Urodacus sp.*
333. 25218 *Varanus gouldii (Bungarra or Sand Monitor)*
334. 25526 *Varanus tristis (Racehorse Monitor)*
335. *Venator yalkara*
336. 25765 *Zosterops lateralis (Grey-breasted White-eye, Silvereye)*

Fungi

337. *Aleurodiscus sp.*
338. *Aspicilia sp.*
339. 42107 *Austroparmelina elixiana*
340. 42104 *Buellia albula*
341. 44945 *Caloplaca hnatiukii*
342. 28208 *Cladonia cervicornis subsp. verticillata*
343. 27694 *Cladonia southlandica*
344. *Collema novozelandicum*
345. *Collema sp.*
346. 27720 *Diploschistes hensseniae*
347. 27723 *Diploschistes scruposus*
348. *Diploschistes sp.*
349. 27725 *Diploschistes thunbergianus*
350. *Geastrum sp.*
351. 27772 *Heterodea beaugleholei*

352. 27773 *Heterodea muelleri*
353. *Hyphodontia sp.*
354. *Hysterographium sp.*
355. 27813 *Lecanora pseudistera*
356. 46014 *Myriospora smaragdula*
357. *Parmelia sp.*
358. 27973 *Physcia nubila*
359. 27984 *Placidium squamulosum*
360. *Podaxis pistillaris*
361. *Podaxis sp.*
362. 27998 *Psora crenata*
363. 28000 *Psora decipiens*
364. *Pycnoporus coccineus*
365. 28060 *Siphula coriacea*
366. 28065 *Teloschistes chrysophthalmus*
367. *Teloschistes sp.*
368. *Vararia sp.*
369. 44221 *Xalocoa ocellata*
370. 28102 *Xanthoparmelia alternata*
371. 28103 *Xanthoparmelia amphixantha*
372. 28104 *Xanthoparmelia amplexula*
373. 28105 *Xanthoparmelia antleriformis*
374. 28112 *Xanthoparmelia cheelii*
375. 28120 *Xanthoparmelia cranfieldii*
376. 18001 *Xanthoparmelia dayiana* P3
377. 28127 *Xanthoparmelia eilifii*
378. 28128 *Xanthoparmelia elevata*
379. 28132 *Xanthoparmelia filarszkyana*
380. 28134 *Xanthoparmelia flavescentireagens*
381. 18007 *Xanthoparmelia fumigata* P1
382. 29032 *Xanthoparmelia imitatrix*
383. 28326 *Xanthoparmelia incantata*
384. 28142 *Xanthoparmelia incerta*
385. 28143 *Xanthoparmelia incrustata*
386. 28144 *Xanthoparmelia isidiigera*
387. 28145 *Xanthoparmelia isidiosa*
388. 29019 *Xanthoparmelia kondininensis* P2
389. 30651 *Xanthoparmelia nodulosa*
390. 28165 *Xanthoparmelia parvoincerta*
391. 28166 *Xanthoparmelia pertinax*
392. 28167 *Xanthoparmelia praegnans*

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393. 29036 *Xanthoparmelia pulla*
394. 28172 *Xanthoparmelia reptans*
395. 44326 *Xanthoparmelia rimalis*
396. 28174 *Xanthoparmelia scabrosa*
397. 28327 *Xanthoparmelia semiviridis*
398. 28330 *Xanthoparmelia subprolixa*
399. 28182 *Xanthoparmelia tasmanica*
400. 44936 *Xanthoparmelia torulosa*
401. 28356 *Xanthoparmelia verrucella*
402. 28186 *Xanthoparmelia versicolor*
403. 28189 *Xanthoparmelia willisii*
404. 18002 *Xanthoparmelia xanthomelanoides* P2
405. *Xanthoria sp.*

Plantae

406. 3200 *Acacia acuminata (Jam, Mangard)*
407. 3217 *Acacia aneura (Mulga, Wanari)*
408. 3248 *Acacia burkittii (Sandhill Wattle)*
409. 3249 *Acacia calcarata*
410. 3251 *Acacia camptoclada*
411. 3256 *Acacia chrysella*
412. 44514 *Acacia collegialis*
413. 3264 *Acacia colletioides (Wait-a-while)*
414. 14068 *Acacia cylindrica* P3
415. 16169 *Acacia deficiens*
416. 3291 *Acacia dempsteri*
417. 16120 *Acacia donaldsonii*
418. 12256 *Acacia dorsenna* P1
419. 3315 *Acacia duriuscula*
420. 16168 *Acacia enervia subsp. enervia*
421. 12257 *Acacia enervia subsp. explicata*
422. 3320 *Acacia ephedroides*
423. 16020 *Acacia eremophila var. eremophila*
424. 3324 *Acacia erinacea*
425. 3342 *Acacia fragilis*
426. 44512 *Acacia fraternalis*
427. 15282 *Acacia gibbosa*
428. 3366 *Acacia hemiteles*
429. 3378 *Acacia inaequiloba*
430. 3379 *Acacia inamabilis*
431. 16164 *Acacia inceana subsp. inceana*
432. 3393 *Acacia jennerae*
433. 3400 *Acacia kerryana* P2
434. 3408 *Acacia lasiocalyx (Silver Wattle, Wilyurwur)*
435. 3419 *Acacia ligulata (Umbrella Bush, Watarka)*
436. 3426 *Acacia longispinea*
437. 13503 *Acacia masliniana*
438. 3440 *Acacia merrallii*
439. 36416 *Acacia mulganeura*
440. 3463 *Acacia nyssophylla*
441. 3473 *Acacia oswaldii (Miljee, Nelia)*
442. 3478 *Acacia pachypoda*
443. 3494 *Acacia poliochroa*
444. 3495 *Acacia prainii (Prain's Wattle)*
445. 3498 *Acacia pritzeliana*
446. 3507 *Acacia quadrimarginea*
447. 19499 *Acacia ramulosa var. ramulosa*
448. 3512 *Acacia rendlei*

449. 3513 *Acacia resinimarginea*
450. 3514 *Acacia resinistipulea*
451. 3539 *Acacia sericocarpa*
452. *Acacia sp.*
453. 3577 *Acacia tetragonophylla (Kurara, Wakalpuka)*
454. 3582 *Acacia triptycha*
455. 3589 *Acacia uncinella*
456. 3599 *Acacia warramaba*
457. 3600 *Acacia websteri* P1
458. 3605 *Acacia xerophila*
459. 16157 *Acacia xerophila var. brevior*
460. 15292 *Acacia yorkrakinensis subsp. acrita*
461. 7817 *Actinobole uliginosum (Flannel Cudweed)*

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462. 6208 *Actinotus superbus*
463. 1719 *Allocasuarina acuaria*
464. 1720 *Allocasuarina acutivalvis*
465. 13904 *Allocasuarina acutivalvis subsp. acutivalvis*
466. 1721 *Allocasuarina campestris*
467. 1722 *Allocasuarina corniculata*
468. 13897 *Allocasuarina eriochlamys subsp. grossa* P3
469. 1730 *Allocasuarina helmsii*
470. 1731 *Allocasuarina huegeliana (Rock Sheoak, Kwowl)*
471. 4905 *Alyogyne hakeifolia*
472. 6565 *Alyxia buxifolia (Dysentery Bush)*
473. 2369 *Amyema benthamii*
474. 2380 *Amyema miquelii (Stalked Mistletoe)*
475. 40910 *Androcalva luteiflora (Yellow-flowered Rulingia)*
476. 7833 *Angianthus preissianus*
477. 41993 *Aotus sp. Tortile (G.J. Keighery 3767)*
478. 31876 *Arabidella chrysodema*
479. 2992 *Arabidella trisecta*
480. 13327 *Argentipallium niveum*
481. 207 *Aristida contorta (Bunched Kerosene Grass)*
482. 7846 *Asteridea athrixioides*
483. *Asteridea sp.*
484. 20726 *Astus subroseus*
485. 11489 *Atriplex acutibractea subsp. karoniensis*
486. 2453 *Atriplex codonocarpa (Flat-topped Saltbush)*
487. 2455 *Atriplex eardleyae*
488. 2468 *Atriplex nana*
489. 2469 *Atriplex nummularia (Old Man Saltbush)*
490. 11516 *Atriplex nummularia subsp. spathulata (Old Man Saltbush)*
491. 11791 *Atriplex quadrivalvata var. quadrivalvata*
492. *Atriplex sp.*
493. 2478 *Atriplex spongiosa (Pop Saltbush)*
494. 2479 *Atriplex stipitata (Mallee Saltbush)*
495. 2481 *Atriplex vesicaria (Bladder Saltbush)*
496. 17232 *Austrostipa blackii* P3
497. 17237 *Austrostipa elegantissima*
498. 17238 *Austrostipa eremophila*
499. 17246 *Austrostipa nitida*
500. 19588 *Austrostipa nodosa*
501. 17247 *Austrostipa platychaeta*
502. 17251 *Austrostipa scabra*
503. 36283 *Austrostipa sp. Carlingup Road (S. Kern & R. Jasper LCH 18459)* P1
504. 17255 *Austrostipa trichophylla*
505. *Baeckea sp.*
506. 36064 *Baeckea sp. Barbalin (B.L. Rye & M.E. Trudgen BLR 241022)*
507. 5375 *Balaustion pulcherrimum (Native Pomegranate)*
508. 5379 *Beaufortia cyrtodonta*
509. 5385 *Beaufortia incana*
510. 5386 *Beaufortia interstans*
511. 4591 *Bertya dimerostigma*
512. 20193 *Bertya virgata*
513. 4592 *Beyeria brevifolia*
514. 4598 *Beyeria lechenaultii (Pale Turpentine Bush)*
515. 34276 *Beyeria sulcata var. brevipes*
516. 34257 *Beyeria sulcata var. sulcata*
517. 7856 *Blennospora drummondii*
518. 11274 *Boronia coerulescens subsp. spinescens*
519. 16628 *Boronia fabianoides subsp. rosea*
520. 15965 *Boronia inornata subsp. inornata*
521. 15966 *Boronia inornata subsp. leptophylla*
522. 30233 *Bossiaea laxa* P2 Y
523. 4999 *Brachychiton gregorii (Desert Kurrajong, Ngalta)*
524. 7871 *Brachyscome ciliaris*
525. 7878 *Brachyscome iberidifolia*
526. 7880 *Brachyscome lineariloba*
527. *Brachyscome sp.*
528. 19437 *Brachysola coerulea*
529. 19436 *Brachysola halganiacea* P2
530. 7413 *Brunonia australis (Native Cornflower)*
531. 19069 *Brunonia sp. Goldfields (K.R. Newbey 6044)*

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532. 19376 *Bryophyllum delagoense* Y
533. *Bryum pachytheca*
534. 1366 *Bulbine semibarbata (Leek Lily)*
535. 15370 *Caladenia microchila*
536. 1614 *Caladenia roei (Ant Orchid)*
537. 2853 *Calandrinia eremaea (Twining Purslane)*
538. 19454 *Calandrinia sp. Needilup (K.R. Newbey 4892)*
539. 43821 *Calandrinia sp. Widgiemooltha (F. Obbens & E. Reid FO 9/05)* P1
540. 30396 *Calandrinia translucens*
541. 1214 *Calectasia grandiflora (Blue Tinsel Lily)*
542. *Callistemon sp.*

543. 8466 *Callitris columellaris (White Cypress Pine)*
544. 96 *Callitris preissii (Rottnest Island Pine, Maro)*
545. 8637 *Callitris verrucosa*
546. 5408 *Calothamnus gilesii*
547. *Calothamnus sp.*
548. 5432 *Calothamnus tuberosus*
549. 7903 *Calotis hispidula (Bindy Eye)*
550. 7905 *Calotis multicaulis (Many-stemmed Burr-daisy)*
551. 5438 *Calytrix amethystina*
552. 5442 *Calytrix birdii*
553. 32461 *Campylopus bicolor var. bicolor*
554. 32336 *Campylopus clavatus*
555. 32338 *Campylopus introflexus* Y
556. 3008 *Carrichtera annua (Ward's Weed)* Y
557. 2953 *Cassytha melantha (Large Dodder-laurel)*
558. 1742 *Casuarina obesa (Swamp Sheoak, Kuli)*
559. 12658 *Casuarina pauper (Black Oak)*
560. 7916 *Centaurea melitensis (Maltese Cockspur)* Y
561. *Centratherum sp.*
562. 13122 *Centrolepis cephaloformis subsp. cephaloformis*
563. 1134 *Centrolepis polygyna (Wiry Centrolepis)*
564. 7922 *Cephalipterum drummondii (Pompom Head)*
565. *Ceratodon purpureus convolutus*
566. 5491 *Chamelaucium ciliatum*
567. 12796 *Cheilanthes adiantoides*
568. 31 *Cheilanthes austrotenuifolia*
569. 37 *Cheilanthes lasiophylla (Woolly Cloak Fern)*
570. 12818 *Cheilanthes sieberi subsp. sieberi*
571. 3168 *Cheiranthera filifolia*
572. 12612 *Chrysocephalum apiculatum*
573. 13138 *Chrysocephalum puteale*
574. 7933 *Chthonocephalus pseudevax (Woolly Groundheads)*
575. 7370 *Citrullus lanatus (Pie Melon)* Y
576. 2778 *Codonocarpus cotinifolius (Native Poplar, Kundurangu)*
577. 4561 *Comesperma scoparium (Broom Milkwort)*
578. 40923 *Commersonia craurophylla (Brittle Leaved Rulingia)*
579. *Commersonia sp.*
580. 7419 *Coopernookia strophiolata*
581. 17701 *Crassula closiana*
582. 11563 *Crassula colorata var. colorata*
583. 7949 *Cratystylis conocephala (Greybush)*
584. *Cratystylis conocephala x microphylla*
585. 7950 *Cratystylis microphylla (Small-leaved Grey Bush)*
586. *Cratystylis sp.* Y
587. 7951 *Cratystylis subspinescens (Australian Sage, Spiny Grey Bush)*
588. 16183 *Cryptandra aridicola*
589. 31591 *Cryptandra crispula* P3
590. 16184 *Cryptandra distigma*
591. 16185 *Cryptandra graniticola*
592. *Cryptandra sp.*
593. 17117 *Cullen cinereum*
594. 15400 *Cyanicula amplexans*
595. 6747 *Cyanostegia angustifolia (Tinsel-flower)*
596. 6750 *Cyanostegia lanceolata (Tinsel Flower)*
597. 6751 *Cyanostegia microphylla (Tinsel Flower)*
598. 44082 *Cyathostemon divaricatus* P1 Y
599. 42066 *Cyathostemon heterantherus*
600. *Cyathostemon sp.*
601. 7422 *Dampiera angulata*

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602. 13155 *Dampiera latealata*
603. 7454 *Dampiera linearis (Common Dampiera)*
604. 7456 *Dampiera luteiflora (Yellow Dampiera)*
605. 7459 *Dampiera oligophylla (Sparse-leaved Dampiera)*
606. *Dampiera sp.*
607. 7477 *Dampiera stenostachya (Narrow-spiked Dampiera)*
608. 7480 *Dampiera tenuicaulis (Slender-stemmed Dampiera)*
609. 13158 *Dampiera tenuicaulis var. curvula*
610. 13159 *Dampiera tenuicaulis var. tenuicaulis*
611. 5510 *Darwinia diosmoides*
612. 35618 *Darwinia sp. Karonie (K. Newbey 8503)*
613. 41025 *Dasymalla terminalis (Native Foxglove)*
614. 12975 *Daviesia benthamii subsp. acanthoclona*
615. 3802 *Daviesia croniniana*
616. 3813 *Daviesia grahamii*
617. 3829 *Daviesia pachyloma*
618. 11636 *Dianella revoluta var. divaricata*
619. 6771 *Dicrastylis parvifolia*
620. 6773 *Dicrastylis reticulata* P3
621. 32346 *Didymodon torquatus*
622. 19854 *Dillwynia sp. Coolgardie (V.E. Sands 637.3.1)*
623. 14887 *Diocirea acutifolia* P3
624. 14888 *Diocirea microphylla* P3
625. *Diocirea sp.* Y
626. 14889 *Diocirea violacea*
627. 2499 *Dissocarpus paradoxus (Curious Saltbush)*
628. 44161 *Diuris hazeliae*
629. 4752 *Dodonaea adenophora*
630. 4753 *Dodonaea amblyophylla*
631. 4769 *Dodonaea lobulata (Bead Hopbush)*
632. 12034 *Dodonaea microzyga var. acrolobata*
633. *Dodonaea sp.*
634. 4780 *Dodonaea stenozyga*
635. 11247 *Dodonaea viscosa subsp. angustissima*
636. 14298 *Drosera macrantha subsp. macrantha*
637. 41202 *Drosera yilgarnensis*
638. 4459 *Drummondita hassellii*
639. 6966 *Duboisia hopwoodii (Pituri, Kundugu)*
640. *Eccremidium sp.*

641. 6681 *Echium plantagineum (Paterson's Curse)* Y
642. 2409 *Emex australis (Doublegee)* Y
643. 2511 *Enchylaena tomentosa (Barrier Saltbush)*
644. 368 *Enteropogon ramosus (Windmill Grass, Curly Windmill Grass)*
645. *Eremaea zonospila*
646. 7180 *Eremophila alternifolia (Poverty Bush)*
647. 31235 *Eremophila annosocaulis* P3
648. 7186 *Eremophila caerulea*
649. 16377 *Eremophila caerulea subsp. caerulea*
650. 13641 *Eremophila caerulea subsp. merrallii* P4
651. 13807 *Eremophila caperata*
652. 7189 *Eremophila clarkei (Turpentine Bush)*
653. 17156 *Eremophila clavata*
654. 14895 *Eremophila decipiens subsp. decipiens*
655. 7195 *Eremophila dempsteri*
656. 7198 *Eremophila deserti*
657. 7200 *Eremophila drummondii*
658. 7212 *Eremophila gibbosa*
659. 14340 *Eremophila glabra subsp. glabra*
660. 7219 *Eremophila granitica (Thin-leaved Poverty Bush)*
661. 15112 *Eremophila interstans subsp. interstans*
662. 15111 *Eremophila interstans subsp. virgata*
663. 7226 *Eremophila ionantha (Violet-flowered Eremophila)*
664. 16363 *Eremophila maculata subsp. brevifolia (Native Fuchsia)*
665. 15003 *Eremophila oldfieldii subsp. angustifolia*
666. 18570 *Eremophila oppositifolia subsp. angustifolia*
667. 7251 *Eremophila parvifolia (Small-leaved Eremophila)*
668. 14594 *Eremophila parvifolia subsp. auricampa*
669. 14514 *Eremophila perglandulosa* P1
670. 14516 *Eremophila praecox* P1
671. 10780 *Eremophila psilocalyx*

