Hinge Iron Ore Study
Vegetation and Flora Survey

May 2013

Prepared for
Karara Mining Ltd

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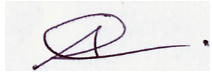
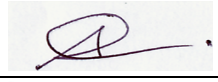
A	18/12/2012	J. Russell	S. Walker	
B	25/01/2013	J. Russell	S. Walker	
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Abbreviations

Abbreviation	Definition
Astron	Astron Environmental Services
Bennett	Bennett Environmental Consulting
BIF	Banded Ironstone Formation
BoM	Bureau of Meteorology
CALM	Department of Conservation and Land Management
DEC	Department of Environment and Conservation
DSEWPC	Department of Sustainability, Environment, Water, Population and Communities.
EPA	Environmental Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
FCT	Floristic Community Type
GML	Gindalbie Metals Limited
GPS	Geographic Positioning System
ha	hectare
IBRA	Interim Biogeographic Regionalisation for Australia
IPP	Invasive Plant Prioritisation
km	kilometre
KIOP	Karara Iron Ore Project
KML	Karara Mining Limited
Ltd	Limited
m	metre
MGA	Map Grid of Australia
mm	millimetre
NRMMC	Natural Resource Management Ministerial Council
NVIS	National Vegetation Information System
PEC	Priority Ecological Community
PER	Public Environmental Review
PFC	Percentage Foliar Cover
P1	Priority one
P2	Priority two
P3	Priority three
P4	Priority four
TEC	Threatened Ecological Community
TPFL	Threatened and Priority Flora Database (DEC)
SimProf	Similarity profile routine
sp.	Species (singular)
spp.	Species (plural)
Woodman	Woodman Environmental Consulting

Executive Summary

Karara Mining Limited is the operating company for the joint venture between Gindalbie Metals Limited and Anshan Iron and Steel. It is located approximately 320 kilometres north north-east of Perth, consists of an existing and proposed open cut mines, beneficiation plant, rail, water supply and port in Geraldton, for the export of magnetite and hematite. A small open cut mine is proposed at the Hinge prospect.

In August 2012, Karara Mining Limited contracted Astron Environmental Services to undertake a Level 2 vegetation and flora survey and targeted priority flora search in the Hinge survey area (a total area of 761.9 hectares). The field survey was conducted between 24 September and 3 October 2012 in accordance with the requirements of Environmental Protection Authority *Guidance Statement 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* and the Department of Environment and Conservation's "*Recommended Interim Protocol for Flora Surveys of Banded Ironstone Formations of the Yilgarn Craton*. The broad scope of this report is to describe flora, vegetation communities, priority flora and weeds in the Hinge survey area.

Combining data from quadrats and opportunistic collections, 172 taxa from 46 plant families were found, with the most diverse families being Asteraceae, Fabaceae, Myrtaceae and Proteaceae. All of the taxa have previously been recorded in the broader area. This study found slightly lower diversity than other recent regional surveys of similar size. This could be the result of the dry conditions late in the season, which meant many annual taxa had died; or that topography and substrate was less complex than those in other studies.

Aerial photography, along with 24 quadrats and 114 mapping notes, was used to map the floristic community types in the Hinge survey area. Of the 761.9 hectare survey area, approximately 200 hectares can be considered banded ironstone. Using a hierarchical approach to classification, a total of five floristic community types were described on the survey area. These were broadly overlapping with the nine floristic community types previously mapped for the survey area. The main reason for this divergence was that in the previous regional survey, a fire scar that crossed a number of floristic community types had been mapped, adding a complexity that did not exist. Furthermore, over the survey area, four floristic community types (2, 10, 26 and some of 18) were amalgamated because the floristic analysis showed they were similar.

No listed threatened or priority ecological communities were identified following analysis of quadrat data. The low banded ironstone range in the survey area was floristically compared to the three Department of Environment and Conservation identified priority ecological communities found within 50 kilometres of the survey area (Blue Hills (Mount Karara/Mungada Ridge/Blue Hills), Minjar/Gnows Nest and Warriedar Hills/Pinyalling).The vegetation on the ironstone ridge and slopes in the survey area were highly dissimilar to all three priority ecological communities.Vegetation throughout the survey area was in very good condition. Disturbance was limited and included: a fire in the last 10 years; over 100 years of sheep grazing; and minor infrastructure.

A targeted flora search was conducted over the whole of the survey area. Eight species of priority flora were found including *Drummondita fulva* P3, *Dicrastylis linearifolia* P3, *Grevillea globosa* P3, *Melaleuca barlowii* P3, *Micromyrtus trudgenii* P3, *Persoonia pentasticha* P3, *Prostanthera* sp. Karara (D. Coultas & K. Greenacre Opp 8) P1, *Psammomoya implexa* P3. All individuals of the P1 species, *Prostanthera* sp. Karara (D. Coultas & K. Greenacre Opp 8), were flagged. The densities of these species are shown across the whole survey area and the probability of finding them in each floristic community type is given.

Five introduced species were found within the survey area; all of them being annual and at very low densities. These were **Brassica tournefortii, *Cuscuta epithymum, *Erodium aureum, *Mesembryanthemum nodiflorum,* and **Wahlenbergia capensis*.

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1 Introduction

1.1 Project Background

Karara Mining Limited (KML) is the operating company for the joint venture between Gindalbie Metals Limited (GML) and Anshan Iron and Steel. The existing Karara Iron Ore Project (KIOP) consists of an open cut mine, beneficiation plant, rail, water supply and port (Geraldton) facilities, for the export of magnetite and hematite. Mining is currently being undertaken at Karara Hill, located approximately 320 kilometres (km) north north-east of Perth.

A number of vegetation and flora surveys have been previously conducted in relation to the KIOP. This includes a Public Environmental Review (PER) that was prepared in 2007 (GML 2007), numerous flora and vegetation surveys: Bennett Environmental Consulting (Bennett)(2004), Botanica (2011), Botanica (2012) and Woodman Environmental Consulting (Woodman) (2007)), and a regional mapping assessment (Woodman 2012). In addition, the Department of Environment and Conservation (DEC) have conducted floristic assessments in the broader region, one of which included the survey area (Markey and Dillon 2008a; Markey and Dillon 2008b).

In August 2012, KML commissioned Astron Environmental Services (Astron) to undertake an (Environmental Protection Authority (EPA)) Level 2 vegetation and flora survey, a targeted priority flora search, and verification of regional mapping in 761.9 hectares (ha) of the Hinge prospect area, located approximately 20 km north-east of Karara. The proposed project is known as the 'Hinge Iron Ore Study' and is hereafter referred to as the 'survey area' (Figure 1).

1.2 Objectives

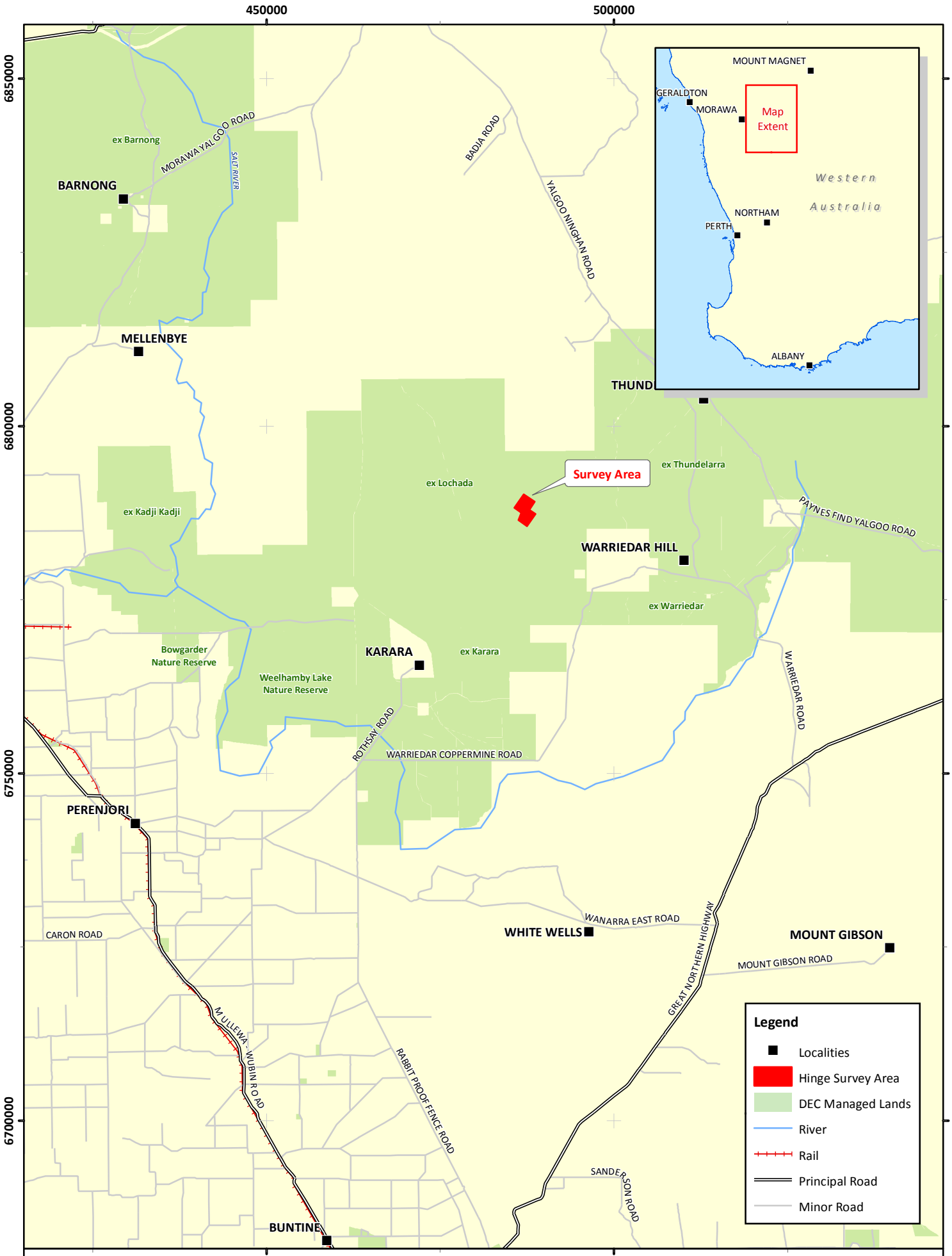
The objectives of the Hinge Iron Ore Study Level 2 vegetation and flora desktop study are to:

- review the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters database for flora of conservation significance and threatened ecological communities (TEC) known, or likely to occur within the survey area
- review the DEC Threatened and Priority Flora Database (TPFL)
- review DEC's NatureMap database for flora
- review the Western Australian Herbarium database for threatened/rare and priority flora known, or likely to occur in the survey area
- review previous reports pertaining to ecological information of the survey area and/or surrounds
- review existing site information.