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672. 15172 *Eremophila rugosa*
673. 7264 *Eremophila saligna (Willowy Eremophila)*
674. 7267 *Eremophila scoparia (Broom Bush ()*
675. 7269 *Eremophila serrulata (Serrate-leaved Eremophila)*
676. *Eremophila sp.*
677. 15049 *Eremophila succinea* P3
678. 2514 *Eriochiton sclerolaenoides (Woolly Bindii)*
679. 4334 *Erodium crinitum (Corkscrew)*
680. 4335 *Erodium cygnorum (Blue Heronsbill)*
681. 14377 *Erymophyllum ramosum subsp. ramosum*
682. 13035 *Eucalyptus aspratilis*
683. 5565 *Eucalyptus brachycorys (Cowcowing Mallee)*
684. 5579 *Eucalyptus calycogona (Gooseberry Mallee)*
685. *Eucalyptus calycogona subsp. spaffordii*
686. 5581 *Eucalyptus campaspe (Silver Gimlet)*
687. 12903 *Eucalyptus capillosa subsp. capillosa (Wheatbelt Wandoo)*
688. 5584 *Eucalyptus celastroides (Mirret, Mired)*
689. 14300 *Eucalyptus celastroides subsp. celastroides (Mirret)*
690. 11978 *Eucalyptus celastroides subsp. virella*
691. 5592 *Eucalyptus clelandii (Cleland's Blackbutt)*
692. 5595 *Eucalyptus comitae-vallis (Comet Vale Mallee)*
693. 5596 *Eucalyptus concinna (Victoria Desert Mallee)*
694. 5607 *Eucalyptus corrugata (Rough-fruited Mallee)*
695. 5612 *Eucalyptus cylindrocarpa (Woodline Mallee)*
696. 5637 *Eucalyptus eremophila (Tall Sand Mallee)*
697. 15667 *Eucalyptus eremophila subsp. eremophila (Sand Mallee)*
698. 5648 *Eucalyptus flocktoniae (Merrit, Merid)*
699. 18521 *Eucalyptus flocktoniae subsp. flocktoniae*
700. 19320 *Eucalyptus flocktoniae subsp. hebes*
701. 5649 *Eucalyptus foecunda (Narrow-leaved Red Mallee)*
702. 34756 *Eucalyptus frenchiana* P3
703. 5662 *Eucalyptus gracilis (Yorrell)*
704. 5665 *Eucalyptus griffithsii (Griffith's Grey Gum)*
705. 5673 *Eucalyptus horistes*
706. 15743 *Eucalyptus incerata (Mount Day Mallee)*
707. 5675 *Eucalyptus incrassata (Lerp Mallee)*
708. 15682 *Eucalyptus leptophylla (Narrow-leaved Red Mallee)*
709. 13056 *Eucalyptus leptopoda subsp. subluta*
710. 5697 *Eucalyptus lesouefii (Goldfields Blackbutt)*
711. 12901 *Eucalyptus livida (Mallee Wandoo)*
712. 5701 *Eucalyptus longicornis (Red Morrel, Moril)*
713. 20802 *Eucalyptus longissima*
714. 13037 *Eucalyptus loxophleba subsp. lissophloia*
715. 5726 *Eucalyptus oleosa (Giant Mallee)*
716. 20091 *Eucalyptus oleosa subsp. oleosa*
717. 13524 *Eucalyptus olivina*
718. 18664 *Eucalyptus optima*
719. 5731 *Eucalyptus orbifolia (Round-leaved Mallee)*
720. 5733 *Eucalyptus ovularis (Small-fruited Mallee)*
721. 5742 *Eucalyptus petraea (Granite Rock Box)*
722. 5745 *Eucalyptus pileata (Capped Mallee)*
723. 18580 *Eucalyptus planipes*
724. 5747 *Eucalyptus platycorys (Boorabbin Mallee)*
725. 13645 *Eucalyptus platydisca* T
726. 19064 *Eucalyptus prolixa*
727. 13525 *Eucalyptus quadrans*
728. 12380 *Eucalyptus ravida (Silver-topped Gimlet)*
729. 5761 *Eucalyptus rigidula (Stiff-leaved Mallee)*
730. 12693 *Eucalyptus salicola (Salt Gum)*
731. 5766 *Eucalyptus salmonophloia (Salmon Gum, Wurak)*
732. 5767 *Eucalyptus salubris (Gimlet)*
733. *Eucalyptus sp.*
734. 5780 *Eucalyptus stricklandii (Strickland's Gum)*
735. 13521 *Eucalyptus tenuis*
736. 5792 *Eucalyptus torquata (Coral Gum)*
737. 5793 *Eucalyptus transcontinentalis (Redwood, Pungul)*
738. 15799 *Eucalyptus trichopoda*

739. 18293 *Eucalyptus urna*
740. 5798 *Eucalyptus websteriana (Webster's Mallee)*
741. 13054 *Eucalyptus websteriana subsp. websteriana*

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742. 5799 *Eucalyptus woodwardii (Lemon-flowered Gum, Gunguru)*
743. 18269 *Eucalyptus x brachyphylla* P4
744. 5802 *Eucalyptus yilgarnensis (Yorrell)*
745. 42867 *Euphorbia multifaria*
746. 12097 *Euphorbia tannensis subsp. eremophila (Desert Spurge)*
747. 16722 *Euryomyrtus maidenii*
748. 10977 *Exocarpos aphyllus (Leafless Ballart)*
749. 10765 *Exocarpos sparteus (Broom Ballart, Djuk)*
750. 32367 *Fissidens megalotis*
751. 5191 *Frankenia cinerea*
752. 5197 *Frankenia desertorum*
753. 5201 *Frankenia georgei*
754. 5204 *Frankenia interioris*
755. 11969 *Frankenia interioris var. parviflora*
756. 5205 *Frankenia irregularis*
757. 5212 *Frankenia setosa (Bristly Frankenia)*
758. *Frankenia sp.*
759. 3907 *Gastrolobium laytonii (Breelya, Prilya)*
760. 3924 *Gastrolobium spinosum (Prickly Poison)*
761. 16311 *Gazania linearis* Y
762. 32384 *Gigaspermum repens*
763. 33620 *Glischrocaryon angustifolium*
764. 6143 *Glischrocaryon aureum (Common Popflower)*
765. 19925 *Glycine peratosa*
766. 3943 *Glycyrrhiza acanthocarpa (Native Liquorice)*
767. 12624 *Gnephosis angianthoides*
768. 7996 *Gnephosis intonsa (Shaggy Gnephosis)* P3
769. 8003 *Gnephosis tridens*
770. 10777 *Gompholobium gompholobioides*
771. 3956 *Gompholobium shuttleworthii*
772. 11801 *Gonocarpus confertifolius var. helmsii*
773. 29362 *Goodenia coerulea*
774. 31833 *Goodenia corralina* P2 Y
775. 7506 *Goodenia elderi*
776. 7514 *Goodenia havilandii*
777. 12523 *Goodenia helmsii*
778. 7531 *Goodenia occidentalis*
779. 7535 *Goodenia pinnatifida (Cutleaf Goodenia)*
780. 7541 *Goodenia pusilliflora (Smallflower Goodenia)*
781. 7565 *Goodenia xanthosperma (Yellow-seeded Goodenia)*
782. 17787 *Goodia medicaginea*
783. 39783 *Goodia stenocarpa*
784. 14427 *Granitites intangendus*
785. 1946 *Grevillea acacioides*
786. 1949 *Grevillea acuaria*
787. 1954 *Grevillea annulifera (Prickly Plume Grevillea)*
788. 1971 *Grevillea cagiana (Red Toothbrushes)*
789. 13453 *Grevillea didymobotrya subsp. didymobotrya*
790. 8832 *Grevillea excelsior (Flame Grevillea)*
791. 14413 *Grevillea haplantha subsp. haplantha*
792. 19314 *Grevillea hookeriana subsp. apiciloba*
793. 19435 *Grevillea hookeriana subsp. hookeriana*
794. 2018 *Grevillea huegelii*
795. 19541 *Grevillea nematophylla subsp. nematophylla*
796. 2055 *Grevillea oncogyne*
797. 13415 *Grevillea petrophiloides subsp. magnifica*
798. 19540 *Grevillea petrophiloides subsp. remota* P3
799. 2064 *Grevillea phillipsiana* P1
800. 19492 *Grevillea plurijuga subsp. plurijuga*
801. 2077 *Grevillea pterosperma*
802. 2088 *Grevillea sarissa (Wheel Grevillea)*
803. 13458 *Grevillea sarissa subsp. sarissa*
804. 2104 *Grevillea teretifolia (Round Leaf Grevillea)*
805. 32386 *Grimmia laevigata*
806. 32473 *Grimmia pulvinata var. africana*
807. 2804 *Gunniopsis glabra*
808. 2807 *Gunniopsis quadrifida (Sturts Pigface)*
809. 2808 *Gunniopsis rodwayi*
810. 2780 *Gyrostemon brownii*
811. 2783 *Gyrostemon racemiger*

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812. 2157 *Hakea erecta*
813. 2163 *Hakea francisiana (Emu Tree)*
814. 2181 *Hakea meisneriana*
815. 2182 *Hakea minyma*
816. 6684 *Halgania andromedifolia*
817. 29840 *Halgania cyanea var. Allambi Stn (B.W. Strong 676)*
818. 31117 *Halgania cyanea var. Charleville (R.W. Purdie +111)*
819. *Halgania cyanea var. Charleville (R.W.Purdie+ 111)*
820. 6691 *Halgania integerrima*
821. 6174 *Haloragis gossei*
822. 6180 *Haloragis trigonocarpa*
823. 17725 *Hannafordia bissillii subsp. latifolia*
824. 19779 *Hibbertia glomerosa var. glomerosa*
825. 5134 *Hibbertia huegelii*
826. *Hibbertia sp. Bankstown (R.T.Miller & C.P.Gibson s.n. 18/10/06)*
827. 5173 *Hibbertia subvaginata*
828. 5815 *Homalocalyx thryptomenoides*
829. 8085 *Hyalochlamys globifera*
830. 12742 *Hyalosperma demissum*
831. 15447 *Hyalosperma glutinosum subsp. glutinosum*
832. 12756 *Hyalosperma zacchaeus*

833. 5220 *Hybanthus epacroides (Spiny Hybanthus)*
834. 11973 *Hybanthus floribundus subsp. curvifolius*
835. 11546 *Hydrocotyle pilifera var. glabrata*
836. 6239 *Hydrocotyle rugulosa*
837. 5180 *Hypericum gramineum (Small St John's Wort)*
838. 8086 *Hypochaeris glabra (Smooth Catsear)* Y
839. 40320 *Indigofera australis subsp. hesperia*
840. 8 *Isoetes brevicula* P3
841. 8087 *Isoetopsis graminifolia (Cushion Grass)*
842. 911 *Isolepis congrua*
843. *Isopogon sp.*
844. 7397 *Isotoma petraea (Rock Isotome, Tundiwari)*
845. 14779 *Jacksonia arida*
846. 1176 *Juncus aridicola*
847. 1189 *Juncus pauciflorus (Loose Flower Rush)*
848. 4043 *Kennedia prorepens*
849. *Keraudrenia sp.*
850. 13729 *Keraudrenia velutina*
851. 19892 *Keraudrenia velutina subsp. velutina*
852. 5830 *Kunzea affinis*
853. 5840 *Kunzea pulchella (Granite Kunzea)*
854. 6779 *Lachnostachys coolgardiensis*
855. 6733 *Lantana camara (Common Lantana)* Y
856. 4951 *Lawrencia chrysoderma*
857. 4954 *Lawrencia diffusa*
858. 4956 *Lawrencia helmsii (Dunna Dunna)*
859. 4957 *Lawrencia repens*
860. 4959 *Lawrencia squamata*
861. 7569 *Lechenaultia brevifolia*
862. 7585 *Lechenaultia pulvinaris (Cushion Leschenaultia)* P4
863. 3018 *Lepidium africanum (Rubble Peppercress)* Y
864. 3033 *Lepidium oxytrichum*
865. 3039 *Lepidium platypetalum (Slender Peppercress)*
866. 1075 *Lepidobolus preissianus*
867. 31760 *Lepidosperma diurnum*
868. 41647 *Lepidosperma sanguinolentum*
869. *Lepidosperma sieberi*
870. *Lepidosperma sp.*
871. 30437 *Lepidosperma sp. Kambalda (A.A. Mitchell 5156)* Y
872. *Lepidosperma sp. Kambalda (A.A.Mitchell 5156)* Y
873. 2352 *Leptomeria preissiana*
874. 17641 *Leptosema cervicorne*
875. 5847 *Leptospermum erubescens (Roadside Teatree)*
876. 5848 *Leptospermum fastigiatum*
877. 5852 *Leptospermum nitens*
878. 5855 *Leptospermum roei*
879. *Leptospermum sp.*
880. 17133 *Leptospermum sp. Peak Charles/Norseman (K.R. Newbey 5243)*
881. 12692 *Leptospermum subtenue*

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882. *Leucopogon inflexifolius MS*
883. *Leucopogon sp.*
884. 41770 *Leucopogon sp. Boorabbin (K.R. Newbey 8374)*
885. 16049 *Leucopogon sp. Clyde Hill (M.A. Burgman 1207)*
886. 20763 *Leucopogon sp. Coolgardie (M. Hislop & F. Hort MH 3197)*
887. 29493 *Leucopogon sp. Kambalda (J. Williams s.n. PERTH 07305028)* P3 Y
888. *Leucopogon sp. Kambalda (J.Williams s.n. PERTH 07305028)* Y
889. 31877 *Lobelia cleistogamoides*
890. 1226 *Lomandra effusa (Scented Matrush)*
891. 6967 *Lycium australe (Australian Boxthorn)*
892. 36375 *Lysimachia arvensis (Pimpernel)* Y
893. 6456 *Lysinema ciliatum (Curry Flower)*
894. 2533 *Maireana amoena*
895. 2535 *Maireana appressa*
896. 2543 *Maireana eriosphaera*
897. 2544 *Maireana georgei (Satiny Bluebush)*
898. 2550 *Maireana marginata*
899. 2553 *Maireana oppositifolia*
900. 2555 *Maireana pentatropis*
901. 2560 *Maireana pyramidata (Sago Bush)*
902. 2561 *Maireana radiata*
903. 2563 *Maireana sedifolia (Pearl Bluebush, Myall)*
904. *Maireana sp.*
905. 2565 *Maireana suaedifolia*
906. 2567 *Maireana tomentosa (Felty Bluebush)*
907. 11662 *Maireana tomentosa subsp. tomentosa*
908. 2568 *Maireana trichoptera (Downy Bluebush)*
909. 41544 *Malva weinmanniana*
910. 12949 *Marsdenia australis*
911. 15063 *Melaleuca acuminata subsp. acuminata*
912. 5891 *Melaleuca coccinea (Goldfields Bottlebrush)* P3
913. 5893 *Melaleuca concreta*
914. 5908 *Melaleuca eleuterostachya*
915. 5909 *Melaleuca elliptica (Granite Bottlebrush, Ngow)*
916. 20286 *Melaleuca exuvia*
917. 5912 *Melaleuca fulgens (Scarlet Honeymyrtle)*
918. 15603 *Melaleuca fulgens subsp. fulgens*
919. 19486 *Melaleuca hamata*
920. 19081 *Melaleuca johnsonii*
921. 5922 *Melaleuca lanceolata (Rottnest Teatree, Moonah)*
922. 5925 *Melaleuca lateriflora (Gorada)*
923. 5927 *Melaleuca laxiflora*
924. 14701 *Melaleuca macronychia subsp. trygonoides* P3
925. 15663 *Melaleuca pauperiflora subsp. fastigiata*
926. 18266 *Melaleuca procera*
927. 5958 *Melaleuca radula (Graceful Honeymyrtle)*
928. 5966 *Melaleuca sheathiana (Boree, Buri)*
929. 5981 *Melaleuca thyoides*
930. 5984 *Melaleuca uncinata (Broom Bush, Kwidjard)*

931. 20287 *Melaleuca zeteticorum*
932. 9187 *Micromyrtus erichsenii*
933. 5999 *Micromyrtus obovata*
934. 6002 *Micromyrtus stenocalyx*
935. 14382 *Microtis eremaea*
936. 8105 *Millotia myosotidifolia*
937. 8107 *Minuria cunninghamii (Bush Minuria)*
938. 4089 *Mirbelia depressa*
939. 4094 *Mirbelia microphylla*
940. 4095 *Mirbelia multicaulis*
941. *Mirbelia sp.*
942. 2842 *Mollugo cerviana*
943. 490 *Monachather paradoxus*
944. 4662 *Monotaxis grandiflora (Diamond of the Desert)*
945. 19587 *Monotaxis grandiflora var. obtusifolia*
946. 18259 *Myoporum platycarpum subsp. platycarpum*
947. 6974 *Nicotiana glauca (Tree Tobacco)* Y
948. 6975 *Nicotiana goodspeedii*
949. 6978 *Nicotiana rotundifolia (Round-leaved Tobacco)*
950. 4366 *Nitraria billardierei (Nitre Bush)*
951. 8134 *Olearia exiguifolia (Small-leaved Daisy Bush)*

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952. 8136 *Olearia homolepis*
953. 8140 *Olearia muelleri (Goldfields Daisy)*
954. 8141 *Olearia muricata (Rough-leaved Daisy Bush)*
955. 8145 *Olearia pimeleoides (Pimelea Daisybush, Burrobunga)*
956. 44401 *Olearia sp. Eremicola (Diels & Pritzel s.n. PERTH 00449628)*
957. 8152 *Olearia subspicata (Spiked Daisy Bush)*
958. 19582 *Olearia trifurcata*
959. 19828 *Oligocarpus calendulaceus* Y
960. 20661 *Oncosiphon suffruticosum* Y
961. 18255 *Opercularia vaginata (Dog Weed)*
962. 521 *Paspalidium gracile (Slender Panic)*
963. 14434 *Patersonia rudis subsp. velutina*
964. 2259 *Persoonia coriacea (Leathery-leaf Persoonia)*
965. 15628 *Persoonia helix*
966. *Persoonia sp.*
967. 3674 *Petalostylis cassioides*
968. 14446 *Petrophile arcuata*
969. 4497 *Phebalium canaliculatum*
970. 4498 *Phebalium clavatum* P2
971. 4500 *Phebalium filifolium (Slender Phebalium)*
972. 4501 *Phebalium lepidotum*
973. *Phebalium sp.*
974. 4504 *Phebalium tuberculosum*
975. 18520 *Philotheca apiculata* P2
976. 3059 *Phlegmatospermum eremaeum* P3
977. 16824 *Phyllangium sulcatum*
978. 5231 *Pimelea angustifolia (Narrow-leaved Pimelea)*
979. 5256 *Pimelea microcephala (Shrubby Riceflower, Banjine)*
980. 11185 *Pimelea microcephala subsp. microcephala*
981. 12104 *Pimelea spiculigera var. thesioides*
982. 5267 *Pimelea subvillifera*
983. 19744 *Pittosporum angustifolium*
984. 6812 *Pityrodia lepidota*
985. 42561 *Pityrodia scabra subsp. dendrotricha* P3
986. *Pityrodia sp.*
987. 7300 *Plantago drummondii (Sago Weed)*
988. 6252 *Platysace effusa*
989. 14999 *Platysace trachymenioides*
990. 65 *Pleurosorus rutifolius (Blanket Fern)*
991. 45238 *Podolepis aristata subsp. affinis*
992. 8173 *Podolepis capillaris (Wiry Podolepis)*
993. 8176 *Podolepis kendallii*
994. 8177 *Podolepis lessonii*
995. 45241 *Podolepis rugata subsp. rugata*
996. 12731 *Podotheca wilsonii*
997. 4815 *Pomaderris forrestiana*
998. 12706 *Prostanthera althoferi*
999. 15822 *Prostanthera althoferi subsp. althoferi*
1000. 6912 *Prostanthera campbellii*
1001. 6916 *Prostanthera grylloana*
1002. 6917 *Prostanthera incurvata*
1003. 12728 *Prostanthera splendens* P1
1004. 4725 *Psammomoya choretroides*
1005. 4726 *Psammomoya ephedroides* P3
1006. 1684 *Pterostylis allantoidea (Shy Greenhood)*
1007. 19327 *Pterostylis sp. dainty brown (N. Gibson & M. Lyons 3690)*
1008. 18657 *Pterostylis sp. inland (A.C. Beauglehole 11880)*
1009. 2717 *Ptilotus divaricatus (Climbing Mulla Mulla)*
1010. 41505 *Ptilotus gaudichaudii subsp. eremita*
1011. 2730 *Ptilotus helichrysoides*
1012. 2732 *Ptilotus holosericeus*
1013. 41001 *Ptilotus nobilis subsp. nobilis (Yellow Tails)*
1014. 2747 *Ptilotus obovatus (Cotton Bush)*
1015. 31252 *Ptilotus rigidus* P1
1016. *Ptilotus sp.*
1017. 41000 *Ptilotus sp. Goldfields (R. Davis 10796)*
1018. 4964 *Radyera farragei (Knobby Hibiscus)*
1019. 11643 *Ranunculus pentandrus var. platycarpus*
1020. 2580 *Rhagodia crassifolia (Fleshy Saltbush)*
1021. 2581 *Rhagodia drummondii*

Name ID Species Name Naturalised Conservation Code [1]Endemic To Query Area

1022. 13306 *Rhodanthe battii*
1023. 13308 *Rhodanthe charsleyae*
1024. 13239 *Rhodanthe chlorocephala*

1025. 13241 *Rhodanthe chlorocephala subsp. rosea*
1026. 13301 *Rhodanthe floribunda*
1027. 13293 *Rhodanthe haigii*
1028. 13294 *Rhodanthe laevis*
1029. 13249 *Rhodanthe oppositifolia subsp. oppositifolia*
1030. 13252 *Rhodanthe pygmaea*
1031. 13253 *Rhodanthe rubella*
1032. *Rhodanthe stuartiana*
1033. 6599 *Rhyncharrhena linearis (Bush Bean, Wintjulanypa)*
1034. *Riccia crinita*
1035. 4701 *Ricinocarpos stylosus*
1036. 32426 *Rosulabryum campylothecium*
1037. 40431 *Rytidosperma acerosum*
1038. 40425 *Rytidosperma caespitosum*
1039. 30434 *Salsola australis*
1040. *Salsola sp.*
1041. 6929 *Salvia verbenaca (Wild Sage)* Y
1042. 2356 *Santalum acuminatum (Quandong, Warnga)*
1043. 2358 *Santalum murrayanum (Bitter Quandong, Kulya)*
1044. 2359 *Santalum spicatum (Sandalwood, Wilarak)*
1045. *Sarcocornia sp.*
1046. 13169 *Scaevola restiacea subsp. divaricata*
1047. 7644 *Scaevola spinescens (Currant Bush, Maroon)*
1048. 8200 *Schoenia cassiniana (Schoenia)*
1049. 993 *Schoenus hexandrus*
1050. 1015 *Schoenus subaphyllus*
1051. 2596 *Sclerolaena articulata*
1052. 2599 *Sclerolaena brevifolia*
1053. 2606 *Sclerolaena cuneata (Yellow Bindii)*
1054. 2609 *Sclerolaena diacantha (Grey Copperburr)*
1055. 2610 *Sclerolaena drummondii*
1056. 2612 *Sclerolaena eurotioides (Fluffy Bindii)*
1057. 2615 *Sclerolaena fusiformis*
1058. 2625 *Sclerolaena obliquicuspis (Limestone Bindii)*
1059. 2626 *Sclerolaena parviflora (Small-flower Saltbush)*
1060. 8207 *Senecio glossanthus (Slender Groundsel)*
1061. 25881 *Senecio lacustrinus*
1062. *Senecio sp.*
1063. 17645 *Senna artemisioides*
1064. 12276 *Senna artemisioides subsp. filifolia*
1065. 17558 *Senna artemisioides subsp. x artemisioides*
1066. 12315 *Senna pleurocarpa var. angustifolia*
1067. 12314 *Senna pleurocarpa var. pleurocarpa*
1068. 4981 *Sida intricata (Tangled Sida)*
1069. *Sida sp.*
1070. 16617 *Sida sp. spiciform panicles (E. Leyland s.n. 14/8/90)*
1071. 3069 *Sisymbrium erysimoides (Smooth Mustard)* Y
1072. 7013 *Solanum hoplopetalum (Thorny Solanum)*
1073. 7018 *Solanum lasiophyllum (Flannel Bush, Mindjulu)*
1074. 7023 *Solanum nummularium (Money-leaved Solanum)*
1075. 7028 *Solanum petrophilum (Rock Nightshade)*
1076. 7030 *Solanum plicatile*
1077. 7034 *Solanum simile (Oondoroo)*
1078. *Solanum sp.*
1079. 8231 *Sonchus oleraceus (Common Sowthistle)* Y
1080. 1313 *Sowerbaea multicaulis (Many Stemmed Lily)* P4
1081. *Stackhousia muricata subsp. Perennial (W.R.Barker 3641)*
1082. 29813 *Stackhousia sp. Mt Keith (G. Cockerton & G. O'Keefe 11017)*
1083. 2917 *Stellaria filiformis (Thread Spurry)*
1084. 16190 *Stenanthemum complicatum*
1085. 16200 *Stenanthemum stipulosum*
1086. 3074 *Stenopetalum anfractum*
1087. 3076 *Stenopetalum filifolium*
1088. 3077 *Stenopetalum lineare (Narrow Thread Petal)*
1089. 2317 *Stirlingia simplex*
1090. 8238 *Streptoglossa liatroides*
1091. 7685 *Stylidium arenicola*

Name ID Species Name Naturalised Conservation Code [1]Endemic To Query Area

1092. 7701 *Stylidium choreanthum (Dancing Triggerplant)* P3
1093. 7714 *Stylidium dielsianum (Tangle Triggerplant)*
1094. 7719 *Stylidium ecorne (Foot Triggerplant)*
1095. 7740 *Stylidium induratum (Desert Triggerplant)*
1096. 7751 *Stylidium limbatum (Fringed-leaved Triggerplant)*
1097. *Stylidium sp.*
1098. 1260 *Stypandra glauca (Blind Grass)*
1099. *Styphelia sp.*
1100. 43203 *Surreya diandra*
1101. 4217 *Swainsona beasleyana*
1102. 4220 *Swainsona canescens (Grey Swainsona)*
1103. 4221 *Swainsona colutoides (Bladder Vetch)*
1104. 12356 *Swainsona formosa*
1105. 32438 *Syntrichia pagorum*
1106. 20103 *Taxandria spathulata*
1107. 31492 *Tecticornia disarticulata*
1108. 31834 *Tecticornia flabelliformis* P1
1109. 33236 *Tecticornia halocnemoides (Shrubby Samphire)*
1110. 33237 *Tecticornia halocnemoides subsp. halocnemoides*
1111. 33318 *Tecticornia indica subsp. leiostachya (Samphire)*
1112. 31718 *Tecticornia lepidosperma*
1113. 31675 *Tecticornia lylei*
1114. 31832 *Tecticornia mellaria* P1
1115. 31551 *Tecticornia moniliformis*
1116. 31674 *Tecticornia peltata*
1117. 33297 *Tecticornia pergranulata subsp. pergranulata (Blackseed Samphire)*
1118. 31618 *Tecticornia pruinosa*
1119. *Tecticornia sp.*
1120. 31716 *Tecticornia syncarpa*
1121. 31494 *Tecticornia triandra (Desert Glasswort)*
1122. 35840 *Templetonia ceracea*

1123. 41500 *Tetratheca spenceri* T Y
1124. 6937 *Teucrium sessiliflorum (Camel Bush)*
1125. 20732 *Thelymitra petrophila*
1126. 13298 *Thiseltonia gracillima*
1127. 6050 *Thryptomene australis (Hook-leaf Thryptomene)*
1128. 19699 *Thryptomene australis subsp. brachyandra*
1129. *Thryptomene sp.*
1130. 36017 *Thryptomene sp. Londonderry (R.H. Kuchel 1763)* P1
1131. *Thryptomene sp. Londonderry (R.H.Kuchel 1763)*
1132. 6068 *Thryptomene urceolaris*
1133. 1328 *Thysanotus dichotomus (Branching Fringe Lily)*
1134. 1338 *Thysanotus manglesianus (Fringed Lily)*
1135. 1352 *Thysanotus speckii*
1136. 32444 *Tortula atrovirens*
1137. *Tortula pagorum*
1138. 6268 *Trachymene cyanopetala*
1139. 19044 *Trachymene pyrophila* P2
1140. 12652 *Trichanthodium skirrophorum*
1141. 1363 *Tricoryne tenella*
1142. 17881 *Triodia desertorum*
1143. 17874 *Triodia rigidissima*
1144. 699 *Triodia scariosa*
1145. 8253 *Triptilodiscus pygmaeus*
1146. 4843 *Trymalium myrtillus*
1147. 16986 *Trymalium myrtillus subsp. myrtillus*
1148. 7664 *Velleia rosea (Pink Velleia)*
1149. 38061 *Verreauxia dyeri (Hairy Verreauxia)*
1150. 6073 *Verticordia chrysantha*
1151. 14711 *Verticordia dasystylis subsp. dasystylis* P2
1152. 12422 *Verticordia eriocephala (Common Cauliflower)*
1153. 6087 *Verticordia helmsii*
1154. 12433 *Verticordia insignis subsp. compta*
1155. 6109 *Verticordia picta (Painted Featherflower)*
1156. 11788 *Vittadinia dissecta var. hirta*
1157. 8265 *Vittadinia eremaea*
1158. 8268 *Vittadinia humerata*
1159. *Vittadinia sp.*
1160. 7386 *Wahlenbergia gracilenta (Annual Bluebell)*
1161. 13331 *Waitzia acuminata var. acuminata*

Name ID Species Name Naturalised Conservation Code [1]**Endemic To Query Area**

1162. 46093 *Waitzia fitzgibbonii*
1163. 6938 *Westringia cephalantha*
1164. 9247 *Westringia rigida (Stiff Westringia)*
1165. 6659 *Wilsonia humilis (Silky Wilsonia)*
1166. 1403 *Wurmbea tenella (Eight Nancy)*
1167. 4385 *Zygophyllum apiculatum (Gallweed)*
1168. 4386 *Zygophyllum aurantiacum (Shrubby Twinleaf)*
1169. 4388 *Zygophyllum compressum*
1170. 4389 *Zygophyllum eremaeum*
1171. 4390 *Zygophyllum fruticulosum (Shrubby Twinleaf)*
1172. 4391 *Zygophyllum glaucum (Pale Twinleaf)*
1173. 18139 *Zygophyllum halophilum*
1174. 4394 *Zygophyllum ovatum (Dwarf Twinleaf)*
1175. 18142 *Zygophyllum reticulatum*
1176. 17278 *Zygophyllum tetrapterum*

Protozoa

1177. *Badhamia affinis*

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

NatureMap is a collaborative project of the Department of Parks and Wildlife and the Western Australian Museum.

EPBC Act Protected Matters Report

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

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

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

Other Matters Protected by the EPBC Act

Acknowledgements

Buffer: 40.0Km

Matters of NES

Report created: 03/10/16 20:15:47

Coordinates

Summary
This part of the report summarises the matters of national environmental significance that may occur in, or may
relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a
significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.
Matters of National Environmental Significance
Listed Threatened Ecological Communities: None
Listed Migratory Species: 3
Great Barrier Reef Marine Park: None
Wetlands of International Importance: None
Listed Threatened Species: 5
National Heritage Places: None
Commonwealth Marine Area: None
World Heritage Properties: None

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a
place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a
Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage
This part of the report summarises other matters protected under the Act that may relate to the area you nominated.
Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land,
when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to
take an action that is likely to have a significant impact on the environment anywhere.
A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened
species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of
a listed marine species.
Other Matters Protected by the EPBC Act
Listed Marine Species:7 None
Whales and Other Cetaceans:
Commonwealth Heritage Places: None
Critical Habitats: None
Commonwealth Land:1
Commonwealth Reserves Terrestrial:
Commonwealth Reserves Marine: None
Extra Information
This part of the report provides information that may also be relevant to the area you have nominated.
State and Territory Reserves: 7
Nationally Important Wetlands: None
Regional Forest Agreements: None
Invasive Species: 13
Key Ecological Features (Marine) None
Details
Listed Threatened Species [Resource Information]
Name Status Type of Presence

Birds
Curlew Sandpiper [856] Critically Endangered Species or species habitat may occur within area
Calidris ferruginea
Malleefowl [934] Vulnerable Species or species habitat known to occur within area
Leipoa ocellata
Night Parrot [59350] Endangered Species or species habitat may occur within area
Pezoporus occidentalis
Plants
Granite Poison [14872] Endangered Species or species habitat likely to occur within area
Gastrolobium graniticum
Bead Glasswort [82664] Vulnerable Species or species habitat known to occur within area
Tecticornia flabelliformis
Listed Migratory Species [Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.
Name Threatened Type of Presence
Migratory Marine Birds
Fork-tailed Swift [678] Species or species habitat likely to occur within area
Apus pacificus
Migratory Terrestrial Species Grey Wagtail [642] Species or species habitat may occur within area
Motacilla cinerea
Migratory Wetlands Species Curlew Sandpiper [856] Critically Endangered Species or species habitat may occur within area
Calidris ferruginea
Matters of National Environmental Significance
Listed Marine Species [Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.
Name Threatened Type of Presence
Birds
Fork-tailed Swift [678] Species or species habitat likely to occur within area
Apus pacificus
Great Egret, White Egret [59541] Species or species habitat likely to occur within area
Ardea alba
Cattle Egret [59542] Species or species habitat may occur within area
Ardea ibis
Curlew Sandpiper [856] Critically Endangered Species or species habitat may occur within area
Calidris ferruginea
Rainbow Bee-eater [670] Species or species habitat may occur within area
Merops ornatus
Grey Wagtail [642] Species or species habitat may occur within area
Motacilla cinerea
Hooded Plover [59510] Species or species habitat may occur within area
Thinornis rubricollis
Commonwealth Land [Resource Information]
The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to
the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.
Name
Commonwealth Land -
Other Matters Protected by the EPBC Act
State and Territory Reserves [Resource Information]
Name State
Binaronca WA
Burra WA
Dordie Rocks WA
Kambalda WA
Scahill Timber Reserve WA
Unnamed WA17804 WA
Yallari Timber Reserve WA
Extra Information

Invasive Species [Resource Information]
Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from
Landscape Health Project, National Land and Water Resouces Audit, 2001.
Name Status Type of Presence
Birds
Rock Pigeon, Rock Dove, Domestic Pigeon [803] Species or species habitat likely to occur within area
Columba livia
Laughing Turtle-dove, Laughing Dove [781] Species or species habitat likely to occur within area
Streptopelia senegalensis
Mammals
Dromedary, Camel [7] Species or species habitat likely to occur within area
Camelus dromedarius
Domestic Dog [82654] Species or species habitat likely to occur within area
Canis lupus familiaris
Goat [2] Species or species habitat likely to occur within area
Capra hircus
Donkey, Ass [4] Species or species habitat likely to occur within area
Equus asinus
Horse [5] Species or species habitat likely to occur within area
Equus caballus
Cat, House Cat, Domestic Cat [19] Species or species habitat likely to occur within area
Felis catus
House Mouse [120] Species or species habitat likely to occur within area
Mus musculus
Rabbit, European Rabbit [128] Species or species habitat likely to occur within area
Oryctolagus cuniculus
Red Fox, Fox [18] Species or species habitat likely to occur within area
Vulpes vulpes
Plants
Ward's Weed [9511] Species or species habitat likely to occur within area
Carrichtera annua
Prickly Pears [85131] Species or species habitat likely to occur within area
Cylindropuntia spp.
- non-threatened seabirds which have only been mapped for recorded breeding sites
- migratory species that are very widespread, vagrant, or only occur in small numbers
- some species and ecological communities that have only recently been listed
Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only.
Where available data supports mapping, the type of presence that can be determined from the data is indicated in general
terms. People using this information in making a referral may need to consider the qualifications below and may need to seek
and consider other information sources.
For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State
vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less
well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
- seals which have only been mapped for breeding sites near the Australian continent
Such breeding sites may be important for the protection of the Commonwealth Marine environment.
For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed
habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For
species whose distributions are less well known, point locations are collated from government wildlife authorities, museums,
and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some

cases, the distribution maps are based solely on expert knowledge.
The information presented in this report has been provided by a range of data sources as acknowledged at the end of the
report.
Caveat
- migratory and
The following species and ecological communities have not been mapped and do not appear in reports produced from this
database:
- marine
This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under
the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage
properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened,
migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete
at this stage. Maps have been collated from a range of sources at various resolutions.
- threatened species listed as extinct or considered as vagrants
- some terrestrial species that overfly the Commonwealth marine area
The following groups have been mapped, but may not cover the complete distribution of the species:
Only selected species covered by the following provisions of the EPBC Act have been mapped:
-31.41167 121.45806
Coordinates
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Department of Parks and Wildlife, Western Australia
Acknowledgements
-Office of Environment and Heritage, New South Wales
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Parks and Wildlife Commission NT, Northern Territory Government
-Department of Environmental and Heritage Protection, Queensland
-Department of Environment and Primary Industries, Victoria
-Australian National Wildlife Collection
-Department of Environment, Water and Natural Resources, South Australia
This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:
-Australian Museum
-National Herbarium of NSW
Forestry Corporation, NSW
-Australian Government, Department of Defence
-State Herbarium of South Australia
The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.
-Natural history museums of Australia
-Queensland Museum
-Australian National Herbarium, Atherton and Canberra
-Royal Botanic Gardens and National Herbarium of Victoria
-Geoscience Australia
-Ocean Biogeographic Information System
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-Western Australian Herbarium
-Tasmanian Herbarium
-Northern Territory Herbarium
-South Australian Museum
-Museum Victoria
-University of New England
-CSIRO