The objectives of the Hinge Iron Ore Study Level 2 vegetation and flora field survey are to:

- use quadrats, relevés and opportunistic observations to increase understanding of vascular plant diversity and distribution
- define and map floristic community types (FCTs) and other communities present using the regional desktop descriptions previously identified within the '*Regional Flora and Vegetation Survey of the Karara to Minjar Block*' (Woodman 2012) report
- verify FCTs within the survey areas and determine if they correlate with the 2012 regional mapping (Woodman 2012)

- flag all individual threatened and priority one (P1) perennial plant species in the field with red and white surveyors tape
- identify the number of individual species of priority species within each FCT that will be impacted enhance the level of knowledge at the locality scale
- establish an inventory of introduced species in the survey area through opportunistic recordings
- record the location of individual threatened, priority, and introduced plants using the Map Grid of Australia (MGA)50, easting/northing coordinate system.



Karara Mining Ltd.
Hinge Vegetation and Flora Survey

Figure 1: Location of Hinge Survey Area

astron environmental services

Author: M. Gardener	Date: 12-12-2012
Drawn: C. Dyde	Figure Ref: 16002-12FMV1RevA_20121212_Fig01

Datum: GDA 1994 - Projection: MGA Zone 50

0 5 10 15 20 25 30 Km

N

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1.3 Environmental Context

1.3.1 Climate and Seasonal Conditions

The survey area is located within the Yalgoo subregion of Western Australia. The climate of this region is classified as Mediterranean, semi-arid to arid and warm, with two distinct seasons: a hot and dry summer (December to February) and a mild and wet winter (June to August) (Payne et al. 1998; Markey and Dillon 2006). The region is characterised by a moderately variable rainfall, with rainfall events being restricted to local areas rather than being widespread (Markey and Dillon 2006). The majority of all rainfall received occurs during winter months and is typically derived from rain-bearing cold fronts associated with the westerly wind system. Irregular summer rainfall occurs in association with thunderstorms and heavy downpours that are the remnants of tropical cyclones (Markey and Dillon 2006).

Climatic data was obtained from the nearest public weather station at Morawa Airport (Station 8296), which is approximately 85 km south-west of the survey area. Based on 15 years of data, the mean annual rainfall at this location is 289 millimetres (mm) with May to September being the wettest months (Bureau of Meteorology (BoM) 2012). The mean maximum temperatures exceed 30 °C between November and March and drop to 20 °C or below during the winter months (Figure 2). Rainfall prior to the survey period was below average in all months except for June when there was 97 mm (Figure 2).

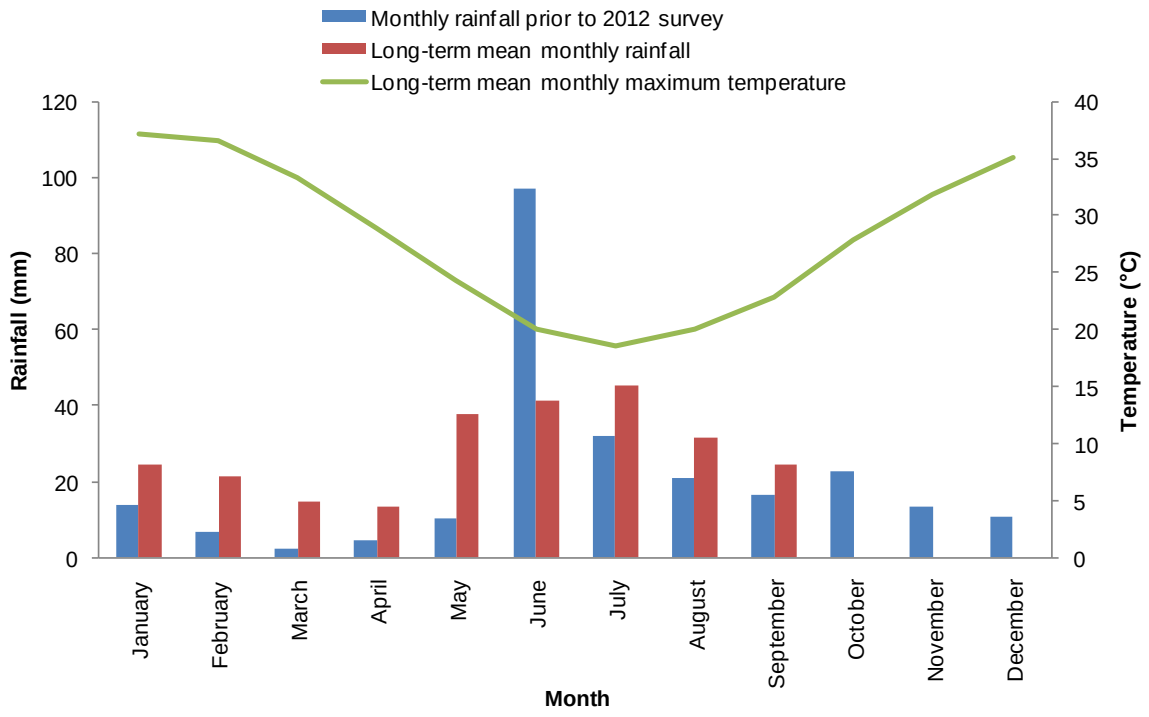

Figure 2: Climate data for Morawa Airport (Station 8296) (BoM 2012).

1.3.2 Geology and Landform

The main continental blocks that make up the Australian continent are the Yilgarn, Pilbara and Gawler Cratons and the Wilyama Block (Lane 2004). Broadly, the survey area is located within the Murchison Province of the Yilgarn Craton. The Yilgarn Craton is comprised of material from the Archaean (2.5 billion years ago) to Cainozoic ages (66 million years ago to present) and bound in the west by the Murgoo Gneiss Complex of the Western Gneiss Terrane and to the east by the Southern Cross Province. The Archaean rocks of the Murchison and Southern Cross Provinces comprise linear to arcuate, north to north-west trending greenstone belts, which have been intruded by granitoid rocks. The greenstones contain volcanic rocks, felsic volcanic rocks and metasedimentary rocks including cherts and banded iron formation (BIF), and the granitoid rocks contain adamellites, granite, gneiss and migamite (Payne et al. 1998).

The survey area is located within the Yalgoo-Singleton Archaean greenstone belt. The survey area contains a low ridge with gentle slopes oriented in a north easterly orientation. The soils in the region are derived from old lateritic profiles, approximately 50 million years ago, at a time when the climate was wetter. The ridge consists of shallow stony soils (< 50 centimetres), with some outcropping flanked by alluvial and sand plains.

1.3.3 Surface Water

The Murchison and Greenough Rivers are the two principal drainage systems in the Yalgoo bioregion and drain into the Murchison/Gascoyne, Yarra Yarra and Ninghan catchment areas. The Murchison River extends approximately 820 km from the southern slopes of the Robinson Ranges (75 km north of Meekatharra) to the Indian Ocean at Kalbarri. The Greenough River is approximately 340 km in length, spanning from the Woojalong Hills on the Yilgarn Plateau to the Indian Ocean at Cape Burney, 9 km south of Geraldton. Neither of these rivers, nor their tributaries occurs within the survey area (Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) 2009).

There are two wetlands of national significance within the Yalgoo bioregion; Thundelarra Lignum Swamp and Wagga Wagga Salt Lake (Environment Australia 2001). Neither is located within 10 km of the survey area. Two lakes within the bioregion are classified as wetlands of regional significance; Lake Monger, which lies approximately 55 km south of the survey area, and Lake Moore, located approximately 90 km south-east of the survey area.

1.3.4 Land Systems

A land system is an area with a recurring pattern of topography, soils and vegetation (Christian and Stewart 1953). The land system approach to mapping different surface types has been used in all Western Australian regional rangeland surveys. The biophysical resources, including soil and vegetation condition, of the Sandstone-Yalgoo-Paynes region were surveyed between 1992 and 1993, resulting in the delineation of 20 land surface types comprising 76 land systems (Payne et al. 1998). Five of these land systems occur within the survey area (Table 1). The Tallering ridge is flanked by Euchre alluvial plains and Joseph and Yowie sand plains (Appendix A; Table A. 1). Land systems mapping is presented in Appendix A.

Table 1: Distribution of land systems within the survey area and the Yalgoo region (Payne et al. 1998).

Land system	Description	Total area (ha) in the Yalgoo region	Area (ha) within survey area and percent (%) of total
Euchre	Low granite breakaways with alluvial plains and sandy tracts supporting eucalypt woodlands and acacia shrublands.	88,578	111 (0.13)
Joseph	Undulating yellow sandplain supporting dense mixed shrublands with patchy mallees.	217,409	153 (0.07)
Tallering	Prominent ridges and hills of banded ironstone, dolerite and sedimentary rocks.	31,486	187 (0.59)
Tealtoo	Level to gently undulating loamy plains with fine ironstone lag gravel supporting dense acacia shrublands.	19,215	18 (0.09)
Yowie	Loamy plains supporting shrublands of mulga and bowgada with patchy wanderrie grasses.	357,418	293 (0.08)

1.3.5 Bioregional Summaries

1.3.5.1 Interim Biogeographic Regionalisation for Australia

The Interim Biogeographic Regionalisation for Australia (IBRA) is a landscape-based approach to classifying the land surface, including attributes of climate, geomorphology, landform, lithology, and characteristic flora and fauna. Specialist ecological knowledge, combined with appropriate regional and continental scale biophysical datasets were interpreted to define and describe these regions (Thackway and Cresswell 1995). Information about each region is used to help determine which ecosystems are adequately protected in the conservation estate. In a 2012 revision, a number of regional changes occurred, including moving the western boundary of the Yalgoo bioregion to the coast, truncating the northern portion of the Geraldton Sandplains bioregion (DSEWPC 2012b). The survey area occurs in the Yalgoo bioregion, of which greater than 30% is represented in the national reserve system (DSEWPC 2012a).

The Yalgoo bioregion represents an interzone between south western bioregions and the Murchison bioregion. It is characterised by *Callitris*, *Eucalyptus salubris*, mulga (*Acacia* aff. *aneura*) and bowgada (*Acacia ramulosa*) open woodlands and scrubs on earth to sandy-earth plains in the western Yilgarn Craton and southern Carnarvon Basin. It is a region rich in ephemeral flora species and occurs in an arid to semi-arid warm Mediterranean climate (DSEWPC 2009).

1.3.5.2 Biodiversity Audit of Western Australia

As part of the National Land and Water Resources Biodiversity Audit, the Department of Conservation and Land Management (CALM, now DEC) conducted an audit of Western Australia's terrestrial biodiversity (CALM 2002). The audit aimed to assess priority for reservation based on the subregions defined in IBRA version 5.1 (Environment Australia 2000). The bioregional summaries (CALM 2002) also categorised ecosystems as 'low', 'medium' or 'high' depending on their priority for reservation in the conservation estate; and those considered to be 'at risk' within each IBRA subregion. Some of these ecosystems listed as 'at risk' were subsequently formally gazetted as TECs under the *Wildlife Conservation Act 1950*. Approximately 10 - 15% of the Yalgoo subregion is represented in the national reserve system (Desmond and Chant 2001).

1.3.6 Broad Scale Vegetation and Flora

The survey area occurs within the Yalgoo sub-region of the Austin botanical district, within the Murchison botanical region. The Murchison region generally coincides with the upper edges of the Yilgarn Block, and is dominated by granite, gneiss and metamorphic geology. It is divided into six sub-regions, but has many vegetation features which are common to all. The region represents a district within the Eremaean Botanical Province, and is a transition zone to the South-West Botanical province, which occurs further south. This transition is expressed as a shift from mulga low woodland in the north, to acacia and eucalypt dominated woodlands in the south (Beard 1976).

The survey area occurs in the south-west of the Yalgoo sub-region. In this area, hills are dominated by *Acacia ramulosa* and *A. acuminata* scrub, mid-slopes are characterised by *A. ramulosa, A. acuminata* and *Melaleuca uncinata*, the sandplains are characterised by *A. ramulosa* and *A. murrayana*. Scattered *Callitris* sp. and *Eucalyptus* sp. trees are characteristic of the vegetation in the valleys (Beard 1976). Beard (1976) mapped pre-European vegetation types across the Murchison region at a scale of 1: 1,000,000. The survey area is comprised of only one pre-European vegetation association (Beard 1976), which is summarised in Table 2.

Table 2: Pre-European (Beard 1976) vegetation associations within the survey area.

Beard physiographic unit	**Beard vegetation unit†**	**Vegetation description**	**Total area (ha) in the Yalgoo region**	Area (ha) within survey area and percent (%) of total
Yalgoo	420	Shrublands; bowgada (*Acacia ramulosa*) & jam scrub (*A. acuminata*).	455,432	761 (0.17)

† Numbers representing the Beard vegetation associations are those that have been assigned by Shepherd et al. (2002).

1.3.7 Vegetation and Flora Conservation Categories

Commonwealth and Western Australian regulatory authorities maintain databases of the locations and conservation status of significant ecological communities and flora species in Western Australia.

The EPBC Act provides a legal framework to protect and manage matters of national environmental significance including listed ecological communities and flora species. Listed ecological communities and flora species are allocated a conservation category, which are outlined in Appendices B and C.

A TEC is an ecological community that has been identified by the Commonwealth Minister for Environment as being subject to processes that threaten to destroy or significantly modify it across much of its range. TECs are listed under one of four categories as outlined in Appendix B. The DEC also maintains a list of priority ecological communities (PEC). PECs are assigned one of four priority rankings according to the criteria outlined in Appendix B. Unlike TECs, PECs are not formally recognised by the Minister for Environment but are considered significant by regulating authorities during environmental impact assessment.

Under Western Australian legislation, all native flora are protected and it is an offence to 'take' protected flora. To 'take' includes the removal of seeds or injuring plants. The *Wildlife Conservation Act 1950* also provides for native plant species to be specially protected because they are under identifiable threat of extinction, are rare, or otherwise in need of special protection. Such specially protected flora is considered under the Act to be threatened.

Due to the diversity of Western Australia's flora, many species are known from only a few collections or locations, but have not been adequately surveyed. Such flora may be rare or threatened, but cannot be considered for declaration as threatened flora until adequate surveys have been undertaken. These flora species are included on a supplementary conservation list called the priority flora list. Three categories of priority flora cover these poorly known species. A fourth category of priority flora includes species that have been adequately surveyed and are considered to be rare but not currently threatened and a fifth category of priority flora includes conservation dependent species. Western Australian flora conservation categories are described in Appendix C.

1.3.8 Introduced Flora Categories

The Australian Weed Strategy (Natural Resource Management Ministerial Council (NRMMC) 2007) identifies 'Weeds of National Significance'. Weeds of National Significance are invasive, with the potential to impact primary industry and/or environmental and social values.

The management of introduced flora in Western Australia is primarily regulated through the provisions of the *Agriculture and Related Resources Protection Act 1976*, and the *Biosecurity and Agriculture Management Act 2007*. A list of Declared Plants has been gazetted under the *Agriculture and Related Resources Protection Act 1976*. Listed species are allocated one of five priority ratings that define the required level of management (Appendix D).

The invasive plant prioritisation (IPP) process (DEC 2011) was developed to supersede the Environmental Weed Strategy for Western Australia (CALM 1999). The prioritisation process considers both a "species-led" and a "site-led" approach to priority setting for weed management on DEC managed lands. The IPP process rating system is presented in Appendix D, Table D.2. The prioritisation results for individual weeds should be utilised as a guide only and does not diminish any other requirements (statutory or otherwise).

1.3.9 Land Tenure and Use

The survey area is located in the Shire of Perenjori on the former Lochada Station (Figure 1). Between 2000 and 2004, a number of pastoral leases including Lochada, Kadji Kadji, Karara, Warriedar, and Thundelarra were transferred to unallocated Crown land with interim management by the DEC. The DEC took over the management of Lochada in 2000 and the sheep were removed at the end of 2001. The ex-station is currently managed by the DEC for conservation purposes under Section 33 (2) of the *Conservation and Land Management Act 1984*. Two mining tenements held by KML make up the survey area. E59/817 and E59/1170 were granted on 3 April 2001 and 1 November 2005 respectively.

2 Methodology

2.1 Desktop Assessment

2.1.1 Database Searches

Database searches were conducted in August 2012, to identify conservation significant flora communities and flora species within the survey area, or known from a 50 km radius listed under the *Wildlife Conservation Act 1950* and the EPBC Act. The search details are summarised in Appendix E.

2.1.2 Literature Review

A number of vegetation and flora surveys have been conducted within 100 km of the Hinge survey area. A selection of the reports from these surveys was reviewed to compare vegetation and flora values and include:

- Astron Environmental Services 2012a. Karara Expansion vegetation and flora survey. Consultant's report prepared for Karara Mining Ltd.
- Astron Environmental Services 2012b. Karara Mungada Ridge vegetation and flora survey. Consultant's report prepared for Karara Mining Ltd.
- Botanica 2012. Level 2 flora and vegetation survey and priority flora search of the Shine Project. Consultant's report prepared for Karara Mining Ltd.
- Woodman Environmental Consulting 2012. Regional flora and vegetation survey of the Karara to Minjar Block. Consultant's report prepared for Karara Mining Ltd.
- Botanica 2011. Level 1 flora and vegetation survey for the Jasper Hill and Hinge. Consultant's report prepared for Karara Mining Limited.
- Markey, A.S., and Dillon, S. J. 2008a. Flora and vegetation of the banded iron formation of the Yilgarn Craton: Yalgoo. Department of Environment and Conservation, Perth.
- Markey, A.S., and Dillon, S. J. 2008b. Flora and vegetation of the banded iron formation of the Yilgarn Craton: central Tallering Land System. Department of Environment and Conservation, Perth.
- Woodman Environmental Consulting 2007. Karara-Mungada Project survey area flora and vegetation. Consultant's report prepared for Gindalbie Metals Limited.
- Bennett Environmental Consulting 2004. Flora and vegetation Blue Hills. Consultant's report prepared for ATA Environmental.
- Paul Armstrong and Associates. 2003. Vegetation assessment and rare flora search between Perenjori and Mt Gibson. Consultant's report prepared for Mount Gibson Iron Limited.

Where these reports included part of a Level 2 survey component, they were reviewed to determine the size of the survey area, and the number of vascular plant species, priority flora species, PECs and TECs that were recorded.

2.2 Vegetation and Flora Survey

2.2.1 Field Survey

The field survey was undertaken in accordance with the requirements for a Level 2 assessment outlined in the EPA's Position Statement 3: *Terrestrial Biological Surveys as an Element of Biodiversity Protection* (2002), and Guidance Statement 51: *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA 2004), and DEC's *Recommended Interim Protocol for Flora Surveys of Banded Iron Formations (BIF) of the Yilgarn Craton* (CALM, 2007)

Information acquired during the desktop study assisted in the design of the field survey. Pre-survey planning involved the examination of 1: 10,000 scale aerial photography of the survey area. The number and location of quadrat sites were determined based on the following criteria:

- minimum of two quadrats per vegetation unit except those confined to a small area (EPA 2004)
- FCTs with larger heterogeneity should have proportionally more quadrats (CALM 2007)
- the inclusion of target areas that are prospective for listed ecological communities and flora species identified during the desktop study
- the availability of safe access to the site.

In the survey area, Woodman (2012) sampled a total of nine quadrats in six of the eight FCTs, whereas this survey sampled 24 quadrats in all FCTs except 17, which was sampled using a mapping note because of its small area (Table 3). Locations of Astron and Woodman transects are shown in Figure 3.

Table 3: Summary of FCTs intersecting with the Hinge survey area and quadrats sampled.

Woodman (2012) FCT code	Area (ha)	Number of Woodman (2012) quadrats	Number of Astron quadrats (2012)
2	95.5	2	5
9	156.9	1	3
10	15.9	1	2
13	157.4	2	4
17	1.4	0	0*
18	57.0	1	2
19a	216.8	2	4
26	47.2	0	2
32	13.7	0	2

* A mapping note was taken in FCT 17.

The field survey was conducted over one field visit from 24 September to 3 October 2012. The field team included Mark Gardener (Supervising Botanist), Natalie Krawczyk (Botanist), Jo Smartt (Botanist) and Louise Kitscha (Botanist). All of the team are experienced in conducting Level 2 vegetation and flora surveys. Natalie Krawczyk and Jo Smartt were team members in the prior Karara surveys in Mungada Ridge and Expansion areas during August/September 2012 and were therefore especially familiar with the flora.

A total of 24 permanent quadrats (see Figure 3 for locations) measuring 20 metre (m) x 20 m (as recommended by CALM 2007) were surveyed in representative vegetation units within the survey area. The north-west, south-west, north-east and south-east corners of each quadrat were aligned with the aid of an optical square and measuring tapes, and each corner was marked with a galvanised steel fence dropper. A permanent identifying label was attached to the north-west fence dropper.

The following information was collected at each quadrat:

- **Location** – coordinates measured using a handheld GPS (MGA50, GDA94) at each corner.
- **Recorder and date** – a list of the personnel involved in sampling the quadrat and the date.
- **Species** – all vascular plant species present. To ensure a thorough search, each quadrat was traversed systematically at approximately two metre intervals. Species that could not be identified in the field were collected for later identification at the Astron herbarium or Western Australian Herbarium.
- **Percentage Foliar Cover** – the percentage foliar cover (PFC) was estimated for each species.
- **Vegetation description** – vegetation was described according to the Australian Soil and Land Survey Field Handbook (The National Committee on Soil and Water 2009) vegetation classification system (Appendix F) and National Vegetation Information System (NVIS) level 5: association level. At this level, up to three dominant genera for each of the upper, mid and ground strata are categorised based on dominant growth form, cover and height (DSEWPC 2003).
- **Vegetation condition** – vegetation was described according to Keighery (1994) (Appendix F).
- **Photographs** – a photograph of the vegetation was taken from the north-west corner of each quadrat.

The size of quadrats and information collected addresses requirements of the DEC's "*Recommended Interim Protocol for Flora Surveys of Banded Iron Formations (BIF) of the Yilgarn Craton"* (CALM 2007).