-Other groups and individuals

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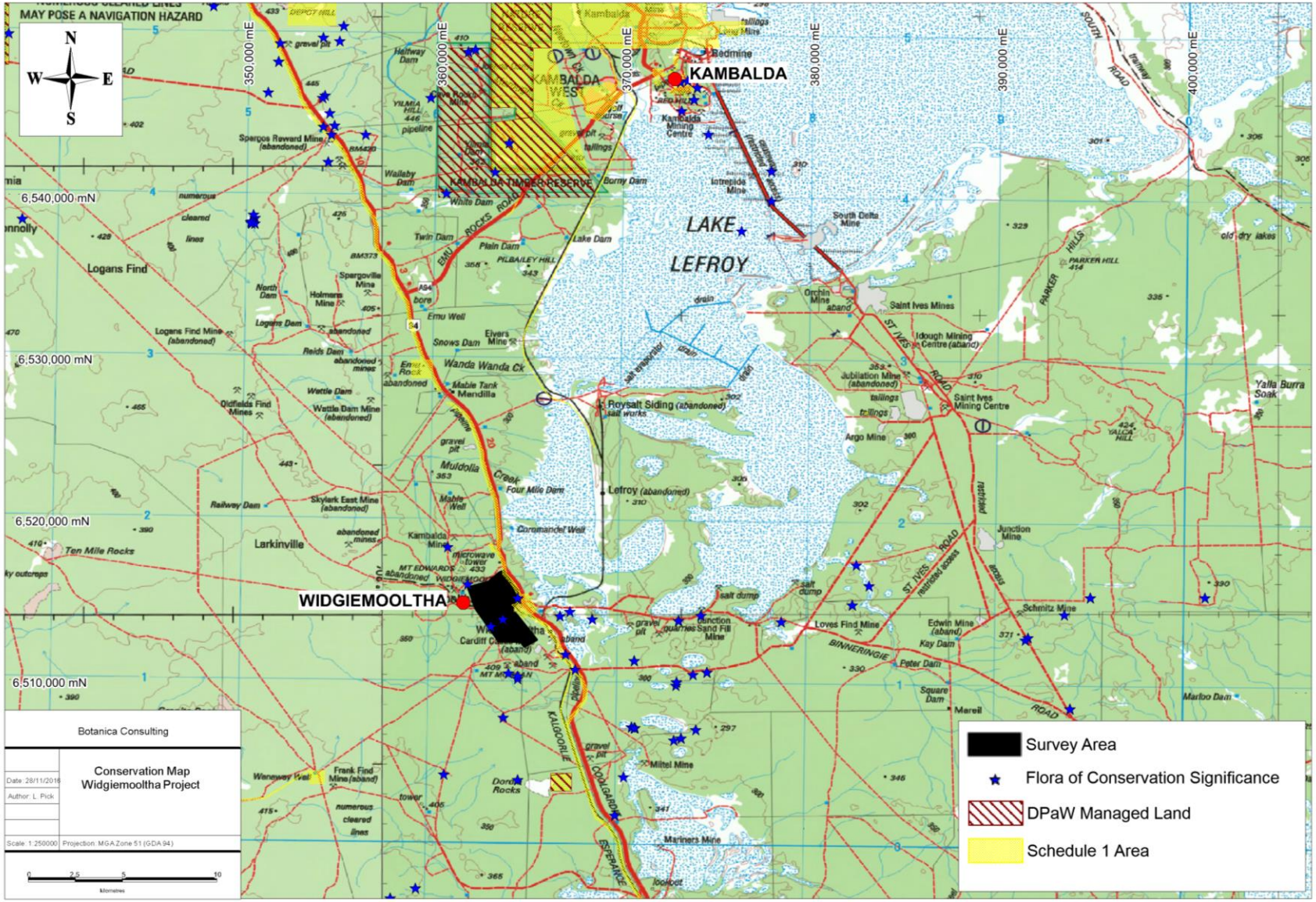
Please feel free to provide feedback via the Contact Us page.

Appendix 2: GPS coordinates of Priority Flora locations (GDA94)

Taxon	Zone	Easting	Northing
Austrostipa sp. Carlingup Road (S. Kern & R. Jasper LCH 18459) (P1)	51 J	362109	6516044
Austrostipa blackii (P3)	51 J	362109	6516044
Philotheca apiculata (P1)	51 J	364099	6515973
Philotheca apiculata (P1)	51 J	363564	6515718
Philotheca apiculata (P1)	51 J	363263	6513565

Appendix 3: Regional map of the Widgiemooltha Project survey area including DPaW Flora of Conservation Significance and areas of Conservation



Appendix 4: List of all species identified within each floristic community

(A) Green text Denotes Introduced species; (W) Blue text Denotes Annual species; (P) Red text Denotes Priority Flora as listed on Florabase (WAHERB, 2016)

Family	Genus	Taxon	CLP-EW1	CLP-EW2	CLP-EW3	RH-AFW1	RH-EW1	RH-EW2	RH-EW3
Aizoaceae	*Disphyma*	*crassifolium*				*			
Amaranthaceae	*Ptilotus*	*nobilis (A)*						*	
Amaranthaceae	*Ptilotus*	*obovatus*				*		*	
Amaranthaceae	*Ptilotus*	*holosericeus (A)*	*						
Apocynaceae	*Alyxia*	*buxifolia*	*	*	*		*	*	*
Apocynaceae	*Marsdenia*	*australis (A)*				*			
Asparagaceae	*Thyanotus*	*manglesianus*							*
Asphodelaceae	*Bulbine*	*semibarbata (A)*				*			
Asteraceae	*Asteridea*	*athrixioides (A)*				*			
Asteraceae	*Centaurea*	*melitensis (W)*	*	*					
Asteraceae	*Chrysocephalum*	*puteale*				*			
Asteraceae	*Olearia*	*muelleri*	*	*		*	*	*	*
Asteraceae	*Vittadinia*	sp. (sterile)				*			
Asteraceae	*Waitzia*	*acuminata*				*			
Brassicaceae	*Carrichtera*	*annua (W)*	*	*	*				
Casuarinaceae	*Allocasuarina*	*helmsii*				*			*
Chenopodiaceae	*Atriplex*	*nummularia* subsp. *spatulata*	*	*	*		*	*	
Chenopodiaceae	*Atriplex*	*vesicaria*	*	*	*		*	*	
Chenopodiaceae	*Cratystylis*	*conocephala*					*		
Chenopodiaceae	*Enchylaena*	*lanata*	*					*	
Chenopodiaceae	*Maireana*	*georgei*	*					*	
Chenopodiaceae	*Maireana*	*pentatropis*	*	*	*		*	*	
Chenopodiaceae	*Maireana*	*sedifolia*			*				
Chenopodiaceae	*Maireana*	*tomenosa*	*		*				
Chenopodiaceae	*Maireana*	*triptera*						*	
Chenopodiaceae	*Rhagodia*	*eremaea*					*		
Chenopodiaceae	*Sclerolaena*	*diacantha*	*	*	*		*	*	
Chenopodiaceae	*Sclerolaena*	*drummondii*			*				
Chenopodiaceae	*Sclerolaena*	*parvifolia*	*	*	*		*	*	

Family	Genus	Taxon	CLP-EW1	CLP-EW2	CLP-EW3	RH-AFW1	RH-EW1	RH-EW2	RH-EW3
Chenopodiaceae	*Tecticornia*	*disarticulata*	*	*	*				
Colchicaceae	*Wurmbea*	sp. (sterile) (A)				*			
Euphorbiaceae	*Euphorbia*	*tannensis (A)*				*			
Fabaceae	*Acacia*	*acuminata*				*		*	
Fabaceae	*Acacia*	*collegialis*				*			
Fabaceae	*Acacia*	*colletioides*					*	*	*
Fabaceae	*Acacia*	*erinacea*		*			*	*	
Fabaceae	*Acacia*	*hemiteles*	*	*					*
Fabaceae	*Acacia*	*tetragonophylla*				*	*	*	
Fabaceae	*Mirbelia*	*densiflora*				*			
Fabaceae	*Senna*	*artemiosioides* subsp. *filifolia*	*		*			*	
Fabaceae	*Senna*	*artemisoides* subsp. x *artemisioides*	*						
Frankeniaceae	*Frankenia*	*setosa*	*	*			*		
Goodeniaceae	*Dampiera*	*latealata*				*			
Goodeniaceae	*Goodenia*	sp. sterile (A)				*			
Goodeniaceae	*Scaevola*	*spinescens*	*	*	*	*	*	*	*
Lamiaceae	*Prostanthera*	*grylloana*				*			
Lamiaceae	*Westringia*	*cephalantha*						*	
Lamiaceae	*Westringia*	*rigida*					*	*	*
Malvaceae	*Brachychiton*	*gregorii*				*			
Myrtaceae	*Calothamnus*	*gilesii*				*			
Myrtaceae	*Eucalyptus*	*celestroides*	*		*		*	*	
Myrtaceae	*Eucalyptus*	*griffithsii*	*	*			*	*	
Myrtaceae	*Eucalyptus*	*lesouefii*	*	*	*		*	*	
Myrtaceae	*Eucalyptus*	*oleosa*					*		
Myrtaceae	*Eucalyptus*	*ravida*		*	*		*		
Myrtaceae	*Eucalyptus*	*salmonophloia*	*	*	*				
Myrtaceae	*Eucalyptus*	*stricklandii*		*			*		
Myrtaceae	*Eucalyptus*	*torquata*					*	*	*
Myrtaceae	*Eucalyptus*	*urna*	*						
Myrtaceae	*Melaleuca*	*sheathiana*	*		*		*	*	
Myrtaceae	*Thryptomene*	*australis* subsp. *brachyandra*				*			
Myrtaceae	*Melaleuca*	*hamata*				*			

Family	Genus	Taxon	CLP-EW1	CLP-EW2	CLP-EW3	RH-AFW1	RH-EW1	RH-EW2	RH-EW3
Pittosporaceae	*Pittosporum*	*angustifolium*	*	*					
Poaceae	*Aristida*	*contorta (A)*				*			
Poaceae	*Austrostipa*	*elegantissima*	*	*			*		
Poaceae	*Austrostipa*	*blackii* (P3)				*			
Poaceae	*Austrostipa*	sp. Carlingup Road (S. Kern & R. Jasper LCH 18459) (P1)				*			
Poaceae	*Austrostipa*	*nitida*			*	*		*	
Poaceae	*Eriachne*	*pulchella (A)*				*			
Proteaceae	*Grevillea*	*acuaria*				*	*	*	*
Proteaceae	*Grevillea*	*nematophylla*					*		
Pteridaceae	*Cheilanthes*	*sieberi* subsp. *sieberi*				*			
Rhamnaceae	*Cryptandra*	*distigma*				*			
Rhamnaceae	*Trymalium*	*myrtillus*				*		*	*
Rutaceae	*Philotheca*	*apiculata* (P1)							*
Santalaceae	*Exocarpos*	*aphyllus*	*	*	*	*	*	*	
Santalaceae	*Santalum*	*acuminatum*	*		*		*		
Santalaceae	*Santalum*	*spicatum*				*	*	*	
Sapindaceae	*Dodonaea*	*lobulata*	*			*	*	*	
Sapindaceae	*Dodonaea*	*adenophora*							*
Sapindaceae	*Dodonaea*	*stenozyga*							*
Scrophulariaceae	*Eremophila*	*alternifolia*		*		*		*	
Scrophulariaceae	*Eremophila*	*caerulea* subsp. *caerulea*	*				*	*	
Scrophulariaceae	*Eremophila*	*decipiens*	*				*	*	
Scrophulariaceae	*Eremophila*	*dempsteri*			*				
Scrophulariaceae	*Eremophila*	*gibbosa*				*			
Scrophulariaceae	*Eremophila*	*glabra*						*	
Scrophulariaceae	*Eremophila*	*interstans* subsp. *virgata*		*	*		*		
Scrophulariaceae	*Eremophila*	*ionantha*	*						
Scrophulariaceae	*Eremophila*	*oldfieldii* subsp. *angustifolia*	*					*	
Scrophulariaceae	*Eremophila*	*oldfieldii* subsp. *oldfieldii*				*	*	*	
Scrophulariaceae	*Eremophila*	*psilocalyx*							*
Scrophulariaceae	*Eremophila*	*saligma*							*
Scrophulariaceae	*Eremophila*	*scoparia*	*	*	*		*		
Solanaceae	*Lycium*	*australe*	*	*					
Solanaceae	*Solanum*	*lasiophyllum*	*			*		*	

Family	Genus	Taxon	CLP-EW1	CLP-EW2	CLP-EW3	RH-AFW1	RH-EW1	RH-EW2	RH-EW3
Solanaceae	*Solanum*	*nummularium*	*						
Thymelaeaceae	*Pimelea*	*microcephala*	*		*	*		*	

Appendix 5: GPS coordinates of Quadrat locations (GDA94)

Quadrat	Zone	Easting	Northing	Elevation
Q1	51 J	364664	6514087	308 m
Q2	51 J	364845	6513914	307 m
Q3	51 J	365027	6513498	309 m
Q4	51 J	365223	6513309	322 m
Q5	51 J	365299	6513114	323 m
Q6	51 J	365069	6513225	318 m
Q7	51 J	364161	6513852	312 m
Q8	51 J	363541	6513616	328 m
Q9	51 J	364730	6513123	325 m
Q10	51 J	364789	6513051	323 m
Q11	51 J	364587	6512863	359 m
Q12	51 J	364365	6512858	355 m
Q13	51 J	364363	6512982	328 m
Q14	51 J	364196	6513028	353 m
Q15	51 J	363648	6512901	337 m
Q16	51 J	363525	6514388	321 m
Q17	51 J	363309	6514372	350 m
Q18	51 J	363078	6514572	350 m
Q19	51 J	364241	6515228	314 m
Q20	51 J	364563	6515299	313 m
Q21	51 J	364175	6515498	325 m
Q22	51 J	363141	6515043	331 m
Q23	51 J	362442	6514904	347 m
Q24	51 J	362376	6515395	355 m
Q25	51 J	362694	6515368	374 m
Q26	51 J	362109	6516044	362 m
Q27	51 J	362313	6515977	356 m
Q28	51 J	363778	6516377	319 m
Q29	51 J	364099	6515973	351 m
Q30	51 J	363564	6515718	340 m

Appendix 6: Quadrat Photographs for Spring 2016 and Autumn 2017

Quadrat 1
Spring

Autumn

Quadrat 2
Spring



Autumn



Quadrat 3
Spring



Autumn



Quadrat 4
Spring



Autumn



Quadrat 5
Spring



Autumn



Quadrat 6
Spring



Autumn



Quadrat 7
Spring



Autumn



Quadrat 8
Spring



Autumn



Quadrat 9
Spring



Autumn



Quadrat 10
Spring



Autumn



Quadrat 11
Spring



Autumn



Quadrat 12
Spring



Autumn



Quadrat 13
Spring



Autumn



Quadrat 14
Spring



Autumn



Quadrat 15
Spring



Autumn



Quadrat 16
Spring



Autumn



Quadrat 17
Spring



Autumn



Quadrat 18
Spring



Autumn



Quadrat 19
Spring



Autumn



Quadrat 20
Spring



Autumn



Quadrat 21
Spring



Autumn



Quadrat 22
Spring



Autumn



Quadrat 23
Spring



Autumn



Quadrat 24
Spring



Autumn



Quadrat 25
Spring



Autumn



Quadrat 26
Spring



Autumn



Quadrat 27
Spring



Autumn



Quadrat 28
Spring



Autumn



Quadrat 29
Spring



Autumn



Quadrat 30
Spring



Autumn



Appendix 7:Datasheets from the Quadrat Flora Survey Spring 2016 & Autumn 2017

Project Name: Widgiemooltha Project		
Date:27/10/2016 & 06/05/2017	**Botanist:** Jim Williams	
Vegetation Group: CLP-EW2		
Quadrat No: 1	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):**20/21/22
Zone: 51J	**Easting:** 364664	**Northing:** 6514087
Altitude: 308 m	**Fire (yrs):** 30+	**Health rating:** 4
Landform: Flat/ Middle third / Valley flat		
Coarse fragments on the surface (abundance/size/shape): Moderately; many/ Fine gravelly, small pebbles/Sub angular		
Rock outcrop (abundance/runoff): Nil/ Moderately rapid		
Soil (profile/field texture/soil surface): Uniform/ Medium heavy clay/ Firm		
%Cover leaf litter: 10%		
%Cover bare ground: 20%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Tree	**Growth form:** Shrub	**Growth form:** Chenopod shrub
Height: 6-12m	**Height:** 1-3m	**Height:** 0.5-1m
Crown cover %: 10-30	**Crown cover %:** <1	**Crown cover %:** 10-30
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Eucalyptus lesouefii	*Eremophila interstans* subsp. *virgata*	*Tecticornia disarticulata*
ALL SPECIES		
Atriplex nummularia subsp. *spathulata*		
Atriplex vesicaria		
Eremophila interstans subsp. *virgata*		
Eremophila scoparia		
Eucalyptus lesouefii		
Eucalyptus salmonophloia		
Frankenia setosa		
Lycium australe		
Maireana pentatropis		
Pimelea microcephala		
Tecticornia disarticulata		

Project Name: Widgiemooltha Project		
Date:27/10/2016 & 06/05/2017	**Botanist:** Jim Williams	
Vegetation Group: CLP-EW3		
Quadrat No: 2	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 25/26/27
Zone: 51J	**Easting:** 364845	**Northing:** 6513914
Altitude: 307 m	**Fire (yrs):** 30+	**Health rating:** 4
Landform: Flat/ Middle third / Valley flat		
Coarse fragments on the surface (abundance/size/shape): No coarse fragments		
Rock outcrop (abundance/runoff): Nil/ Rapid		
Soil (profile/field texture/soil surface): Uniform/ Medium heavy clay/ Firm		
%Cover leaf litter: 70%		
%Cover bare ground: 10%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Tree	**Growth form:** Shrub	**Growth form:** Chenopod shrub
Height: 6-12m	**Height:** 1-3m	**Height:** 0.5-1m
Crown cover %: 10-30	**Crown cover %:** <1	**Crown cover %:** 10-30
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Eucalyptus ravida	*Eremophila interstans* subsp. *virgata*	*Tecticornia disarticulata*
ALL SPECIES		
Atriplex vesicaria		
Carrichtera annua (W)		
Eremophila interstans subsp. *virgata*		
Eucalyptus ravida		
Sclerolaena parvifolia		
Tecticornia disarticulata		