2.2.2 Classification of Astron Quadrats

Vegetation was mapped at community level and is based on floristics and land systems as per EPA Guidance Statement No. 51 (EPA 2004). Quadrats were classified by creating a dendrogram based on Sorensen's index of similarity (equivalent to Bray-Curtis index, with species presence-absence data only (Magurran 2004)). The dendrogram was created using the Group Average Method ('UPGMA'), implemented in Primer v6 (Clarke and Gorley 2006). Primer also allowed for the objective classification of quadrats into statistically significant clusters using the SimProf test (Clarke et al. 2008). Quadrats were then mapped, including the classification derived from the SimProf results and overlaid with the FCTs (Woodman 2012).

2.2.3 Vegetation Description Mapping

Using a combination of data from quadrats, mapping notes and opportunistic collections, a species list was developed for the survey area. This list is also expressed as a species by FCT matrix. A floristic assessment has previously been conducted and used to define and map FCTs across the broader region (Woodman 2012). An A3 colour aerial photograph at 1:10,000 scale with the FCT mapping marked, and a handheld computer device (Trimble) with Geographic Positioning System (GPS) and ArcPad Geographic Information System with the survey area uploaded were used in the field to ground-truth and verify the mapping boundaries.

To verify FCTs from (Woodman 2012) regional mapping, an independent method was used to develop maps. Vegetation maps were created by integrating a number of elements in hierarchical order: 1) land system mapping by Payne et al. (1998) based on topography and substrate; 2) similarity of species profile (presence-absence) of Astron quadrats; 3) the presence-absence of *Eucalyptus* species (spp.); and 4) habit of *Eucalyptus* spp. (i.e. tree (*Eucalyptus loxophleba*) or mallee (*E. kochii, E. brachycorys*, *E. celastroides*, *E. leptopoda*). Further, information on boundaries came from satellite imagery (2006) and 114 geo-referenced mapping notes (see Appendix G for locations). Each mapping note recorded dominant species in tree and shrub layer, substrate and disturbance history (grazing or fire).

A key question is to determine if the vegetation on the low banded ironstone range running north east through the survey area could be identified as one of the PECs found on similar geology in the region. Using the same methodology outlined in section 2.2.2, species similarity of the three identified PECs (Blue Hills (Mount Karara/Mungada Ridge/Blue Hills), Minjar/Gnows Nest and Warriedar Hills/Pinyalling (downloaded from DEC's NatureMap 2013)) was compared with the survey area. Quadrats from PECs were compared with the fifteen from this survey and five from Woodman (2007).

2.2.4 Targeted Survey

Using the list of conservation significant species compiled from the literature review and database search and FloraBase (WA Herbarium 2012), a booklet containing photographs, habitat information and taxonomic features for each species was compiled for use in the field. Botanists familiarised themselves with all these species at the WA Herbarium before going into the field.

Although guidance is not explicit (EPA 2004), regulators need to know which threatened or priority species are present, their distribution over the survey area and an estimation of the number of individuals.

In order to get total coverage of the 761.9 ha survey area, a grid of parallel south-east to north-west lines 100 m apart was superimposed over the survey area and uploaded as a shape file to the Trimble units. Additionally, traverses on foot were made up and down all existing drill lines and pads and opportunistic records of priority flora and weeds were also made when walking to quadrat locations (Appendix G). In the proposed pit area the lines were reduced to approximately 50 m apart and were undertaken parallel to the ridge (i.e. south west to north east) to enhance the probability of finding all populations (Appendix G). It was calculated that at least 156 km was traversed on the survey area.

Red-and-white striped flagging tape was used to mark threatened and priority P1 and P2 flora. Where large populations of these species were encountered, record points were collected across a representative area of the population. Specimens of each priority flora species were collected for verification and lodgment at the WA Herbarium as per flora licensing requirements.

2.2.5 Mapping and Density Estimates of Priority Flora

Our estimates of plant densities were adjusted to account for a decline in plant detectability with distance from the transect. Hence, observed densities were multiplied by this factor in order to derive an estimated density of individuals per hectare. This information was visualised by creating coloured density kernels in which the density of plants (plants per ha) was estimated for each 10 m x 10 m cell of the landscape. The result is a "smoothing" of values between recorded points. This estimation was performed using the "Density" function within ArcGIS 9.3's Spatial Analyst.

Probability of occurrence within an FCT was calculated first by overlaying priority flora locations on modified FCTs to get presence/absence. When taxa were present in the FCT, mean density of taxa within each FCT was calculated by dividing total abundance by total area (ha) of FCT. This number was used to estimate probability of occurrence (<1 low, 1-5 Medium, 5-20 high, >20 very high).

2.2.6 Specimen Identification and Data Entry

Plant specimens not able to be positively identified in the field were collected, given a unique collection number and pressed. Specimens were air-dried and identified by Astron botanists Vanessa Clarke, Raimond Orifici, Janelle Atkinson, Alice Bott and Jessie-Leigh Brown. Specimens were identified to the fullest possible classification (i.e. species, subspecies or variant) dependant on the availability of the vegetative and reproductive parts.

Data from each quadrat were entered into a customised Access database. Data entry was completed by Astron Botanist Natalie Krawczyk and Graduate Scientist Blake Wood. Due to the names of some taxa having been recently revised, scientific names assigned were updated to reflect current nomenclature (Western Australian Herbarium 2012).

3 Results

3.1 Desktop Assessment

3.1.1 Database Search Results

No TECs listed under the EPBC Act have been recorded within a 10 km radius of the survey area (DSEWPC 2012c). Similarly, no vegetation based TECs or PECs listed on the DEC for the Murchison Bioregion were found within the survey area (DEC 2012a).

Three terrestrial vegetation PECs are listed as occurring within 50 km of the survey area (DEC 2012a):

- Blue Hills (Mount Karara/Mungada Ridge/Blue Hills) vegetation complexes (banded ironstone formation)'. This PEC is regionally restricted and is only found on the Blue Hills Range (P1)
- Minjar/Gnows Nest vegetation complexes (banded iron formation) (P1)
- Warriedar Hills/Pinyalling vegetation complexes (banded iron formation) (P1).

Five Declared Rare Flora (DRF) species, *Acacia woodmaniorum*, *Eremophila viscida, Eucalyptus synandra, Hybanthus cymulosus* and *Stylidium scintillans,* have been previously recorded within 20 km of the survey area (DEC 2012b; DEC 2012c; DEC 2012d; DEC 2012e).

Forty-seven priority flora species have been identified by the DEC database searches as occurring within 50 km of the survey area (Appendix H). Of these, 10 are priority one (P1) species, five are priority two (P2), 25 are priority three (P3) and two are priority four (P4) species (Table 4). Based on habitat preferences and previously recorded proximity to the survey area, combined with the FCT soil descriptions from previous mapping and aerial photograph interpretation of landforms within the survey area, 19 of the listed priority flora species are considered to have the potential to occur (Western Australian Herbarium 2012). Six of these species have previously been recorded within the survey area (Woodman 2012; Table 4). One P3 species, *Melaleuca barlowii*, was not identified on DEC database searches (DEC 2012a, 2012c; DEC 2012d; DEC 2012e) or the EPBC Act Protected Matters Search (DSEWPC 2012c), but has previously been recorded in the survey area (Woodman 2012).

All database search results are provided in Appendix E.

3.1.2 Literature Review

The results of previous reports were compared with the current survey (Table 4). The Yalgoo region has a high vascular plant biodiversity. As expected the number of species increases with area surveyed. Areas with greater topographic and substrate diversity such as Blue Hills had corresponding increased levels of plant diversity.

Table 4: Summary of comparative literature review in the Yalgoo region.

Author (year)/Project Area	Size (ha) and location	Number of sample sites & species	Seasonal conditions	TECs and PECs recorded	Priority flora recorded
This survey	761 ha	24 quadrats, 172 species	Poor	None recorded.	8 (including 4 sterile specimens)
Astron 2012a, Expansion	340. 7 ha	13 quadrats and nine relevés, 167 species	Good	No TEC, but one PEC (Blue Hills) adjacent to the survey area.	6
Astron 2012b, Mungada Ridge	306 ha	27 quadrats and seven relevés, 166 species	Good	No TEC, but one PEC (Blue Hills) adjacent to the survey area.	7
Bennett Environmental Consulting, 2004, Blue Hills	Size not reported. Blue Hills.	29 quadrats, 13 relevé. 211 species.	Average	None recorded.	3 (including 1 sterile specimen)
Botanica, 2011, Jasper Hill and Hinge	4.9 ha. 79.4 km SSE of Yalgoo.	Level 1 survey, no quadrats or relevés. 115 species.	Excellent	None recorded.	3
Botanica, 2012, Shine	646 ha. 69 km SE of Yalgoo.	28 quadrats. 148 species.	Excellent	None recorded.	3
Paul Armstrong and Associates, 2003, Perenjori to Mt Gibson	85 km long haul road. Perenjori to Mount Gibson.	Number of sites not reported. 354 species.	Average	None recorded.	6
Woodman Environmental Consulting, 2007, Mungada Ridge	Karara – Mungada, 60 km NE of Perenjori.	156 quadrats. 509 species +	Poor	None recorded.	21
Woodman 2012, Regional Mapping+	Regional mapping (more than 75,000 ha)	990 quadrats. 640 species	Mixed	None recorded	35

Author (year)/Project Area	Size (ha) and location	Number of sample sites & species	Seasonal conditions	TECs and PECs recorded	Priority flora recorded
Markey, A.S., and Dillon, S. J. 2008a, Yalgoo Region - Yalgoo	Yalgoo area – Gnows Nest Range, Wolla Wolla and Woolgah-Wadgingarra hills.	55 quadrats, 243 species	Mixed	None recorded	5
Markey, A.S., and Dillon, S. J. 2008a, Yalgoo Bioregion - Tallering	Yalgoo bioregion – Tallering Landsystem	103 quadrats, 414 species	Mixed	None recorded	15

+ includes the combined results of Markey and Dillon (2006), Markey and Dillon (2008a), and Markey and Dillon (2008b)

3.1.2.1 'At Risk' Ecosystems

Desmond and Chant (2001) listed 12 ecosystems characterised by flora or vegetation traits as being 'at risk' in the Yalgoo subregion. Based on the defining land systems, habitats and/or soils of these ecosystems, it is considered unlikely that any of these would occur in the survey area.

3.1.2.2 Reservation Priority

Desmond and Chant (2001) listed 83 pre-European (Beard 1976) vegetation units in the Yalgoo subregion as being of priority for reservation in the conservation estate. Of these vegetation associations, 51 were rated as high priority, 10 of medium priority and 22 of low priority for reservation. Vegetation unit 420 (Beard 1976), which covers the whole of the survey area, has a high reservation priority.

3.2 Vegetation and Flora Survey

3.2.1 Field Survey

Using a combination of data from quadrats, mapping notes and opportunistic collections, a species list was developed for the survey area. Combining data from quadrats, vegetation mapping and opportunistic collections, 172 taxa from 46 families were found with the most diverse families being Asteraceae, Fabaceae, Myrtaceae and Proteaceae (Appendix I). A species list has also been presented in a modified FCT by species matrix (Appendix J). Dry conditions meant many perennial taxa were not flowering and annual taxa had died resulting in almost 25% of the collected taxa not being able to be fully confirmed. All of the taxa recorded have been previously recorded in the broader area. Due to the inability to fully identify a number of the plant collections, the species list is representative of the regional flora but is restricted in the total number of taxa presented.

Raw data from the 24 quadrats is presented in Appendix K. A statistical classification of quadrats based on vegetation composition is presented in Appendix L and Figure 3. This classification is then used to support the vegetation mapping.

3.2.2 Vegetation Mapping

A mapping stratification process was applied to the survey area using a combination of information from the aerial photography, land system mapping, quadrats, and the presence/absence of mallees or trees. The resultant map showed good fidelity with the previous mapping (Woodman 2012) although only five FCTs were mapped compared to the previous (Woodman 2012) nine. The main reason for this divergence was that FCT 18 was actually a fire scar across a number of mapping units and was dissolved. Appendix M maps the fire scar over the survey area. Floristic composition of Astron quadrats were classified using Sorensen's index of similarity. Quadrats with a similar species composition have the same colour (Figure 3). FCTs 9, 17 and some of 18 were amalgamated to FCT 9 because they were floristically similar. Similarly, FCTs 2, 10 and 26 were amalgamated to become FCT 2. Although FCT 13 was also found to be floristically similar to this second group (FCT 2), FCT 2 is unique from FCT 13 because of the absence of *Eucalyptus* species. Table 5 and Figure 3 shows these changes and gives a summary of substrate and dominant species defining these modified FCTs based on data from the Astron survey area. Plant species composition on the low banded ironstone formation on the survey area (quadrats from modified FCT 2 and 13) and the three adjacent PECs (Blue Hills (Mount Karara/Mungada Ridge/Blue Hills), Minjar/Gnows Nest and Warriedar Hills/Pinyalling) were highly dissimilar (see dendrograms and cluster diagrams in Appendix L).

Table 5: Modified FCTs – substrate and dominant species.

Modified FCTs	Amalgamated	Area (ha)	Substrate	Dominant species defining FCT
2	2,10, 26	207.9	BIF slopes and ridges. Ironstone outcrops and ironstone gravel. Silty clay loam.	Very sparse *Acacia ramulosa* var. *ramulosa*, *Acacia acuminata*, *Acacia sibina* shrubs over sparse *Aluta aspera* subsp. *hesperia, Philotheca sericea* shrubs.
9	9, 17 plus some of 18	208.4	Flats. Sand plain with little gravel. Sandy loam.	Very sparse *Eucalyptus* spp. mallees over very sparse *Acacia ramulosa* var. *ramulosa*, *Acacia latior* shrubs.
13	13 plus eastern side of 9	121.1	Lower slopes and flats. Ironstone gravel. Silty clay loam.	Isolated *Eucalyptus* spp. mallees over very sparse *Melaleuca leiocarpa*, *Acacia ramulosa* var. *ramulosa*, *Acacia acuminata* shrubs over very sparse *Philotheca brucei* subsp. *brucei* shrubs.
19a	Mostly the same	202.3	Alluvial flats. Clay crust with little gravel. Clay loam.	Very sparse *Eucalyptus loxophleba* subsp. *supralaevis* trees over very sparse *oldfieldii* subsp. *?angustifolia, Acacia tetragonophylla* shrubs over very sparse *Ptilotus obovatus*, mixed chenopods shrubs.
32	32 plus some of 19a	22.3	Low rise. Quartz, granite and ironstone gravel. Silty clay loam.	Very sparse *Allocasuarina campestris* trees over very sparse *Acacia acuminata*, *Acacia ramulosa* var. *ramulosa*, *A. tetragonophylla*, *Thryptomene costata* shrubs over very sparse *Borya sphaerocephala* herbs.

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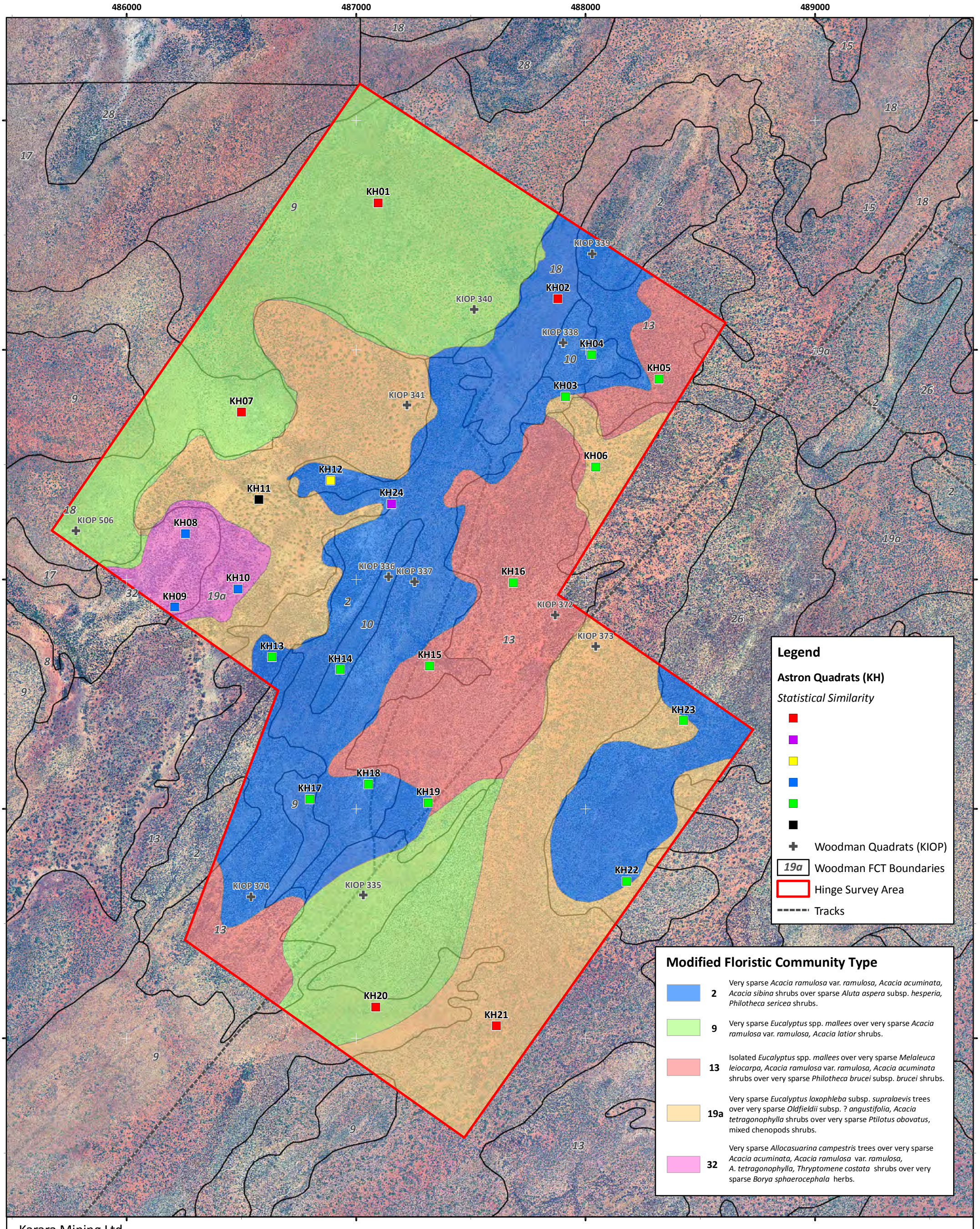

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Figure 3: Modified Floristic Community Types and Quadrat Similarity.

Author: M. Gardener	Date: 12-03-2013	Datum: GDA 1994 - Projection: MGA Zone 50 - Scale: 1:15,000 (A3)
Drawn: C. Dyde	Figure Ref: 16002-12FMV1RevA_20130312_Fig03_VegMap	Metres 0 200 400 600 800 1,000

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3.2.3 Vegetation Condition

The vegetation recorded in the survey area was mostly in 'very good' and a few areas 'excellent' (Keighery 1994) condition throughout (Appendix K).

The main disturbance was historic: between the late 1880s and 2001 Lochada was run as a sheep station. There was strong evidence of heavy grazing particularly on the more fertile alluvial flats (FCT 19a) dominated by *Eucalyptus loxophleba* and chenopod shrubs. In addition, evidence of grazing by rabbits was also observed across the survey area.

As discussed above, approximately one-third of the survey area was burnt in a single fire less than 10 years ago.

The survey area was mostly undisturbed by infrastructure. There is a central access track and more recent mineral exploration tracks and drill holes present.

There were only five introduced species found in the survey area (see Section 3.2.5). They were all ephemeral with limited distributions in low abundance and did not have a detrimental impact on the condition of the vegetation.

3.2.4 Conservation Significance of Flora

All six conservation significant species (Appendix F) previously recorded in survey area were found. Two additional taxa were also found: *Grevillea globosa* P3 and *Persoonia pentasticha* P3 (Table 6). These have been mapped against the modified FCTs (Figure 4) and their locations and photos are in Appendix N. The total number of individuals observed in the survey area are presented in Table 6. Appendix O shows estimated densities of significant flora, per 10 m x 10 m grid cell. Up to 370 plants per ha were recorded for a single 10 m x 10 m cell for each of the eight species. Table 7 shows the average density (an indicator shows probability of occurrence of the eight species) in each of the FCTs (estimated from average density over whole area of FCT). *Grevillea globosa*, *Melaleuca barlowii* P3 and *Persoonia pentasticha* P3 were all uncommon at low densities, therefore predictive power is limited.

Prostanthera sp. Karara (D. Coultas & K. Greenacre Opp 8) P1 and *Psammomoya implexa* P3 are both common in several FCTs but mostly on plains and lower slopes (i.e. 9, 13). *Drummondita fulva* preferred ridges, upper slopes and lower slopes (i.e. 2, 13). *Dicrastylis linearifolia* P3 and *Micromyrtus trudgenii* P3 were restricted to a single FCT (9 and 2 respectively).

Table 6: Flora of conservation significance recorded in the survey area.

Species	Family	Priority status	Total number of individuals observed	Life form
Prostanthera ?sp. Karara (D. Coultas & K. Greenacre Opp 8)	LAMIACEAE	P1	553	Perennial shrub
Drummondita fulva	RUTACEAE	P3	1902	Perennial shrub
Dicrastylis ?linearifolia	LAMIACEAE	P3	663	Perennial shrub
Grevillea ?globosa	PROTEACEAE	P3	32	Perennial shrub
Melaleuca ?barlowii	MYRTACEAE	P3	1	Perennial shrub
Micromyrtus trudgenii	MYRTACEAE	P3	470	Perennial shrub

Species	Family	Priority status	Total number of individuals observed	Life form
Persoonia pentasticha	PROTEACEAE	P3	23	Perennial shrub
Psammomoya implexa	CELASTRACEAE	P3	5553	Perennial shrub

? Specimens were sterile, hence full identification is queried.