Project Name: Widgiemooltha Project		
Date:27/10/2016 & 06/05/2017	**Botanist:** Jim Williams	
Vegetation Group: CLP-EW2		
Quadrat No: 3	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):**28/29/30
Zone: 51J	**Easting:** 365027	**Northing:** 6513498
Altitude: 309 m	**Fire (yrs):** 40+	**Health rating:** 3
Landform: Flat/ Middle third / Valley flat		
Coarse fragments on the surface (abundance/size/shape): No coarse fragments		
Rock outcrop (abundance/runoff): Nil/ Moderately rapid		
Soil (profile/field texture/soil surface): Uniform/ Medium heavy clay/ Firm		
%Cover leaf litter: 10%		
%Cover bare ground: 10%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Tree	**Growth form:** Shrub	**Growth form:** Chenopod shrub
Height: 6-12m	**Height:** 1-3m	**Height:** 0.5-1m
Crown cover %: 10-30	**Crown cover %:** <1	**Crown cover %:** 10-30
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Eucalyptus lesouefii	*Eremophila interstans* subsp. *virgata*	*Tecticornia disarticulata*
ALL SPECIES		
Atriplex nummularia subsp. *spathulata*		
Atriplex vesicaria		
Eremophila interstans subsp. *virgata*		
Eremophila scoparia		
Eucalyptus lesouefii		
Eucalyptus salmonophloia		
Sclerolaena diacantha		
Tecticornia disarticulata		

Project Name: Widgiemooltha Project		
Date:27/10/2016 & 06/05/2017	**Botanist:** Jim Williams	
Vegetation Group: RH-EW1		
Quadrat No: 4	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 34/35/36
Zone: 51J	**Easting:** 365223	**Northing:** 6513309
Altitude: 322 m	**Fire (yrs):** 40+	**Health rating:** 3
Landform: Simple slope/ Middle third / Hillslope		
Coarse fragments on the surface (abundance/size/shape): Moderately; many/ Medium gravelly; medium pebbles/Surrounded		
Rock outcrop (abundance/runoff): Nil/ Moderately rapid		
Soil (profile/field texture/soil surface): Uniform/ Medium heavy clay/ Firm		
%Cover leaf litter: 20%		
%Cover bare ground: 10%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Tree	**Growth form:** Shrub	**Growth form:** Shrub
Height: 6-12m	**Height:** 1-3m	**Height:** 0.5-1m
Crown cover %: 10-30	**Crown cover %:** <1	**Crown cover %:** 10-30
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Eucalyptus lesouefii	*Dodonaea lobulata*	*Eremophila caerulea* subsp. *caerulea*
ALL SPECIES		
Acacia erinacea		
Atriplex nummularia subsp. *spathulata*		
Austrostipa elegantissima		
Cratystylis conocephala		
Dodonaea lobulata		
Eremophila caerulea subsp. *caerulea*		
Eremophila decipiens		
Eucalyptus lesouefii		
Exocarpos aphyllus		
Scaevola spinescens		
Sclerolaena diacantha		
Sclerolaena parviflora		

Project Name: Widgiemooltha Project		
Date:27/10/2016 & 06/05/2017	**Botanist:** Jim Williams	
Vegetation Group: CLP-EW3		
Quadrat No: 5	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 37/38/39
Zone: 51J	**Easting:** 365299	**Northing:** 6513114
Altitude: 323 m	**Fire (yrs):** 40+	**Health rating:** 3
Landform: Flat/ Middle third / Valley flat		
Coarse fragments on the surface (abundance/size/shape): No coarse fragments		
Rock outcrop (abundance/runoff): Nil/ Moderately rapid		
Soil (profile/field texture/soil surface): Uniform/ Medium heavy clay/ Firm		
%Cover leaf litter: 70%		
%Cover bare ground: 10%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Tree	**Growth form:** Shrub	**Growth form:** Chenopod shrub
Height: 6-12m	**Height:** 1-3m	**Height:** 0.5-1m
Crown cover %: 10-30	**Crown cover %:** <1	**Crown cover %:** 10-30
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Eucalyptus ravida	*Melaleuca sheathiana*	*Atriplex vesicaria*
ALL SPECIES		
Atriplex vesicaria		
Eremophila scoparia		
Eucalyptus celastroides		
Eucalyptus ravida		
Maireana pentatropis		
Melaleuca sheathiana		
Santalum acuminatum		

Project Name: Widgiemooltha Project		
Date:27/10/2016 & 06/05/2017	**Botanist:** Jim Williams	
Vegetation Group: RH-EW1		
Quadrat No: 6	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 40/41/42
Zone: 51J	**Easting:** 365069	**Northing:** 6513225
Altitude: 318 m	**Fire (yrs):** 40+	**Health rating:** 3
Landform: Mid slope/ Middle third / Hill slope		
Coarse fragments on the surface (abundance/size/shape): Moderately; many/ Medium gravelly; medium pebbles/ Angular		
Rock outcrop (abundance/runoff): Nil/ Moderately rapid		
Soil (profile/field texture/soil surface): Uniform/ Medium heavy clay/ Firm		
%Cover leaf litter: 30%		
%Cover bare ground: 10%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Tree	**Growth form:** Shrub	**Growth form:** Shrub
Height: 3-6m	**Height:** 1-3m	**Height:** 0.5-1m
Crown cover %: 10-30	**Crown cover %:** <1	**Crown cover %:** 10-30
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Eucalyptus lesouefii	*Santalum acuminatum*	*Eremophila caerulea* subsp. *caerulea*
ALL SPECIES		
Acacia erinacea		
Atriplex nummularia subsp. *spathulata*		
Eremophila caerulea subsp. *caerulea*		
Eremophila scoparia		
Eucalyptus celastroides		
Eucalyptus lesouefii		
Maireana pentatropis		
Olearia muelleri		
Santalum acuminatum		
Sclerolaena parviflora		

Project Name: Widgiemooltha Project		
Date:27/10/2016 & 06/05/2017	**Botanist:** Jim Williams	
Vegetation Group: CLP-EW1		
Quadrat No: 7	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 43/44/45
Zone: 51J	**Easting:** 364161	**Northing:** 6513852
Altitude: 312 m	**Fire (yrs):** 90+	**Health rating:** 3
Landform: Flat/ Middle third / Valley flat		
Coarse fragments on the surface (abundance/size/shape): No coarse fragments		
Rock outcrop (abundance/runoff): Nil/ Moderately rapid		
Soil (profile/field texture/soil surface): Uniform/ Medium heavy clay/ Firm		
%Cover leaf litter: 30%		
%Cover bare ground: 10%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Tree	**Growth form:** Shrub	**Growth form:** Chenopod shrub
Height: 6-12m	**Height:** 1-3m	**Height:** 0.5-1m
Crown cover %: <1	**Crown cover %:** <10	**Crown cover %:** 10-30
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Eucalyptus salmonophloia	*Eremophila scoparia*	*Atriplex vesicaria*
ALL SPECIES		
Atriplex nummularia subsp. *spathulata*		
Atriplex vesicaria		
Austrostipa elegantissima		
Eremophila dempsteri		
Eremophila ionantha		
Eremophila scoparia		
Eucalyptus salmonophloia		
Maireana tomentosa		
Pittosporum angustifolium		
Santalum acuminatum		
Sclerolaena diacantha		
Sclerolaena parviflora		
Senna artemisioides subsp. *filifolia*		
Solanum nummularium		

Project Name: Widgiemooltha Project		
Date:27/10/2016 & 06/05/2017	**Botanist:** Jim Williams	
Vegetation Group: CLP-EW1		
Quadrat No: 8	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 46/47/48
Zone: 51J	**Easting:** 363541	**Northing:** 6513616
Altitude: 328 m	**Fire (yrs):** 40+	**Health rating:** 3
Landform: Flat/ Middle third / Plain		
Coarse fragments on the surface (abundance/size/shape): No coarse fragments		
Rock outcrop (abundance/runoff): Nil/ Moderately rapid		
Soil (profile/field texture/soil surface): Uniform/ Medium heavy clay/ Firm		
%Cover leaf litter: 30%		
%Cover bare ground: 10%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Tree	**Growth form:** Shrub	**Growth form:** Chenopod shrub
Height: 6-12m	**Height:** 1-3m	**Height:** 0.5-1m
Crown cover %: <10	**Crown cover %:** <10	**Crown cover %:** 10-30
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Eucalyptus salmonophloia	*Exocarpos aphyllus*	*Atriplex vesicaria*
ALL SPECIES		
Alyxia buxifolia		
Atriplex nummularia subsp. *spathulata*		
Atriplex vesicaria		
Autrostipa elegantissima		
Enchylaena lanata		
Eremophila caerulea subsp. *caerulea*		
Eremophila decipiens		
Eremophila scoparia		
Eucalyptus celastroides		
Eucalyptus salmonophloia		
Exocarpos aphyllus		
Lycium australe		
Olearia muelleri		
Ptilotus holosericeus (A)		
Santalum acuminatum		
Scaevola spinescens		
Sclerolaena diacantha		

Project Name: Widgiemooltha Project		
Date:27/10/2016 & 06/05/2017	**Botanist:** Jim Williams	
Vegetation Group: CLP-EW3		
Quadrat No: 9	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 49/50/51
Zone: 51J	**Easting:** 364730	**Northing:** 6513123
Altitude: 325 m	**Fire (yrs):** 40+	**Health rating:** 4
Landform: Simple slope/ Middle third / Hillslope		
Coarse fragments on the surface (abundance/size/shape): Very slightly; very few/ Medium gravelly; medium pebbles/ Angular tabular		
Rock outcrop (abundance/runoff): Nil/ Moderately rapid		
Soil (profile/field texture/soil surface): Uniform/ Medium heavy clay/ Firm		
%Cover leaf litter: 20%		
%Cover bare ground: 20%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Tree	**Growth form:** Shrub	**Growth form:** Chenopod shrub
Height: 3-6m	**Height:** 1-3m	**Height:** 0.5-1m
Crown cover %: 10-30	**Crown cover %:** <10	**Crown cover %:** 10-30
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Eucalyptus ravida	*Eremophila interstans* subsp. *virgata*	*Atriplex vesicaria*
ALL SPECIES		
Atriplex nummularia subsp. *spathulata*		
Atriplex vesicaria		
Carrichtera annua (W)		
Eremophila interstans subsp. *virgata*		
Eucalyptus ravida		
Exocarpos aphyllus		
Santalum acuminatum		
Sclerolaena diacantha		

Project Name: Widgiemooltha Project		
Date:27/10/2016 & 06/05/2017	**Botanist:** Jim Williams	
Vegetation Group: CLP-EW1		
Quadrat No: 10	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 52/53/54
Zone: 51J	**Easting:** 364789	**Northing:** 6513051
Altitude: 323 m	**Fire (yrs):** 40+	**Health rating:** 4
Landform: Simple slope/ Middle third / Hillslope		
Coarse fragments on the surface (abundance/size/shape): Slightly; few/ Medium gravelly; medium pebbles/ Rounded		
Rock outcrop (abundance/runoff): Nil/ Moderately rapid		
Soil (profile/field texture/soil surface): Uniform/ Medium heavy clay/ Firm		
%Cover leaf litter: 20%		
%Cover bare ground: 10%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Tree	**Growth form:** Shrub	**Growth form:** Chenopod shrub
Height: 3-6m	**Height:** 1-3m	**Height:** 0.5-1m
Crown cover %: 10-30	**Crown cover %:** <10	**Crown cover %:** 10-30
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Eucalyptus salmonophloia	*Eremophila scoparia*	*Atriplex vesicaria*
ALL SPECIES		
Alyxia buxifolia		
Atriplex nummularia subsp. *spathulata*		
Atriplex vesicaria		
Eremophila scoparia		
Eucalyptus salmonophloia		
Exocarpos aphyllus		
Pimelea microcephala		
Rhagodia eremaea		
Scaevola spinescens		
Sclerolaena parviflora		

Project Name: Widgiemooltha Project		
Date:27/10/2016 & 06/05/2017	**Botanist:** Jim Williams	
Vegetation Group: RH-EW2		
Quadrat No: 11	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 58/59/60
Zone: 51J	**Easting:** 364587	**Northing:** 6512863
Altitude: 359 m	**Fire (yrs):** 40+	**Health rating:** 4
Landform: Crest/ Top third / Hillcrest		
Coarse fragments on the surface (abundance/size/shape): Moderately; many / Cobbly; or cobbles / Angular tabular		
Rock outcrop (abundance/runoff): Nil/ Moderately rapid		
Soil (profile/field texture/soil surface): Uniform/Silty loam/ Firm		
%Cover leaf litter: 10%		
%Cover bare ground: 10%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Mallee	**Growth form:** Shrub	**Growth form:** Shrub
Height: 3-6m	**Height:** 1-3m	**Height:** 0.5-1m
Crown cover %: 10-30	**Crown cover %:** <10	**Crown cover %:** 10-30
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Eucalyptus griffithsii	*Eremophila oldfieldii* subsp. *oldfieldii*	*Eremophila caerulea* subsp. *caerulea*
ALL SPECIES		
Alyxia buxifolia		
Atriplex nummularia subsp. *spathulata*		
Atriplex vesicaria		
Dodonaea lobulata		
Eremophila caerulea subsp. *caerulea*		
Eremophila decipiens		
Eremophila oldfieldii subsp. *oldfieldii*		
Eucalyptus celastroides		
Eucalyptus griffithsii		
Grevillea acuaria		
Ptilotus obovatus		
Senna artemisioides subsp. *filifolia*		

Project Name: Widgiemooltha Project		
Date:27/10/2016 & 06/05/2017	**Botanist:** Jim Williams	
Vegetation Group: RH-EW2		
Quadrat No: 12	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 61/62/63
Zone: 51J	**Easting:** 364365	**Northing:** 6512858
Altitude: 355 m	**Fire (yrs):** 40+	**Health rating:** 3
Landform: Crest/ Top third / Hillcrest		
Coarse fragments on the surface (abundance/size/shape): Moderately; many / Coarse gravelly; large pebbles / Angular tabular		
Rock outcrop (abundance/runoff): Nil/ Moderately rapid		
Soil (profile/field texture/soil surface): Uniform/Silty loam/ Firm		
%Cover leaf litter: 20%		
%Cover bare ground: 20%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Tree	**Growth form:** Shrub	**Growth form:** Shrub
Height: 6-12m	**Height:** 1-3m	**Height:** 0.5-1m
Crown cover %: <10	**Crown cover %:** <10	**Crown cover %:** 10-30
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Eucalyptus lesouefii	*Eremophila oldfieldii* subsp. *oldfieldii*	*Scaevola spinescens*
ALL SPECIES		
Acacia erinacea		
Alyxia buxifolia		
Dodonaea lobulata		
Eremophila caerulea subsp. *caerulea*		
Eremophila oldfieldii subsp. *oldfieldii*		
Eucalyptus celastroides		
Eucalyptus lesouefii		
Ptilotus obovatus		
Scaevola spinescens		
Sclerolaena parviflora		
Westringia rigida		

Project Name: Widgiemooltha Project		
Date:27/10/2016 & 06/05/2017	**Botanist:** Jim Williams	
Vegetation Group: RH-AFW1		
Quadrat No: 13	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 67/68/69
Zone: 51J	**Easting:** 364363	**Northing:** 6512982
Altitude: 328 m	**Fire (yrs):** 40+	**Health rating:** 3
Landform: Mid slope/ Middle third / Hillslope		
Coarse fragments on the surface (abundance/size/shape): Very; abundant / Cobbly; or cobbles / Subrounded		
Rock outcrop (abundance/runoff): Slightly rocky/ Moderately rapid		
Soil (profile/field texture/soil surface): Uniform/Silty clay loam/ Firm		
%Cover leaf litter: 30%		
%Cover bare ground: 20%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Shrub	**Growth form:** Shrub	**Growth form:** Shrub
Height: 3-6m	**Height:** 1-3m	**Height:** 0.25-0.5m
Crown cover %: 10-30	**Crown cover %:** 10-30	**Crown cover %:** 10-30
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Acacia collegialis	*Calothamnus gilesii*	*Dampiera latealata*
ALL SPECIES		
Acacia collegialis		
Allocasuarina helmsii		
Aristida contorta (A)		
Calothamnus gilesii		
Chrysocephalum puteale		
Cryptandra distigma		
Dampiera latealata		
Eremophila alternifolia		
Euphorbia tannensis (A)		
Prostanthera grylloana		
Ptilotus obovatus		
Solanum lasiophyllum		

Project Name: Widgiemooltha Project		
Date:27/10/2016 & 06/05/2017	**Botanist:** Jim Williams	
Vegetation Group: RH-EW2		
Quadrat No: 14	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 70/71/72
Zone: 51J	**Easting:** 364196	**Northing:** 6513028
Altitude: 353 m	**Fire (yrs):** 40+	**Health rating:** 3
Landform: Crest/ Top third / Hillcrest		
Coarse fragments on the surface (abundance/size/shape): Very; abundant / Cobbly; or cobbles / Subrounded		
Rock outcrop (abundance/runoff): Nil/ No runoff		
Soil (profile/field texture/soil surface): Uniform/Silty clay loam/ Firm		
%Cover leaf litter: 20%		
%Cover bare ground: 30%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Mallee	**Growth form:** Shrub	**Growth form:** Shrub
Height: 3-6m	**Height:** 1-3m	**Height:** 0.5-1m
Crown cover %: 10-30	**Crown cover %:** 10-30	**Crown cover %:** 10-30
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Eucalyptus griffithsii	*Eremophila oldfieldii* subsp. *oldfieldii*	*Scaevola spinescens*
ALL SPECIES		
Acacia erinacea		
Atriplex nummularia subsp. *spathulata*		
Dodonaea lobulata		
Eremophila caerulea subsp. *caerulea*		
Eremophila decipiens		
Eremophila oldfieldii subsp. *oldfieldii*		
Eucalyptus celastroides		
Eucalyptus griffithsii		
Exocarpos aphyllus		
Maireana pentatropis		
Santalum acuminatum		
Santalum spicatum		
Scaevola spinescens		
Westringia rigida		

Project Name: Widgiemooltha Project		
Date:27/10/2016 & 07/05/2017	**Botanist:** Jim Williams	
Vegetation Group: RH-EW3		
Quadrat No: 15	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 73/74/75
Zone: 51J	**Easting:** 363648	**Northing:** 6512901
Altitude: 337 m	**Fire (yrs):** 40+	**Health rating:** 3
Landform: Midslope/ Middle third / Hillslope		
Coarse fragments on the surface (abundance/size/shape): Very; abundant / Fine gravelly; small pebbles / Rounded		
Rock outcrop (abundance/runoff): Nil/ Moderately rapid		
Soil (profile/field texture/soil surface): Uniform/ Medium clay / Firm		
%Cover leaf litter: 20%		
%Cover bare ground: 30%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Tree	**Growth form:** Shrub	**Growth form:** Shrub
Height: 3-6m	**Height:** 1-3m	**Height:** 0.5-1m
Crown cover %: 10-30	**Crown cover %:** 10-30	**Crown cover %:** 10-30
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Eucalyptus torquata	*Acacia hemiteles*	*Westringia rigida*
ALL SPECIES		
Acacia hemiteles		
Alyxia buxifolia		
Dodonaea stenozyga		
Eremophila saligma		
Eucalyptus torquata		
Scaevola spinescens		
Westringia rigida		