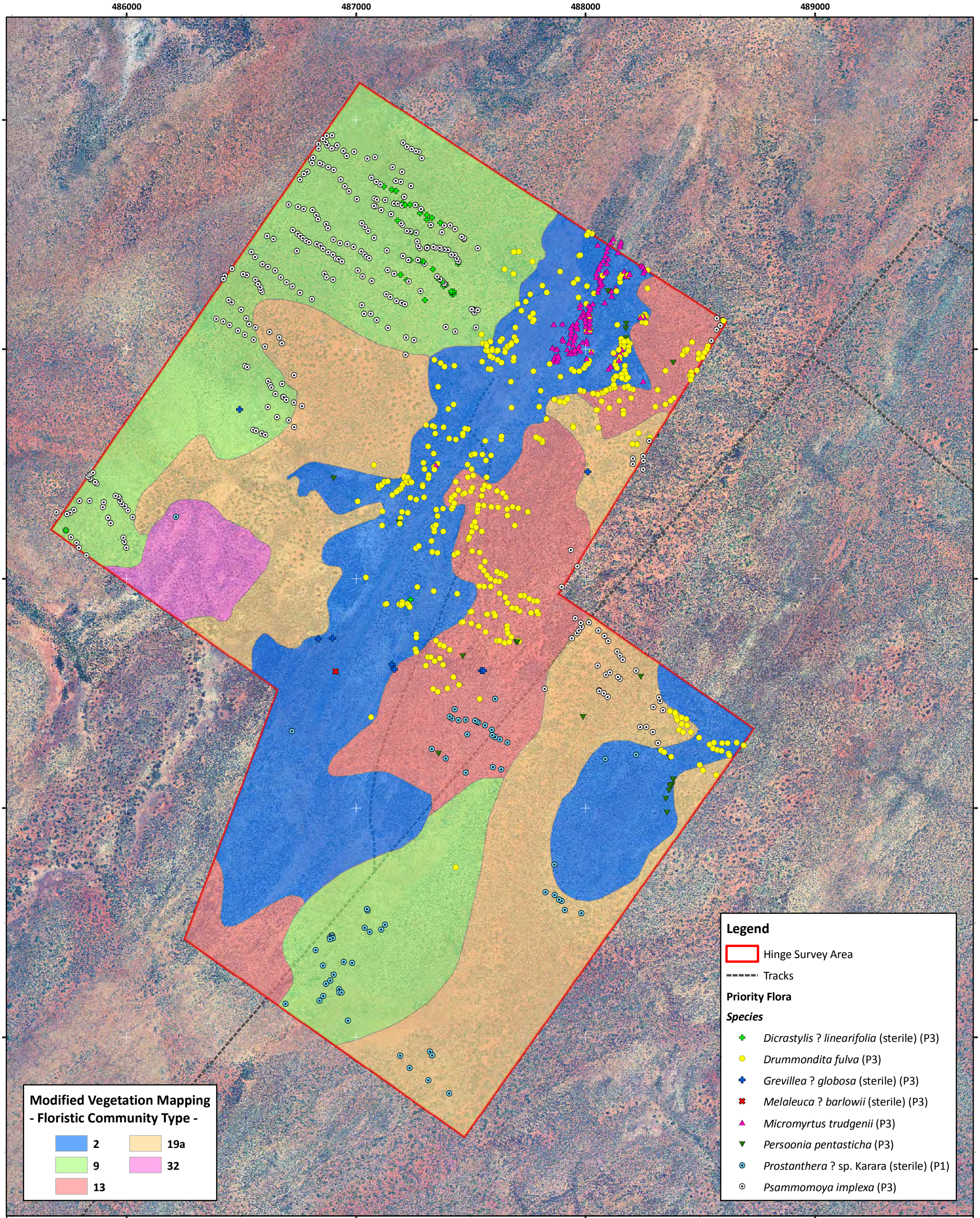

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Figure 4: Priority Flora Locations

astron environmental services

Author: M. Gardener	Date: 12-12-2012	Datum: GDA 1994 - Projection: MGA Zone 50 - Scale: 1:15,000 (A3)
Drawn: C. Dyde	Figure Ref: 16002-12FMV1RevA_20121212_Fig04_PriFlora	Metres 0 200 400 600 800 1,000

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Table 7: Probability of priority flora occurring in each of the FCTs[#].

Taxa	FCT 2	FCT 9	FCT 13	FCT 19a	FCT 32
Prostanthera sp. Karara (D. Coultas & K. Greenacre Opp 8) (P1)	Low	Medium	Medium	Low	Low
Dicrastylis linearifolia(P3)	0	Medium	0	0	0
Drummondita fulva (P3)	High	Low	High	Low	0
Grevillea globosa (P3)	Low	Low	Low	Low	0
Melaleuca barlowii (P3)	Low	0	0	0	0
Micromyrtus trudgenii (P3)	Medium	0	0	0	0
Persoonia pentasticha (P3)	Low	0	Low	Low	0
Psammomoya implexa (P3)	0	Very High	Medium	Medium	0

[#] Probability based on average number of individuals per ha of FCT (<1 low, 1-5 Medium, 5-20 high, >20 very high).

3.2.5 Introduced Flora

No Declared Plants were found in the survey area. Five species of introduced plants were found within the survey area, all of them being annual herbs (Table 8). These included **Brassica tournefortii*, **Cuscuta epithymum*, **Erodium aureum*, **Mesembryanthemum nodiflorum* and **Wahlenbergia capensis*. **Mesembryanthemum nodiflorum* is rated to have a high ecological impact (DEC 2011) and although unknown, **Cuscuta epithymum* is likely to have an impact because it parasitises annual herbs. Introduced flora coordinates are given in Appendix P and are mapped in Appendix Q. Details of the IPP process is presented in Appendix D, Table D. 2.

Table 8: Introduced flora species recorded in the survey area.

Species (common name)	Family	Number of individuals	Floristic Community Types	Ecological impact (Low, Moderate, High, Unknown)
**Brassica tournefortii* (Mediterranean turnip)	BRASSICACEAE	1	2	Limited
**Cuscuta epithymum* (lesser dodder)	CONVOLVULACEAE	+^	2, 19a and 32	Unknown
**Erodium aureum*	GERANIACEAE	8	2	Limited
**?Mesembryanthemum nodiflorum* (slender ice plant)	AIZOACEAE	+^	2	High
**Wahlenbergia capensis* (cape bluebell)	CAMPANULACEAE	1	2	Limited

^ Species were recorded in quadrats as a cover (%), not as individuals.

? Specimens were sterile, hence full identification is queried.

4 Discussion

Within the 761.9 ha survey area, a total of vascular plant 172 taxa were recorded, of which eight were priority flora and five were introduced. The vegetation condition in the survey was mostly in 'very good' and a few areas in 'excellent' (Keighery 1994). Poorer vegetation conditions were recorded in quadrats where a fire had passed in the previous 10 years, and those that had been impacted by grazing. Lochada Station was used for sheep grazing for approximately 100 years and areas of better soil (for example FCT 19a) with palatable grasses (*Austrostipa elegantissima*) and chenopods have been heavily impacted. These values for vascular plant diversity and vegetation condition are comparable to other flora surveys undertaken in the region of similar size and substrate (see Table 4). The EPA (2004) lists a number of possible limitations that may impinge on the adequacy of a vegetation and flora survey. These have been addressed in relation to the current survey in Appendix R. The main limitation of this study was that seasonal conditions were poor and the survey was undertaken in late spring, which resulted in the identity of many perennial specimens not being resolved due to lack of flowers or fruit; and a reduction in number of annual species being recorded.

Historically, Aboriginal people used fire to create a mosaic of small burnt patches of vegetation at different stages of post-fire succession across the landscape (Burrows et al. 2004). However, when land use changed to pastoralism in the late 19th century, fire was largely excluded from this environment. As well as the fire that occurred in the last 10 years, evidence exists on the survey area (such as charcoal remains) that there have been other fires in the last 30 years, although grazing often removes the fuel load and hence suppresses fire. A good indicator of time since last fire, is the size of the widespread white cypress pine (*Callitris columellaris*), which is killed by fire and regrows only from seed. It appears the fire mosaic within the survey area has not been sufficiently frequent to impact white cypress pine recruitment. Other indicators of ecosystem condition, such as the presence of the mallee fowl and the western spiny-tailed skink (Mike Bamford pers. comm. September 2012) show the system is healthy.

Like any theoretical model, vegetation maps are only a two dimensional approximation of a landscape that is shaped by physical and biological factors. Whilst they cannot capture all variation, their simplified representations can assist in management decisions and communication. Using a hierarchical approach to classification, a total of five FCTs were described on the survey area. These were broadly overlapping with the nine FCTs previously mapped on the survey area (Woodman 2012). The main reason for this divergence of results was the differing scales, moving from a regionally based survey to a site specific, local survey over the Hinge project area. Furthermore, Woodman (2012) mapped a fire scar, which crossed a number of FCTs adding a complexity that did not exist. An analysis of Astron quadrats showed that KH01, KH02, KH07, KH20, KH21 are floristically similar and therefore do not warrant separation. Even though the quadrats occur in three different FCTs, they share species suited to post-fire succession.

Another issue was matching the dominant species defining the Woodman (2012) FCTs with Astron's FCTs (Table 5). Woodman's descriptions were based on 990 quadrats at a regional scale, whereas this study used 24 quadrats on a local scale. This was addressed by modifying the description to only include dominant species found in Astron quadrats. Key species such as *Philotheca deserti* subsp. *deserti* (Woodman FCT 18) and *Acacia umbraculiformis* (Woodman FCT 32) were not found. An explanation for this could be the differing scales of survey both spatially and temporally; that the quadrats did not capture some species; and the difficulties associated with identifying sterile specimens. An example of this is FCT 19a where a number of chenopods could not be identified past genus. These probably coincide with Woodman (2012) dominant species such as *Maireana carnosa* and *Enchylaena tomentosa* var. *tomentosa*. Additionally, *Rhagodia drummondii*, *Sclerolaena diacantha*, *Sclerolaena fusiformis* should have been recorded, but were not detected or able to be

identified from material collected for this survey. Conversely, sometimes key species in this study descriptions were absent in Woodman (2012) descriptions. For example, FCT 32 on the eastern side of survey site had the tree *Allocasuarina campestris* as a dominant.

Our approach to mapping the survey area was to use land system as a base layer (topography: crests, slopes, low rises and flats; and substrate: rocky outcrops; gravel cover and soil type). Secondly, similarity of species presence within Astron quadrats were used to simplify previously defined and mapped FCTs. For example: four FCTs (2, 10, 26 and some of 18) were amalgamated to become FCT 2 because the floristic analysis showed they were statistically similar. Thirdly, the presence-absence of *Eucalyptus* spp. was used to separate FCT 2 and FCT 32 out from the other FCTs. Furthermore, this helped redefine the line between FCT 2 and FCT 13. Finally, the habit of the dominant *Eucalyptus* spp. was used to divide FCT 9 and 13 (mallees) and 19a (tree- *E. loxophleba*). A simple key to identify the five modified FCTs in the survey area is provided (Figure 5).