Project Name: Widgiemooltha Project		
Date:28/10/2016 & 07/05/2017	**Botanist:** Jim Williams	
Vegetation Group: RH-EW1		
Quadrat No: 16	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 76/77/78
Zone: 51J	**Easting:** 363525	**Northing:** 6514388
Altitude: 321 m	**Fire (yrs):** 40+	**Health rating:** 3
Landform: Lower slope/ Middle third / Hillslope		
Coarse fragments on the surface (abundance/size/shape): Moderately; many / Medium gravelly; medium pebbles / Subrounded tabular		
Rock outcrop (abundance/runoff): Nil/ Moderately rapid		
Soil (profile/field texture/soil surface): Uniform/ Medium clay / Firm		
%Cover leaf litter: 20%		
%Cover bare ground: 30%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Tree	**Growth form:** Shrub	**Growth form:** Shrub
Height: 3-6m	**Height:** 1-3m	**Height:** 0.5-1m
Crown cover %: 10-30	**Crown cover %:** 10-30	**Crown cover %:** <10
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Eucalyptus lesouefii	*Santalum acuminatum*	*Eremophila caerulea* subsp. *caerulea*
ALL SPECIES		
Atriplex nummularia subsp. *spathulata*		
Atriplex vesicaria		
Eremophila caerulea subsp. *caerulea*		
Eremophila decipiens		
Eremophila scoparia		
Eucalyptus lesouefii		
Exocarpos aphyllus		
Olearia muelleri		
Santalum acuminatum		

Project Name: Widgiemooltha Project		
Date:28/10/2016 & 07/05/2017	**Botanist:** Jim Williams	
Vegetation Group: RH-AFW1		
Quadrat No: 17	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 79/80/81
Zone: 51J	**Easting:** 363309	**Northing:** 6514372
Altitude: 350 m	**Fire (yrs):** 40+	**Health rating:** 3
Landform: Crest/ Top third / Hillcrest		
Coarse fragments on the surface (abundance/size/shape): Moderately; many / cobbly; or cobbles / Angular tabular		
Rock outcrop (abundance/runoff): Slightly rocky/ Slow		
Soil (profile/field texture/soil surface): Uniform/ Silty clay loam / Firm		
%Cover leaf litter: 30%		
%Cover bare ground: 10%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Shrub	**Growth form:** Shrub	**Growth form:** Shrub
Height: 3-6m	**Height:** 0.5-1m	**Height:** 0.25-0.5m
Crown cover %: 10-30	**Crown cover %:** 30-70	**Crown cover %:** <1
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Acacia burkittii	*Prostanthera grylloana*	*Solanum lasiophyllum*
ALL SPECIES		
Acacia acuminata		
Aristida contorta (A)		
Dampiera latealata		
Eremophila alternifolia		
Prostanthera grylloana		
Scaevola spinescens		
Solanum lasiophyllum		

Project Name: Widgiemooltha Project		
Date:28/10/2016 & 07/05/2017	**Botanist:** Jim Williams	
Vegetation Group: RH-EW1		
Quadrat No: 18	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 82/83/84
Zone: 51J	**Easting:** 363078	**Northing:** 6514572
Altitude: 350 m	**Fire (yrs):** 40+	**Health rating:** 4
Landform: Crest/ Top third / Hillcrest		
Coarse fragments on the surface (abundance/size/shape): Moderately; many / cobbly; or cobbles / Angular tabular		
Rock outcrop (abundance/runoff): Nil / Very slow		
Soil (profile/field texture/soil surface): Uniform/ Silty clay loam / Firm		
%Cover leaf litter: 10%		
%Cover bare ground: 20%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Tree	**Growth form:** Shrub	**Growth form:** Shrub
Height: 3-6m	**Height:** 1-3m	**Height:** 0.5-1m
Crown cover %: <10	**Crown cover %:** <10	**Crown cover %:** <10
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Eucalyptus lesouefii	*Santalum acuminatum*	*Eremophila caerulea* subsp. *caerulea*
ALL SPECIES		
Acacia erinacea		
Alyxia buxifolia		
Austrostipa elegantissima		
Eremophila caerulea subsp. *caerulea*		
Eucalyptus lesouefii		
Eucalyptus torquata		
Grevillea nematophylla		
Olearia muelleri		
Santalum acuminatum		
Westringia rigida		

Project Name: Widgiemooltha Project		
Date:28/10/2016 & 07/05/2017	**Botanist:** Jim Williams	
Vegetation Group: RH-EW1		
Quadrat No: 19	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 85/86/87
Zone: 51J	**Easting:** 364241	**Northing:** 6515228
Altitude: 314 m	**Fire (yrs):** 40+	**Health rating:** 3
Landform: Mid slope/ Middle third / Hillslope		
Coarse fragments on the surface (abundance/size/shape): Moderately; many / coarse gravelly; large pebbles / Subrounded tabular		
Rock outcrop (abundance/runoff): Nil / Moderately Rapid		
Soil (profile/field texture/soil surface): Uniform/ Silty clay loam / Firm		
%Cover leaf litter: 30%		
%Cover bare ground: 10%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Tree	**Growth form:** Shrub	**Growth form:** Shrub
Height: 3-6m	**Height:** 1-3m	**Height:** 0.5-1m
Crown cover %: 10-30	**Crown cover %:** <10	**Crown cover %:** <10
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Eucalyptus stricklandii	*Eremophila decipiens*	*Westringia rigida*
ALL SPECIES		
Acacia erinacea		
Atriplex nummularia subsp. *spathulata*		
Atriplex vesicaria		
Dodonaea lobulata		
Eremophila decipiens		
Eremophila oldfieldii		
Eremophila scoparia		
Eucalyptus stricklandii		
Exocarpos aphyllus		
Frankenia setosa		
Grevillea acuaria		
Olearia muelleri		
Rhagodia eremaea		
Sclerolaena parviflora		
Westringia rigida		

Project Name: Widgiemooltha Project		
Date:28/10/2016 & 07/05/2017	**Botanist:** Jim Williams	
Vegetation Group: RH-AFW1		
Quadrat No: 20	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 88/89/90
Zone: 51J	**Easting:** 364563	**Northing:** 6515299
Altitude: 313 m	**Fire (yrs):** 40+	**Health rating:** 3
Landform: Upper slope/ Middle third / Hillslope		
Coarse fragments on the surface (abundance/size/shape): Very; abundant / cobbly; or cobbles / Angular tabular		
Rock outcrop (abundance/runoff): Rocky / Moderately Rapid		
Soil (profile/field texture/soil surface): Uniform/ Silty clay loam / Firm		
%Cover leaf litter: 10%		
%Cover bare ground: 10%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Shrub	**Growth form:** Shrub	**Growth form:** Fern
Height: 1-3m	**Height:** 0.5-1m	**Height:** 0.25-5m
Crown cover %: 10-30	**Crown cover %:** 10	**Crown cover %:** 30-70
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Acacia collegialis	*Thryptomene australis* subsp. *brachyandra*	*Cheilanthes sieberi* subsp. *sieberi*
ALL SPECIES		
Acacia collegialis		
Asteridea athrixioides (A)		
Austrostipa nitida		
Brachychiton gregorii		
Cheilanthes sieberi subsp. *sieberi*		
Dispphyma crassifolium		
Goodenia sp. sterile (A)		
Melaleuca hamata		
Mirbelia densiflora		
Thryptomene australis subsp. *brachyandra*		
Waitzia acuminata		
Wurmbea sp. (sterile) (A)		

Project Name: Widgiemooltha Project		
Date:28/10/2016 & 07/05/2017	**Botanist:** Jim Williams	
Vegetation Group: RH-AFW1		
Quadrat No: 21	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 91/92/93
Zone: 51J	**Easting:** 364175	**Northing:** 6515498
Altitude: 325 m	**Fire (yrs):** 40+	**Health rating:** 3
Landform: Mid slope/ Middle third / Hillslope		
Coarse fragments on the surface (abundance/size/shape): Very; abundant / cobbly; or cobbles / Angular tabular		
Rock outcrop (abundance/runoff): Very rocky / Moderately Rapid		
Soil (profile/field texture/soil surface): Uniform/ Silty clay loam / Firm		
%Cover leaf litter: 20%		
%Cover bare ground: 10%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Shrub	**Growth form:** Shrub	**Growth form:** Fern
Height: 3-6m	**Height:** 1-3m	**Height:** 0.25-5m
Crown cover %: 10-30	**Crown cover %:** <10	**Crown cover %:** 30-70
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Acacia collegialis	*Thryptomene australis* subsp. *brachyandra*	*Cheilanthes sieberi* subsp. *sieberi*
ALL SPECIES		
Acacia collegialis		
Acacia tetragonophylla		
Austrostipa nitida		
Bulbine semibarbata (A)		
Cheilanthes sieberi subsp. *sieberi*		
Dampiera latealata		
Dodonaea lobulata		
Eremophila gibbosa		
Eriachne pulchella (A)		
Olearia muelleri		
Ptilotus obovatus		
Solanum lasiophyllum		
Thryptomene australis subsp. *brachyandra*		
Waitzia acuminata		

Project Name: Widgiemooltha Project		
Date:28/10/2016 & 07/05/2017	**Botanist:** Jim Williams	
Vegetation Group: CLP-EW2		
Quadrat No: 22	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 94/95/96
Zone: 51J	**Easting:** 363141	**Northing:** 6515043
Altitude: 331 m	**Fire (yrs):** 40+	**Health rating:** 3
Landform: Flat/ Bottom third / Valley flat		
Coarse fragments on the surface (abundance/size/shape): No qualifier; Common / Medium gravelly; Medium pebbles / Angular tabular		
Rock outcrop (abundance/runoff): Nil / Moderately Rapid		
Soil (profile/field texture/soil surface): Uniform/ Medium heavy clay/ Firm		
%Cover leaf litter: 30%		
%Cover bare ground: 10%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Tree	**Growth form:** Shrub	**Growth form:** Chenopod shrub
Height: 6-12m	**Height:** 1-3m	**Height:** 0.25-0.5m
Crown cover %: 10-30	**Crown cover %:** <10	**Crown cover %:** <10
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Eucalyptus lesouefii	*Eremophila scoparia*	*Atriplex vesicaria*
ALL SPECIES		
Atriplex nummularia subsp. *spathulata*		
Atriplex vesicaria		
Eremophila interstans subsp. *virgata*		
Eremophila scoparia		
Eucalyptus lesouefii		
Olearia muelleri		
Sclerolaena parviflora		

Project Name: Widgiemooltha Project		
Date:28/10/2016 & 07/05/2017	**Botanist:** Jim Williams	
Vegetation Group: CLP-EW3		
Quadrat No: 23	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 97/98/99
Zone: 51J	**Easting:** 362442	**Northing:** 6514904
Altitude: 347 m	**Fire (yrs):** 40+	**Health rating:** 3
Landform: Simple slope/ Middle third / Hillslope		
Coarse fragments on the surface (abundance/size/shape): No qualifier; Common / Medium gravelly; Medium pebbles / Subrounded tabular		
Rock outcrop (abundance/runoff): Nil / Moderately Rapid		
Soil (profile/field texture/soil surface): Uniform/ Medium heavy clay/ Soft		
%Cover leaf litter: 40%		
%Cover bare ground: 5%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Tree	**Growth form:** Shrub	**Growth form:** Chenopod shrub
Height: 3-6m	**Height:** 1-3m	**Height:** 0.25-0.5m
Crown cover %: 10-30	**Crown cover %:** <10	**Crown cover %:** 10-30
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Eucalyptus ravida	*Eremophila dempsteri*	*Sclerolaena drummondii*
ALL SPECIES		
Alyxia buxifolia		
Austrostipa nitida		
Eremophila dempsteri		
Eucalyptus ravida		
Maireana tomentosa		
Sclerolaena drummondii		
Sclerolaena parvifolia		
Senna artemisioides subsp. *filifolia*		

Project Name: Widgiemooltha Project		
Date:28/10/2016 & 07/05/2017	**Botanist:** Jim Williams	
Vegetation Group: RH-EW2		
Quadrat No: 24	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 100/101/102
Zone: 51J	**Easting:** 362376	**Northing:** 6515395
Altitude: 355 m	**Fire (yrs):** 40+	**Health rating:** 3
Landform: Flat/ Middle third / Valley flat		
Coarse fragments on the surface (abundance/size/shape): No qualifier; Common / Medium gravelly; Medium pebbles / Angular tabular		
Rock outcrop (abundance/runoff): Nil / Moderately Rapid		
Soil (profile/field texture/soil surface): Uniform/ Medium heavy clay/ Firm		
%Cover leaf litter: 30%		
%Cover bare ground: 10%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Tree	**Growth form:** Shrub	**Growth form:** Shrub
Height: 3-6m	**Height:** 1-3m	**Height:** 0.5-1m
Crown cover %: <10	**Crown cover %:** <10	**Crown cover %:** 10-30
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Eucalyptus torquata	*Acacia acuminata*	*Scaevola spinescens*
ALL SPECIES		
Acacia acuminata		
Acacia colletioides		
Acacia erinacea		
Dodonaea lobulata		
Eremophila caerulea subsp. *caerulea*		
Eremophila oldfieldii subsp. *oldfieldii*		
Eucalyptus lesouefii		
Eucalyptus torquata		
Grevillea acuaria		
Maireana georgei		
Maireana triptera		
Scaevola spinescens		
Westringia rigida		

Project Name: Widgiemooltha Project		
Date:28/10/2016 & 07/05/2017	**Botanist:** Jim Williams	
Vegetation Group: RH-AFW1		
Quadrat No: 25	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 104/105/106
Zone: 51J	**Easting:** 362694	**Northing:** 6515368
Altitude: 374 m	**Fire (yrs):** 40+	**Health rating:** 3
Landform: Crest/ Top third / Hillcrest		
Coarse fragments on the surface (abundance/size/shape): Very; abundant / coarse gravelly; large pebbles / Subrounded tabular		
Rock outcrop (abundance/runoff): Nil / Moderately Rapid		
Soil (profile/field texture/soil surface): Uniform/ Silty clay loam/ Firm		
%Cover leaf litter: 20%		
%Cover bare ground: 10%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Shrub	**Growth form:** Shrub	**Growth form: S**hrub
Height: 3-6m	**Height:** 1-3m	**Height:** 0.5-1m
Crown cover %: 30-70	**Crown cover %:** <10	**Crown cover %:** 10-30
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Acacia collegialis	*Prostanthera grylloana*	*Dampiera latealata*
ALL SPECIES		
Acacia collegialis		
Acacia tetragonophylla		
Aristida contorta (A)		
Dampiera latealata		
Dodonaea lobulata		
Eremophila oldfieldii subsp. *oldfieldii*		
Prostanthera grylloana		
Santalum spicatum		
Trymalium myrtillus		

Project Name: Widgiemooltha Project		
Date:28/10/2016 & 07/05/2017	**Botanist:** Jim Williams	
Vegetation Group: RH-AFW1		
Quadrat No: 26	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 113/114/115
Zone: 51J	**Easting:** 362109	**Northing:** 6516044
Altitude: 362 m	**Fire (yrs):** 40+	**Health rating:** 3
Landform: Mid slope/ Middle third / Hillslope		
Coarse fragments on the surface (abundance/size/shape): Moderate; many / coarse gravelly; large pebbles / Angular tabular		
Rock outcrop (abundance/runoff): Rocky / Slow		
Soil (profile/field texture/soil surface): Uniform/ Silty clay loam/ Firm		
%Cover leaf litter: 20%		
%Cover bare ground: 10%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Shrub	**Growth form:** Shrub	**Growth form:** Shrub
Height: 3-6m	**Height:** 1-3m	**Height:** 0.5-1m
Crown cover %: <10	**Crown cover %:** 10-30	**Crown cover %:** <1
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Acacia collegialis	*Prostanthera grylloana*	*Ptilotus obovatus*
ALL SPECIES		
Acacia collegialis		
Austrostipa blackii (P3)		
Austrostipa sp. Carlingup Road (S. Kern & R. Jasper LCH 18459) (P1)		
Dampiera latealata		
Eremophila alternifolia		
Eremophila gibbosa		
Exocarpos aphyllus		
Marsdenia australis (A)		
Pimelea microcephala		
Prostanthera grylloana		
Ptilotus obovatus		
Santalum spicatum		
Vittadinia sp. (sterile)		
Waitzia acuminata		
Wurmbea sp. (sterile)		