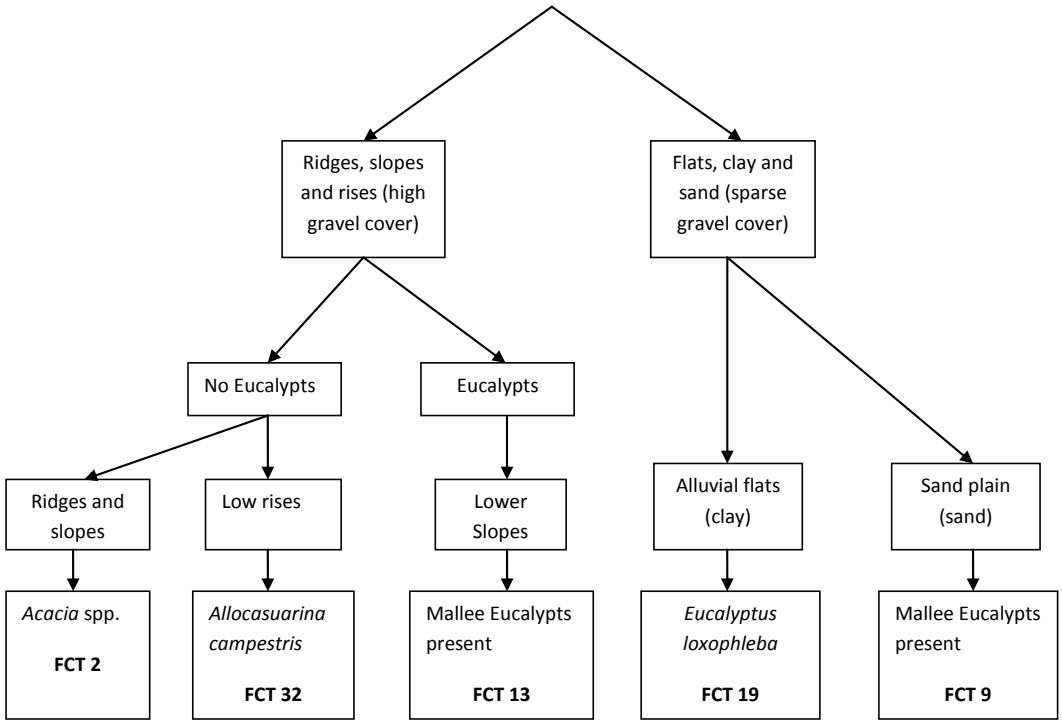

Figure 5: Simple key to identify the five modified FCTs in the survey area.

At the highest level, land system mapping (Payne et al. 1998) identifies some Tallering banded ironstone formation in the survey area. The analysis showed plant species on banded ironstone on the survey area was highly dissimilar to three adjacent PECs (Blue Hills (Mount Karara/Mungada Ridge/Blue Hills), Minjar/Gnows Nest and Warriedar Hills/Pinyalling). Whilst banded ironstone communities across the region had a number of species in common such as *Acacia ramulosa* var. *ramulosa*, *Acacia acuminata*, *Acacia sibina*, *Aluta aspera* subsp. *hesperia* and *Philotheca sericea,* species diversity, particularly of the threatened and priority species, was lower compared to the PECs. The banded ironstone range on the survey area was far lower (about 40 m above the surrounding plain) with little outcropping and had gentle slopes, which may explain differences in species composition. Better seasonal conditions during surveys can result in greater species numbers which could skew data. This could explain the slight dissimilarly between Astron and Woodman quadrats but not the high dissimilarity between the survey area and the PECs.

In this survey, eight species of priority flora were found – all were perennial shrubs. Four of the species were unable to be confirmed because of sterile material. Two new species were found in the survey area (*Grevillea globosa* and *Persoonia pentasticha*); based on previous reports (Appendix N) it is not surprising they are present in the survey area.

A new approach in this report is the visualisation of priority flora densities and probability of occurrence in FCTs. These tools have potential application in management and communication. For example, if new disturbance was planned within the survey area, impacts on priority flora could be predicted with a high level of certainty. The only caveat to this method is that the estimate of total abundance used to calculate densities could be an underestimate. This is because in dense vegetation (e.g. FCT 2), vision was often restricted to less than 25 m, and hence the doubling of the observed abundance to give total abundance is indicative only.

To date, the survey area has a negligible weed component. Five introduced species were found within the survey area, all of them being annual and at very low densities. **Mesembryanthemum nodiflorum* is rated to have a high ecological impact (DEC 2011) but as only a single plant was found and that it is at the edge of its climatic distribution, suggests its potential impact is more likely to be low or moderate. **Cuscuta epithymum* was only found at a few locations in this survey but this is likely the result of poor seasonal conditions and the late survey. However, surveys nearby at Mungada Ridge and Expansion (Astron 2012a, 2012b) found it to be widespread. The ecological impact of it is unknown, but as it is a root parasite on small annuals there is some potential for impact. The invasion of alien plant species is widely accepted to alter ecosystem structure and function, community composition, and species interactions but surprisingly little data conclusively demonstrates this (Gurevitch and Padilla 2004).

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Appendix A: Pre-Land Systems Summary and Mapping

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Table A. 1: Land systems within the survey area (Van Vreeswyk *et al.* 1998).

Land system	Landforms	Soils	Vegetation
Euchre (low granite breakaways with alluvial plains and sandy tracts supporting eucalypt woodlands and acacia shrublands).	Breakaways	Very shallow coarse red clayey sands on granite on plateau; stony soils or shallow duplex on granite on upper footslopes.	Very scattered to scattered mixed low shrubland. Dominant low shrubs include *Thryptomene, Eriostemon* and *Mirbelia* spp. on plateau; very scattered low shrublands on upper footslopes.
	Lower footslopes	Shallow duplex or shallow red earths on granite.	Scattered *Eucalyptus loxophleba* woodland with low halophytic understoreys and scattered low halophytic shrublands occasionally dominated by *Atriplex vesicaria*.
	Sandplains/gravelly sandplains	Deep red or yellow clayey sands on gravel.	Moderately close *Acacia* spp. tall shrublands.
	Stony plains	Shallow red clayey sands on granite.	Very variable, moderately close tall shrublands with acacias, *E. loxophleba* and halophytic and non-halophytic undershrubs.
	Gritty-surfaced plains	Shallow coarse red clayey sands on granite.	Scattered *Acacia quadrimarginea* tall shrubland.
	Loamy plains	Shallow red earths or shallow red clayey sands on hardpan or deep red earths.	Scattered to moderately close eucalypt woodland with acacia tall shrubs and *Amphipogon* spp. or *Monachather paradoxus* perennial grasses.
	Alluvial plains	Shallow duplex or red earths on granite or deep duplex.	Scattered to moderately close eucalypt woodland with 3 halophytic undershrubs, sometimes with *Atriplex* spp. dominant.
	Drainage lines (19a)*	Shallow duplex on granite and shallow red clayey sands.	Very variable vegetation, some have moderately close *E. loxophleba* woodland with *Atriplex* undershrubs.
Joseph (undulating yellow sandplain supporting dense mixed shrublands with patchy mallees).	Gravelly sand sheets	Yellow clayey sands on ironstone gravel at variable depth.	Close mixed shrublands commonly with *Acacia, Melaleuca* and *Allocasuarina* spp. mid and tall shrubs, and low heath shrubs or moderately close to close acacia tall shrublands with an *Amphipogon caricinus* layer.
	Sand sheets (9)*	Deep yellow and red clayey sands.	Close to closed mixed shrublands commonly with acacia and melaleuca tall shrubs and low heath shrubs such as *Eriostemon* and *Thryptomene* sp. or moderately close to close acacia tall shrubland.

Land system	Landforms	Soils	Vegetation
	Loamy plains	Variable shallow red clayey sands on granite, sandy red earths and occasional deep clays.	Scattered eucalypt woodland with tall *Acacia ramulosa* and mixed low shrubs or moderately close *A. ramulosa* tall shrubland.
	Gritty-surfaced plains (32)*	Shallow coarse red clayey sands on granite.	Scattered acacia tall shrublands often with *Borya sphaerocephala* in the ground layer, and very scattered low myrtaceous shrublands.
Tallering (prominent ridges and hills of banded ironstone, dolerite and sedimentary rocks).	Ridges and hills	Shallow stony red earths.	Scattered to moderately close tall shrublands of *A. ramulosa* and other acacias with undershrubs such a *Thryptomene* and *Eriostemon* spp.
	Steeped surfaces	Stony soils.	Very scattered mixed height shrublands with *A. ramulosa* and well developed non-halophytic understoreys.
	Hillslopes (2)*	Shallow red earths and stony red earths.	Scattered to moderately close tall shrublands of *A. ramulosa* and other acacias. Understorey species include *Eremophila* spp., *Ptilotus obovatus, Thryptomene* spp. and *Eriostemon* spp.
	Stony plains/gravelly plains	Shallow stony red earth and red clayey sands with ferruginous gravel.	Scattered to moderately close tall shrublands of *A. ramulosa* and other acacias. Undershrubs include *Eremophila* spp., *Ptilotus obovatus, Thryptomene* and *Eriostemon* spp.
	Narrow drainage tracts	Deep red clayey sands.	Scattered to moderately close tall shrublands of *A. ramulosa* and other species with *Eremophila forrestii* and *Ptilotus obovatus* low shrubs.
Tealtoo (level to gently undulating loamy plains with fine ironstone lag gravel supporting dense acacia shrublands).	Stony plains	Shallow red earths on ironstone gravel or parent rock.	Moderately close acacia tall shrublands.
	Gravelly plains/loamy plains	Deep red earths on ironstone gravel or hardpan at variable depth.	Moderately close acacia tall shrublands with *Acacia aneura* trees and *A. ramulosa*, or eucalypt mallee overstorey, or close *Allocasuarina eriochlamys* subsp. *eriochlamys – A. coolgardiensis* tall shrubland with low and mid myrtaceous shrubs.
	Gravelly hardpan plains	Shallow hardpan loams or red earths on hardpan.	Scattered to moderately close acacia tall shrublands including *A. aneura, A. ramulosa, A. linophylla* and *A. acuminata* subsp. *burkittii*.

Land system	Landforms	Soils	Vegetation
	Gravelly sand sheets (13)*	Shallow red clayey sands with ferruginous gravel on hardpan or gravel.	Moderately close acacia tall shrublands with mallee eucalypts. Understorey species include *Prostanthera, Phebalium* and *Mirbelia* spp.
	Alluvial plains	Deep red earths.	Scattered acacia tall shrublands with *Eucalyptus loxophleba* overstorey and *Atriplex bunburyana* understorey or moderately close acacia tall shrublands.
Yowie (loamy plains supporting shrublands of mulga and bowgada with patchy wanderrie grasses).	Loamy plains	Variable depth red clayey sands, hardpan loams and red earths on hardpan.	Moderately close acacia tall shrublands, dominated by *Acacia ramulosa, A. coolgardiensis, A. acuminata* subsp. *burkittii* or *A. aneura*, often with emergent *A. aneura* trees, or *Callitris glaucophylla* trees, or mallee eucalypts. Occasional *Eucalyptus loxophleba* woodlands with acacia tall shrubs.
	Sand sheets (13)*	Deep red clayey sands.	Moderately close acacia tall shrublands, or acacia shrubland with mallee eucalypts, rarely *Triodia basedowii* hummock grasslands with acacia and eucalypt overstoreys.
	Hardpan plains	Shallow hardpan loams, red clayey sands and red earths on hardpan. Deep red earths and sandy red earths.	Scattered acacia tall shrublands.
	Gravelly plains	Variable depth red clayey sands with ferruginous gravel over hardpan.	Moderately close *A. aneura* or *A. ramulosa* tall shrublands with occasional mallees, and sparse perennial grasses.
	Narrow drainage tracts	Deep red earths and juvenile alluvial deposits.	Moderately close to close acacia tall shrublands with scattered trees and mallees.