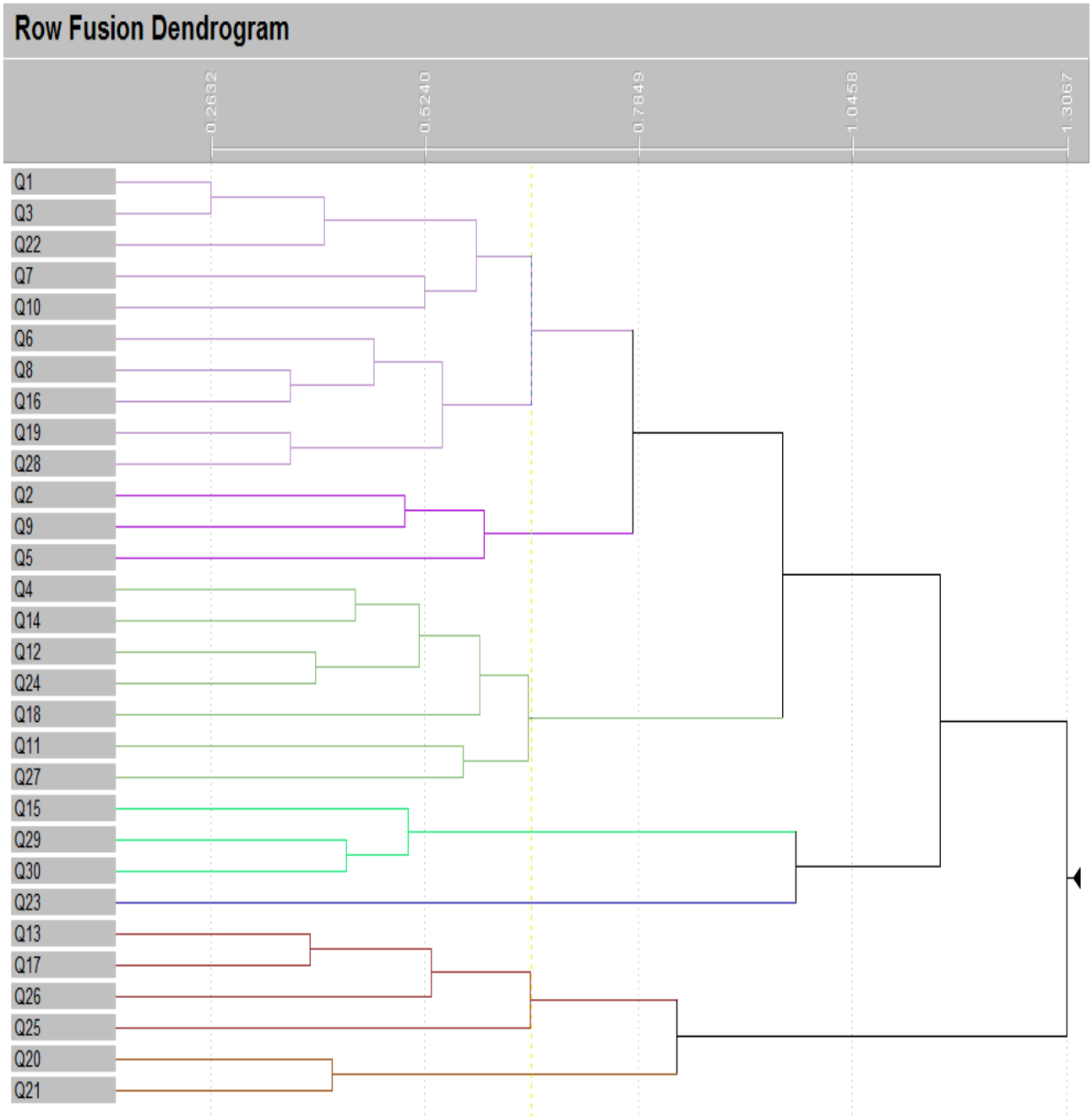
Project Name: Widgiemooltha Project		
Date:28/10/2016 & 07/05/2017	**Botanist:** Jim Williams	
Vegetation Group: RH-EW2		
Quadrat No: 27	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 116/117/118
Zone: 51J	**Easting:** 362313	**Northing:** 6515977
Altitude: 356 m	**Fire (yrs):** 40+	**Health rating:** 3
Landform: Lower slope/ Middle third / Hillslope		
Coarse fragments on the surface (abundance/size/shape): No qualifier; Common / Medium gravelly; Medium pebbles / Subrounded		
Rock outcrop (abundance/runoff): Nil / Slow		
Soil (profile/field texture/soil surface): Uniform/ Medium heavy clay/ Firm		
%Cover leaf litter: 30%		
%Cover bare ground: 10%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Shrub Mallee	**Growth form:** Shrub	**Growth form:** Shrub
Height: 6-12m	**Height: 0.5-1**m	**Height:** 0.5-1m
Crown cover %: 10-30	**Crown cover %:** 10-30	**Crown cover %:** <10
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Eucalyptus griffithsii	*Senna artemisioides* subsp. *filifolia*	*Olearia muelleri*
ALL SPECIES		
Acacia erinacea		
Austrostipa nitida		
Dodonaea lobulata		
Enchylaena lanata		
Eremophila caerulea subsp. *caerulea*		
Eremophila decipiens		
Eucalyptus griffithsii		
Grevillea acuaria		
Maireana georgei		
Maireana pentatropis		
Olearia muelleri		
Pimelea microcephala		
Scaevola spinescens		
Sclerolaena diacantha		
Senna artemisioides subsp. *filifolia*		
Solanum lasiophyllum		

Project Name: Widgiemooltha Project		
Date:28/10/2016 & 07/05/2017	**Botanist:** Jim Williams	
Vegetation Group: CLP-EW2		
Quadrat No: 28	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 119/120/121
Zone: 51J	**Easting:** 363778	**Northing:** 6516377
Altitude: 319 m	**Fire (yrs):** 40+	**Health rating:** 3
Landform: Flat/ Middle third / Valley flat		
Coarse fragments on the surface (abundance/size/shape): No coarse fragments		
Rock outcrop (abundance/runoff): Nil / Moderately rapid		
Soil (profile/field texture/soil surface): Uniform/ Medium heavy clay/ Firm		
%Cover leaf litter: 20%		
%Cover bare ground: 15%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Tree	**Growth form:** Shrub	**Growth form:** Chenopod Shrub
Height: 3-6m	**Height:** 1-3m	**Height:** 0.5-1m
Crown cover %: 10-30	**Crown cover %:** <10	**Crown cover %:** <10
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Eucalyptus lesouefii	*Eremophila scoparia*	*Atriplex vesicaria*
ALL SPECIES		
Acacia erinacea		
Atriplex nummularia subsp. *spathulata*		
Atriplex vesicaria		
Austrostipa elegantissima		
Eremophila scoparia		
Eucalyptus griffithsii		
Eucalyptus lesouefii		
Exocarpos aphyllus		
Frankenia setosa		
Olearia muelleri		
Scaevola spinescens		

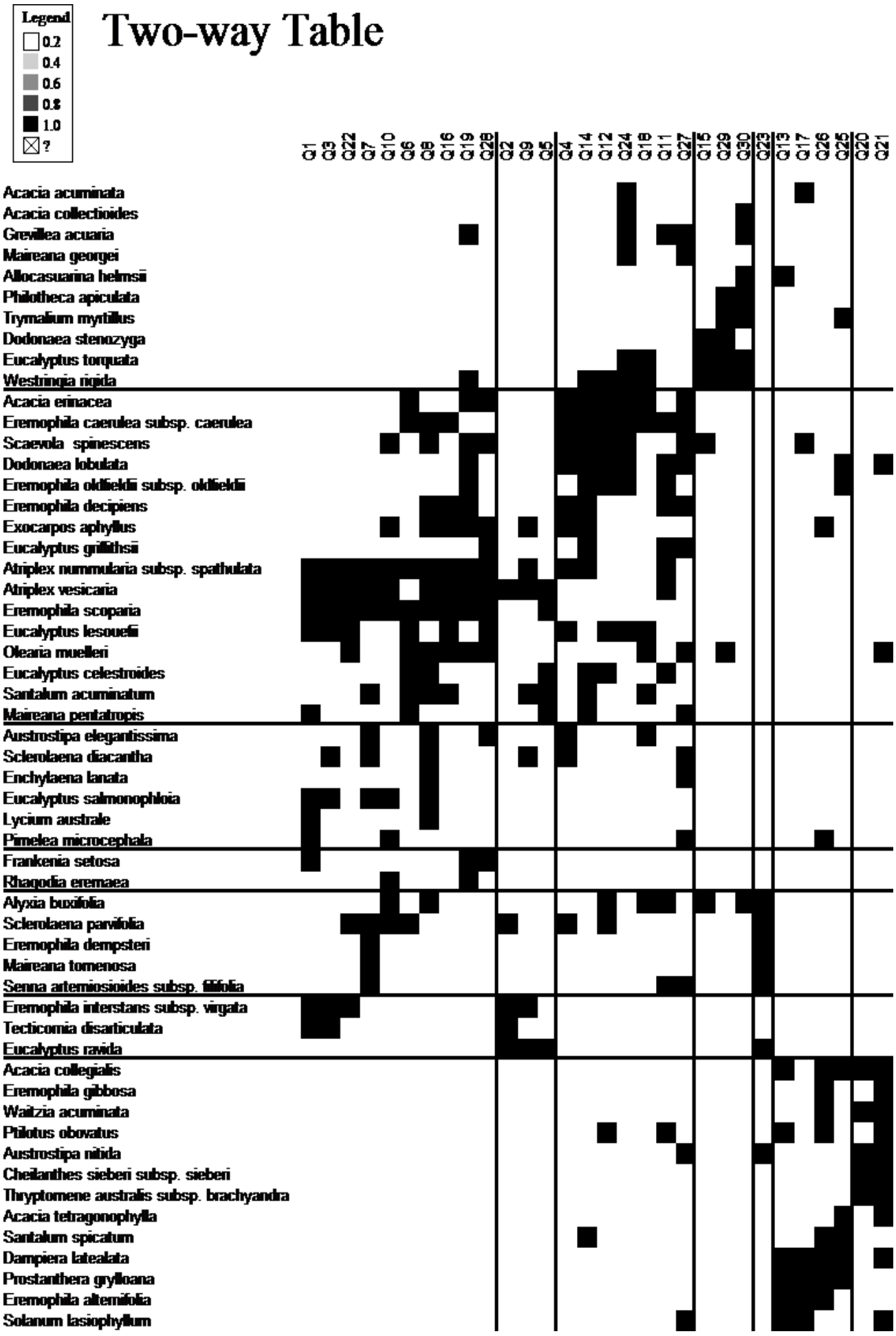
Project Name: Widgiemooltha Project		
Date:28/10/2016 & 07/05/2017	**Botanist:** Jim Williams	
Vegetation Group: RH-EW3		
Quadrat No: 29	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 122/123/124
Zone: 51J	**Easting:** 364099	**Northing:** 6515973
Altitude: 351 m	**Fire (yrs):** 40+	**Health rating:** 3
Landform: Upper slope/ Middle third / Hillslope		
Coarse fragments on the surface (abundance/size/shape): Moderate; many / coarse gravelly; large pebbles / Angular platy		
Rock outcrop (abundance/runoff): Nil / Moderately rapid		
Soil (profile/field texture/soil surface): Uniform/ Silty clay loam/ Soft		
%Cover leaf litter: 30%		
%Cover bare ground: 10%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Tree	**Growth form:** Shrub	**Growth form:** Shrub
Height: 6-12m	**Height:** 1-3m	**Height:** 0.5-1m
Crown cover %: 10-30	**Crown cover %:** 10-30	**Crown cover %:** <10
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Eucalyptus torquata	*Dodonaea stenozyga*	*Westringia rigida*
ALL SPECIES		
Dodonaea stenozyga		
Eremophila psilocalyx		
Eucalyptus torquata		
Olearia muelleri		
Philotheca apiculata (P1)		
Trymalium myrtillus		
Westringia rigida		

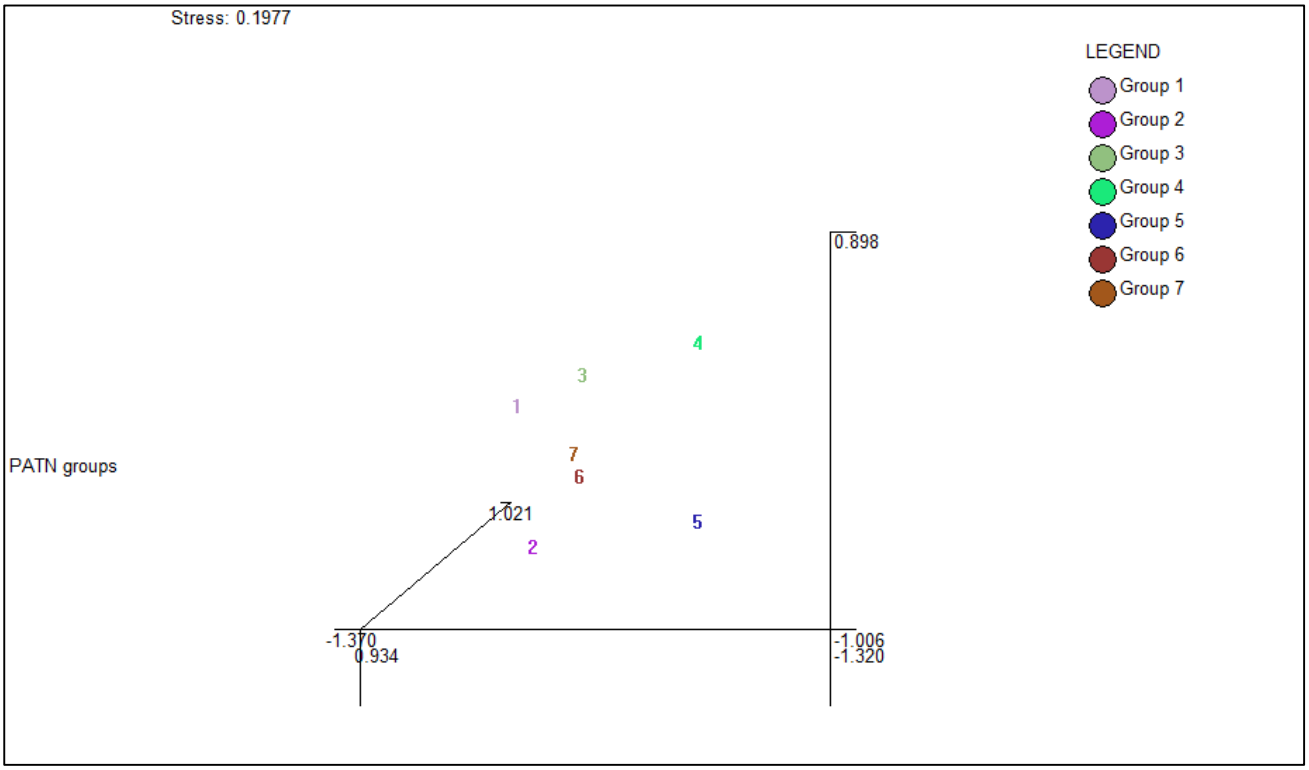
Project Name: Widgiemooltha Project		
Date:28/10/2016 & 07/05/2017	**Botanist:** Jim Williams	
Vegetation Group: RH-EW3		
Quadrat No: 30	**Quadrat size/shape:** 20m x 20m Square	**Photo number (NW corner):** 128/129/130
Zone: 51J	**Easting:** 363564	**Northing:** 6515718
Altitude: 340 m	**Fire (yrs):** 40+	**Health rating:** 3
Landform: Mid slope/ Middle third / Hillslope		
Coarse fragments on the surface (abundance/size/shape): Very; abundant / cobbly; or cobbles / Angular		
Rock outcrop (abundance/runoff): Nil / Moderately rapid		
Soil (profile/field texture/soil surface): Uniform/ Silty clay loam/ Firm		
%Cover leaf litter: 40%		
%Cover bare ground: 10%		
Tallest stratum	**Mid-stratum**	**Lower stratum**
Growth form: Tree	**Growth form:** Shrub	**Growth form:** Shrub
Height: 6-12m	**Height:** 1-3m	**Height:** 0.5-1m
Crown cover %: 10-30	**Crown cover %:** 10-30	**Crown cover %:** <10
Dominant taxa:	**Dominant taxa:**	**Dominant taxa:**
Eucalyptus torquata	*Allocasuarina helmsii*	*Westringia rigida*
ALL SPECIES		
Acacia colletioides		
Allocasuarina helmsii		
Alyxia buxifolia		
Dodonaea adenophora		
Eucalyptus torquata		
Grevillea acuaria		
Philotheca apiculata (P1)		
Thysanotus manglesianus		
Trymalium myrtillus		
Westringia rigida		

Appendix 8: PATN analysis results



Two-way Table




Stress: 0.1977
LEGEND
Group 1
Group 2
Group 3
Group 4
Group 5
Group 6
Group 7
PATN groups
0.898
-1.006
-1.320
1.021
-1.370
0.934
1
2
3
4
5
6
7

Appendix 9: Vegetation Condition Rating

Vegetation Condition Rating	South West and Interzone Botanical Provinces	Eremaean and Northern Botanical Provinces
1	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.	
2	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
3	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
4	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
5		Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
6	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing.	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
7	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees and shrubs.	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or ‘parkland cleared’ with their flora comprising weed or crop species with isolated native trees or shrubs.

Fauna Observed or Potentially in Region of Survey Area

Widgiemooltha Project

Approximate centroid - 31.495600°S and 121.565920°E

Compiled by Greg Harewood - December 2016

Recorded (Sighted/Heard/Signs) = X

A = Botanica (2016). Flora and Fauna Assessment Widgiemooltha Project. Unpublished report for Mincor Resources NL.
B = Chapman et al (1991). Biological Surveys of Four Goldfields Reserves. Landnote 1/91 Department of Conservation and Land Management.
C = McKenzie, N.L. and Hall, N.J. (1992). The Biological Survey of the Eastern Goldfields of WA - Pt 8: Kurnalpi – Kalgoorlie study area. Records of the WAM, Supplement 41: 1 – 125.
D = Ninox Wildlife Consulting (2004). St Ives Gold Delta Island Vertebrate Fauna Assessment. Unpublished Report Commissioned by St Ives Gold Mining Company Pty Ltd.
E = Western Wildlife (2006). St. Ives Gold Fauna Survey; Spring 2005. Unpublished Report commissioned by Jim's Seeds, Weeds and Trees Pty. Ltd.
F = ATA Environmental (June 2006). Vertebrate Fauna Assessment, St. Ives Gold Mine. Unpublished Report commissioned by Jim's Seeds, Weeds and Trees Pty Ltd.
G = Halpern, Glick, Maunsell (1998). Lake Lefroy Environmental Assessment. Report ES4490C. Unpublished Report to WMC Resources Ltd.
H = KLA (2007). St. Ives Gold Mining Company. Northern Tailings Storage Facility (No. 4). Spring Fauna Survey. Unpublished report for St Ives Gold Mining Company.
I = Bamford Consulting Ecologists (2010). St. Ives Gold Mine Kambalda. Fauna Assessment. Unpublished report for St Ives Gold Mining Company.
J = DPaW (2016). NatureMap Database search. "By Circle" 121° 33' 57" E, 31° 29' 44" S (plus 40km buffer). 07 December 2016.

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Amphibia												
Myobatrachidae Ground or Burrowing Frogs												
Neobatrachus kunapalari	Kunapalari Frog	LC				X			X		X	X
Neobatrachus pelobatoides	Humming Frog	LC				X			X			
Neobatrachus sutor	Shoemaker Frog	LC			X	X			X			
Neobatrachus wilsmorei	Plonking Frog	LC			X							
Pseudophryne occidentalis	Western Toadlet	LC		X	X	X	X	X	X		X	X

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Reptilia												
Carphodactylidae Knob-tailed Geckos												
Nephrurus laevissimus	Smooth Knob-tail					X	X	X	X		X	X
Diplodactylidae Geckoes												
Crenadactylus ocellatus	Clawless Gecko					X	X	X				X
Diplodactylus conspicillatus	Fat-tailed Gecko											
Diplodactylus granariensis rex	Western Stone Gecko			X	X	X	X	X				
Diplodactylus pulcher	Western Saddled Ground Gecko			X	X	X	X	X			X *Lucasium*	
maini	Mains Ground Gecko		X	X	X	X	X	X	X	X *Oedura reticulata*		
Reticulated Velvet Gecko		X	X	X	X							
Rhynchoedura ornata	Beaked Gecko			X								
Strophurus assimilis	Goldfields Spiny-tailed Gecko			X			X	X		X	X	X
Strophurus elderi	Jewelled Gecko				X		X	X			X	X
Strophurus strophurus	Ring-tailed Gecko											

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Gekkonidae Geckoes												
Christinus marmoratus	Marbled Gecko						X					X
Gehyra purpurascens	Purple Arid Dtella					X				X	X	X
Gehyra variegata	Variegated Dtella			X	X	X	X	X	X	X	X	X
Heteronotia binoei	Bynoe's Gecko			X	X	X	X	X	X	X	X	X
Nephrurus milii	Barking Gecko			X	X	X	X	X			X	
Pygopodidae Legless Lizards												
Delma australis	Marble-faced Delma				X		X	X			X	X
Delma butleri	Unbanded Delma					X	X	X	X			X
Delma fraseri	Fraser’s Legless Lizard					X	X	X				X
Lialis burtonis	Burton’s Legless Lizard				X	X	X	X			X	X
Pygopus lepidopodus	Common Scaly Foot					X	X	X				X
Pygopus nigriceps	Hooded Scaly Foot											

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Agamidae Dragon Lizards												
Caimanops amphiboluroides	Mulga Dragon				X							
Ctenophorus cristatus	Bicycle Dragon			X	X	X	X	X		X	X	X
Ctenophorus fordi	Mallee Sand Dragon			X	X	X	X	X	X		X	X
Ctenophorus isolepis	Crested Dragon								X			
Ctenophorus maculatus	Spotted Military Dragon											
Ctenophorus nuchalis	Central Netted Dragon											
Ctenophorus ornatus	Ornate Crevice Dragon			X						X		X
Ctenophorus reticulatus	Western Netted Dragon				X	X						X
Ctenophorus salinarum	Salt Pan Dragon					X	X	X	X	X	X	X
Ctenophorus scutulatus	Lozenge-marked Bicycle Dragon			X	X		X	X			X	X
Moloch horridus	Thorny Devil			X	X	X		X			X	X
Pogona minor	Western Bearded Dragon			X	X	X	X	X	X	X	X	X
Tympanocryptis cephalus	Pebble Dragon					X		X				X

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Varanidae Monitor's or Goanna's												
Varanus caudolineatus	Stripe-tailed Pygmy Monitor				X							
Varanus gouldii	Bungarra or Sand Monitor			X	X	X	X	X	X	X	X	X
Varanus tristis	Racehorse Monitor			X				X				X

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Scincidae Skinks												
Cryptoblepharus buchananii	Buchanan's Snake-eyed Skink			X	X	X	X	X	X			X
Ctenotus atlas	Southern Malle Ctenotus				X	X	X	X	X	X	X	X
Ctenotus impar	Odd-striped Ctenotus											
Ctenotus leonhardii	Leonhardi's Skink				X	X					X	X
Ctenotus pantherinus ocellifer	Leopard Skink			X								
Ctenotus schomburgkii	Barred Wedge-snout Ctenotus				X	X	X	X	X		X	X
Ctenotus severus	Stern Rock Ctenotus									X		
Ctenotus uber	Spotted Ctenotus				X		X	X				X
Cyclodomorphus melanops elongatus	Eastern Slender Blue-tongue			X	X		X	X				
Egernia depressa	Pygmy Spiny-tailed Skink							X				X
Egernia formosa	Goldfields Crevise Skink				X	X	X	X				X
Egernia inornata	Desert Skink			X	X		X	X		X	X	
Egernia multiscutata	Bull Skink					X						
Egernia richardi	Woodland Crevice Skink											

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Eremiascincus richardsonii	Broad-banded Sand Swimmer						X	X				X
Hemiergis initialis initialis	Sth Five-toed Mulch Skink					X	X	X				
Hemiergis peronii peronii	Four-toed Earless Skink											
Lerista distinguenda	SW Four-toed Lerista						X	X			X	X
Lerista kingi												X
Lerista muelleri	Common Mulch Skink			X	X	X	X	X	X			
Lerista picturata	Goldfields Robust Lerista				X	X	X	X				X
Lerista taeniata												X
Menetia greyii	Dwarf Skink			X	X	X	X	X	X	X	X	X
Morethia adelaidensis	Saltbush Flecked Morethia				X		X	X	X			
Morethia butleri	Woodland Dark-flecked Morethia				X	X	X	X				X
Morethia obscura	Shrubland Pale-flecked Morethia			X			X	X			X	X
Tiliqua occipitalis	Western Bluetongue			X		X						
Tiliqua rugosa	Bobtail			X	X	X	X	X	X	X		

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Typhlopidae Blind Snakes												
Ramphotyphlops australis	Southern Blind Snake					X	X	X			X	
Ramphotyphlops bicolor	Dark-spined Blind Snake										X	
Ramphotyphlops bituberculatus	Prong-snouted Blind Snake				X							
Boidae Pythons, Boas												
Morelia spilota	Carpet Python		X			X					X	

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Elapidae Elapid Snakes												
Brachyurophis fasciolata	Narrow-banded Shovel-nosed Snake					X	X	X			X	
Demansia psammophis	Yellow-faced Whipsnake					X	X	X				X
Parasuta gouldii	Gould's Hooded Snake				X	X	X	X				X
Parasuta monachus	Monk Snake				X	X	X	X				X
Pseudechis australis	Mulga Snake			X			X	X		X		X
Pseudonaja modesta	Ringed Brown Snake				X		X	X				X
Pseudonaja nuchalis	Gwardar				X	X					X	X
Simoselaps bertholdi	Jan's Banded Snake			X	X	X	X	X				X
Suta fasciata	Rosen's Snake											X
Aves												
Casuariidae Emus, Cassowarries												
Dromaius novaehollandiae	Emu	LC		X	X	X	X	X	X	X	X	X
Megapodiidae Moundbuilders												
Leipoa ocellata	Malleefowl	S3 VU VU A2bce+3ce			X						X	X

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Accipitridae Kites, Goshawks, Eagles, Harriers												
Accipiter cirrocephalus	Collared Sparrowhawk	LC		X		X		X				X
Accipiter fasciatus	Brown Goshawk	LC		X	X	X	X	X		X	X	X
Aquila audax	Wedge-tailed Eagle	LC	X	X	X	X	X			X	X	X
Aquila morphnoides	Little Eagle	LC		X		X						X
Circus assimilis	Spotted Harrier	LC			X							
Haliastur sphenurus	Whistling Kite	LC			X	X	X					
Hamirostra isura	Square-tailed Kite	LC		X			X					
Hamirostra melanosternon	Black-breasted Buzzard	LC					X					
Falconidae Falcons												
Falco berigora	Brown Falcon	LC		X	X	X	X				X	X
Falco cenchroides	Australian Kestrel	LC		X	X	X	X					X
Falco longipennis	Australian Hobby	LC										X
Falco peregrinus	Peregrine Falcon	S7 LC				X			X			X

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Otididae Bustards												
Ardeotis australis	Australian Bustard											
Charadriidae Lapwings, Plovers, Dotterels												
Vanellus tricolor	Banded Lapwing	LC		X								
Columbidae Pigeons, Doves												
Ocyphaps lophotes	Crested Pigeon	LC		X	X	X	X	X			X	X
Phaps chalcoptera	Common Bronzewing	LC		X	X	X	X	X		X	X	X

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Psittacidae Parrots												
Cacatua roseicapilla	Galah	LC		X	X		X					
Glossopsitta porphyrocephala	Purple-crowned Lorikeet	LC		X	X	X	X	X	X		X	X
Melopsittacus undulatus	Budgerigar	LC			X						X	X
Neophema splendida	Scarlet-chested Parrot	LC									X	
Nymphicus hollandicus	Cockatiel	LC			X							
Platycercus varius	Mulga Parrot	LC		X	X						X	X
Platycercus zonarius	Australian Ringneck	LC	X	X	X	X	X	X	X	X	X	X
Polytelis anthopeplus	Regent Parrot	LC		X		X	X	X		X	X	
Cuculidae Parasitic Cuckoos												
Chrysococcyx basalis	Horsfield's Bronze Cuckoo	LC			X	X					X	X
Chrysococcyx osculans	Black-eared Cuckoo	LC			X	X						
Cuculus pallidus	Pallid Cuckoo	LC			X	X			X			
Strigidae												

Class	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Hawk Owls												
Family												
Species												
Ninox novaeseelandiae	Boobook Owl	LC		X	X		X					X

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Tytonidae Barn Owls												
Tyto alba	Barn Owl	LC								X		
Podargidae Frogmouths												
Podargus strigoides	Tawny Frogmouth	LC		X	X	X	X					
Caprimulgidae Nightjars												
Eurostopodus argus	Spotted Nightjar	LC		X								
Aegothelidae Owlet-nightjars												
Aegotheles cristatus	Australian Owlet-nightjar	LC		X	X	X			X		X	X
Halcyonidae Tree Kingfishers												
Todiramphus pyrrhopygia	Red-backed Kingfisher	LC			X	X	X	X				
Todiramphus sanctus	Sacred Kingfisher	LC		X		X						X
Meropidae Bee-eaters												
Merops ornatus	Rainbow Bee-eater	S5 Mig JA LC	X	X	X	X	X	X		X	X	X

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Climacteridae Treecreepers												
Climacteris affinis	White-browed Treecreeper	LC			X							
Climacteris rufa	Rufous Treecreeper	LC		X	X	X	X	X	X	X	X	X
Maluridae Fairy Wrens, GrassWrens												
Malurus leucopterus	White-winged Fairy-wren	LC			X	X	X	X			X	X
Malurus pulcherrimus	Blue-breasted Fairy-wren	LC				X	X	X				X
Malurus splendens	Splendid Fairy-wren	LC		X								X

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Acanthizidae Thornbills, Geryones, Fieldwrens & Whitefaces												
Acanthiza apicalis	Broad-tailed Thornbill	LC	X	X	X	X	X	X	X	X	X	X
Acanthiza chrysorrhoa	Yellow-rumped Thornbill	LC		X	X	X	X					X
Acanthiza robustirostris	Slaty-backed Thornbill	LC			X							
Acanthiza uropygialis	Chestnut-rumped Thornbill	LC		X	X	X	X	X	X	X	X	X
Aphelocephala leucopsis	Southern Whiteface	LC			X							
Calamanthus campestris	Rufous Fieldwren	LC					X					
Gerygone fusca	Western Gerygone	LC				X						X
Hylacola cauta whitlocki	Shy Heathwren (western)					X		X			X	
Pyrrholaemus brunneus	Redthroat	LC	X	X	X	X	X	X		X	X	X
Smicrornis brevirostris	Weebill	LC	X	X	X	X	X	X	X	X	X	X
Pardalotidae Pardalotes												
Pardalotus punctatus	Spotted Pardalote	LC										X
Pardalotus striatus	Striated Pardalote	LC	X	X	X	X	X	X	X	X	X	X

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Meliphagidae Honeyeaters, Chats												
Acanthagenys rufogularis	Spiny-cheeked Honeyeater	LC	X	X	X	X	X	X	X	X	X	X
Anthochaera carunculata	Red Wattlebird	LC	X	X	X	X	X	X		X	X	X
Anthochaera lunulata	Western Little Wattlebird	LC							X			
Certhionyx niger	Black Honeyeater	LC										
Certhionyx variegatus	Pied Honeyeater	LC										X
Epthianura albifrons	White-fronted Chat	LC		X		X						X
Epthianura tricolor	Crimson Chat	LC							X			
Lichenostomus cratitius	Purple-gaped Honeyeater	LC		X								X
Lichenostomus leucotis	White-eared Honeyeater	LC	X	X	X	X	X	X	X			X
Lichenostomus ornatus	Yellow-plumed Honeyeater	LC	X	X	X	X	X	X	X	X	X	
Lichenostomus plumulus	Grey-fronted Honeyeater	LC			X							
Lichenostomus virescens	Singing Honeyeater	LC	X	X	X	X	X	X	X	X	X	
Lichmera indistincta	Brown Honeyeater	LC	X	X	X	X	X	X	X		X	X

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Manorina flavigula	Yellow-throated Miner	LC		X	X	X	X	X	X	X	X	X

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Melithreptus brevirostris	Brown-headed Honeyeater	LC		X	X	X	X		X	X	X	X
Phylidonyris albifrons	White-fronted Honeyeater	LC		X	X	X	X		X	X	X	
Phylidonyris nigra	White-cheeked Honeyeater	LC			X							
Petroicidae Australian Robins												
Drymodes brunneopygia	Southern Scrub-robin	LC		X				X				X
Eopsaltria australis griseogularis	Western Yellow Robin	LC		X		X						
Microeca fascinans	Jacky Winter	LC		X	X	X	X		X			X
Petroica cucullata	Hooded Robin	LC			X				X			
Petroica goodenovii	Red-capped Robin	LC		X	X	X	X		X	X	X	X
Pomatostomidae Babblers												
Pomatostomus superciliosus	White-browed Babbler	LC	X	X	X	X	X	X		X		X
Cinclosomatidae Whipbirds, Wedgebills, Quail Thrushes												
Cinclosoma castanotus	Chestnut Quail-thrush	LC	X	X		X	X	X				X

Class **Neosittidae** Sittellas *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Daphoenositta chrysoptera	Varied Sittella	LC			X	X	X				X	X

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Pachycephalidae Crested Shrike-tit, Crested Bellbird, Shrike Thrushes, Whistlers												
Colluricincla harmonica	Grey Shrike-thrush	LC	X	X	X	X	X	X	X	X	X	X
Oreoica gutturalis	Crested Bellbird	LC	X								X	X
Pachycephala rufiventris	Rufous Whistler	LC			X	X						X
Dicruridae Monarchs, Magpie Lark, Flycatchers, Fantails, Drongo												
Grallina cyanoleuca	Magpie-lark	LC		X	X	X	X					X
Myiagra inquieta	Restless Flycatcher	LC		X			X					
Rhipidura fuliginosa	Grey Fantail	LC			X							
Rhipidura leucophrys	Willie Wagtail	LC		X	X	X	X	X	X		X	X
Campephagidae Cuckoo-shrikes, Trillers												
Coracina maxima	Ground Cuckoo-shrike	LC		X	X	X			X			
Coracina novaehollandiae	Black-faced Cuckoo-shrike	LC	X	X	X	X	X		X	X	X	X
Lalage tricolor	White-winged Triller	LC			X		X					

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Artamidae Woodswallows, Butcherbirds, Currawongs												
Artamus cinereus	Black-faced Woodswallow	LC		X	X	X	X		X	X		X
Artamus cyanopterus	Dusky Woodswallow	LC		X	X	X	X	X			X	X
Artamus personatus	Masked Woodswallow	LC		X					X		X	X
Cracticidae Currawongs, Magpies & Butcherbirds												
Cracticus nigrogularis	Pied Butcherbird	LC		X	X	X	X			X		X
Cracticus tibicen	Australian Magpie	LC		X	X	X	X	X			X	X
Cracticus torquatus	Grey Butcherbird	LC		X	X	X	X	X	X	X	X	X
Strepera versicolor	Grey Currawong	LC	X	X	X	X	X	X		X	X	X
Corvidae Ravens, Crows												
Corvus bennetti	Little Crow	LC		X		X						X
Corvus coronoides	Australian Raven	LC	X	X	X	X	X	X	X	X	X	X
Corvus orru	Torresian Crow	LC				X						X

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Motacillidae Old World Pipits, Wagtails												
Anthus australis	Australian Pipit	LC		X	X	X					X	

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Estrilidae Grass Finches & Mannikins												
Taeniopygia guttata	Zebra Finch	LC			X							
Dicaeidae Flowerpeckers												
Dicaeum hirundinaceum	Mistletoebird	LC			X	X	X				X	X
Hirundinidae Swallows, Martins												
Cheramoeca leucosternus	White-backed Swallow	LC				X	X		X		X	X
Hirundo ariel	Fairy Martin	LC										X
Hirundo neoxena	Welcome Swallow	LC			X		X					
Hirundo nigricans	Tree Martin	LC		X	X	X	X			X	X	X
Sylviidae Old World Warblers												
Cincloramphus cruralis	Brown Songlark	LC										
Cincloramphus mathewsi	Rufous Songlark	LC					X					
Zosteropidae White-eyes												
Zosterops lateralis	Grey-breasted White-eye	LC				X	X				X	X

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Mammalia												
Tachyglossidae Echidnas												
Tachyglossus aculeatus	Echidna	LC	X	X	X	X	X	X			X	
Dasyuridae Carnivorous Marsupials												
Ningaui ridei	Wongai Ningaui	LC			X		X					
Ningaui sp.	Ningaui	LC						X				
Ningaui yvonneae	Southern Ningaui	LC		X		X	X		X	X	X	X
Sminthopsis crassicaudata	Fat-tailed Dunnart	LC		X	X	X	X	X				
Sminthopsis dolichura	Little long-tailed Dunnart	LC		X	X	X	X	X	X	X		X
Sminthopsis gilberti	Gilbert's Dunnart	LC						X				
Burramyidae Pygmy Possums												
Cercartetus concinnus	Western Pygmy-possum	LC		X	X	X	X	X	X	X	X	X

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Macropodidae Kangaroos, Wallabies												
Macropus fuliginosus	Western Grey Kangaroo	LC	X	X	X	X	X				X	X
Macropus robustus	Euro	LC		X	X	X						
Macropus rufus	Red Kangaroo	LC				X	X			X		
Molossidae Freetail Bats												
Austronomus australis	White-striped Freetail-bat	LC			X		X					
Ozimops petersi	Inland Freetail-bat	LC			X			X				
Vespertilionidae Ordinary Bats												
Chalinolobus gouldii	Gould's Wattled Bat	LC					X	X				X
Chalinolobus morio	Chocolate Wattled Bat	LC			X			X				
Nyctophilus geoffroyi	Lesser Long-eared Bat	LC			X			X				
Nyctophilus gouldi	Gould's Long-eared Bat	LC			X							
Nyctophilus major tor	Central Long-eared Bat	P4						X				
Scotorepens balstoni	Inland Broad-nosed Bat	LC			X			X				

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Vespadelus regulus	Southern Forest Bat	LC			X			X				

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Muridae Rats, Mice												
Mus musculus	House Mouse	Introduced		X	X		X	X	X		X	X
Notomys alexis	Spinifex Hopping-mouse	LC						X				
Notomys mitchellii	Mitchell's Hopping-mouse	LC		X	X		X	X			X	X
Pseudomys bolami	Bolam's Mouse	LC			X	X	X				X	X
Pseudomys hermannsburgensis	Sandy Inland Mouse	LC		X	X	X						
Pseudomys sp.	Native Rodent	LC						X				
Canidae Dogs, Foxes												
Canis lupus dingo	Dingo	LC					X				X	
Canis lupus familiaris	Dog	Introduced										
Vulpes vulpes	Red Fox	Introduced			X							
Felidae Cats												
Felis catus	Cat	Introduced									X	X

Class Family *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Bovidae Horned Ruminants *Capra hircus*	Goat	Introduced										

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Camelidae Camels												
Camelus dromedarius	Dromedary, Camel	Introduced										
Leporidae Rabbits, Hares												
	Rabbit	Introduced	X									