*Identifies the landforms that are the most similar to the modified Woodman FCTs.

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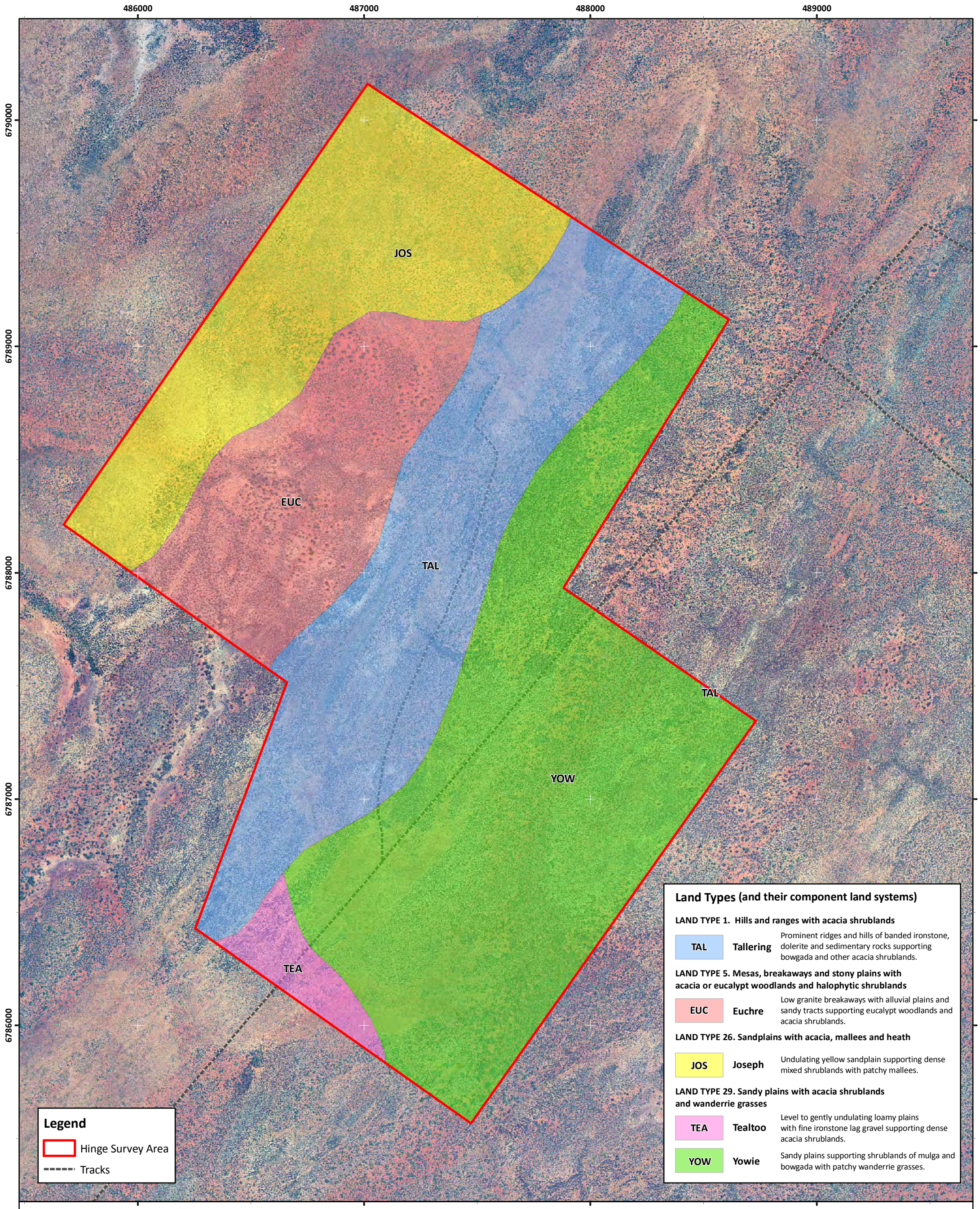

Karara Mining Ltd.
Hinge Vegetation and Flora Survey

Appendix A1: Land Systems in the Hinge Survey Area

Author: M. Gardener	Date: 12-12-2012	Datum: GDA 1994 - Projection: MGA Zone 50 - Scale: 1:15,000 (A3)
Drawn: C. Dyde	Figure Ref: 16002-12FMV1RevA_20121212_AppendixA1_LandSys	0 200 400 600 800 1,000 Metres

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Appendix B: Definitions, Categories and Criteria for Threatened and Priority Ecological Communities

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Table B.1: Categories of Threatened Ecological Communities (DEC 2010).

PD: Presumed Destroyed
An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future. 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 (A or B): A) Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats or B) All occurrences recorded within the last 50 years have since been destroyed.
CR : Critically Endangered
An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated. 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. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C): A) The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and either or both of the following apply (i or ii): i) geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 10 years); ii) modification throughout its range is continuing such that in the immediate future (within approximately 10 years) the community is unlikely to be capable of being substantially rehabilitated. B) Current distribution is limited, and one or more of the following apply (i, ii or iii): i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 10 years); ii) there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes; iii) there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes. C) The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately 10 years).
En: Endangered
An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future. 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. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B, or C): A) The geographic range, and/or total area occupied, and/or number of discrete occurrences have been reduced by at least 70% since European settlement and either or both of the following apply (i or ii): i) the estimated geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short term future (within approximately 20 years);

ii) modification throughout its range is continuing such that in the short term future (within approximately 20 years) the community is unlikely to be capable of being substantially restored or rehabilitated.

B) Current distribution is limited, and one or more of the following apply (i, ii or iii):

i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short term future (within approximately 20 years);

ii) there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes;

iii) there may be many occurrences but total area is small and all or most occurrences are small and/or isolated and very vulnerable to known threatening processes.

C) The ecological community exists only as very modified occurrences that may be capable of being substantially restored or rehabilitated if such work begins in the short-term future (within approximately 20 years).

VU: Vulnerable

An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.

An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium to long-term future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B or C):

A) The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated.

B) The ecological community may already be modified and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations.

C) The ecological community may be still widespread but is believed likely to move into a category of higher threat in the medium to long term future because of existing or impending threatening processes.

Table B.2: Definitions, Categories and Criteria for Priority Ecological Communities: Priority Ecological communities (DEC 2010).

Possible threatened ecological communities that do not meet survey criteria or that are not adequately defined are added to the Priority Ecological Community Lists under Priorities 1, 2 and 3. Ecological Communities that are adequately known, and are rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

P1: Priority One – 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. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.
P2: Priority Two – 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, unallocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.
P3: Priority Three – Poorly-Known ecological communities
(i) 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: (ii) 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; (iii) 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 much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes. Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.
P4: Priority Four
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. (a) Rare. Ecological communities known from few occurrences 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 communities are usually represented on conservation lands. (b) Near Threatened. Ecological communities 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) Ecological communities that have been removed from the list of threatened communities during the past five years.

P5: Priority Five – 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.

Table B.3: Definitions and Criteria for Threatened Ecological communities (DSEWPC 2010).

Three categories exist for listing threatened ecological communities under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). An ecological community may be categorised:

Categories of Ecological Communities	
Critically Endangered	If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future.
Endangered	If, at that time, it is not critically endangered and is facing a very high risk of extinction in the wild in the near future.
Vulnerable	If, at that time, it is not critically endangered or endangered, and is facing a high risk of extinction in the wild in the medium-term future.

Appendix C: Categories of Conservation Significant Flora Species

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Table C.1: Categories of Conservation Significant Flora Species (*Wildlife Conservation Act 1950*).

R: Declared Rare Flora - Extant
Taxa which have been adequately searched for, and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.
P1: Priority One - Poorly Known
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, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
P2: Priority Two - Poorly Known
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 are in urgent need of further survey.
P3: Priority Three - Poorly Known
Taxa which are known from several 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 are in need of further survey.
P4: Priority Four - Rare
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.

Table C.2: Categories of Threatened Species (DSEWPC 2010).

Threatened flora may be listed in any one of the following categories as defined in Section 179 of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act):

Section 179 Categories of Threatened Species	
(1) A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.	
(2) A native species is eligible to be included in the extinct in the wild*category at a particular time if, at that time:	
	(a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or
	(b) 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.
(3) A native species is eligible to be included in the critically endangered*category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.	
(4) A native species is eligible to be included in the endangered category* at a particular time if, at that time:	
	(a) it is not critically endangered; and
	(b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
(5) A native species is eligible to be included in the vulnerable category* at a particular time if, at that time:	
	(a) it is not critically endangered or endangered; and
	(b) it is facing a high risk of extinction in the wild in the medium term future, as determined in accordance with the prescribed criteria.
(6) A native species is eligible to be included in the conservation dependent category at a particular time if, at that time:	
	(a) the species is 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; (ii) the species is the focus of a plan of management that provides for management 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. (7) In subsection (6): Fish includes all species of bony fish, sharks, rays, crustaceans, molluscs and other marine organisms, but does not include marine mammals or marine reptiles.	

Appendix D: Categories of Introduced Flora Species

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Table D.1: Declared Plants Management Ratings as Gazetted under the Agriculture and Related Resources Protection Act 1976.

Listed species have a priority rating which defines their required level of management.	
Priority 1	Introduction of the plant into or movement of the plant within, an area is prohibited.
Priority 2	Plant to be eradicated in the area.
Priority 3	Plant to be controlled by reduction in number or distribution of the plant or both.
Priority 4	Spread of plant beyond where it currently occurs to be prevented.
Priority 5	Particular action to be taken on public land or land under the control of a local government.

Table D.2: Invasive Plant Prioritisation (IPP) process rating system (DEC 2011c).

Field	**Description**	**Code**	**Code Description**
Potential Distribution	Area of potential habitat in the Region that could be occupied of the area at risk of invasion by the weed.	L	Limited (localised)
		M	Moderate
		H	High
		E	Extensive (widespread)
		U	Unknown
Current Distribution	Area of habitat in the Region currently occupied by the weed.	L	Limited (localised)
		M	Moderate
		H	High
		E	Extensive (widespread)
		U	Unknown
Survey Effort	Survey effort of IBRA.	Nil	0%
		Some	0 - 25%
		Patchy	25 – 50%
		Extensive	50 – 75%
		Complete	75 – 100%
Abundance	Density class across one or more IBRA regions in the DEC region.	Occasional	Light – scattered individual plants (< 10 populations or 1 – 10% of IBRA region)
		Common	Medium to scattered patches with isolated plants interspersed (>10 populations or 11 – 50% of IBRA region)
		Abundant	Heavy to large infestations (>100 populations or 51 – 100% of IBRA region)

Field	Description	Code	Code Description
Ecological Impact	Impact of species with the Region, from low impact (causes minimal disruption to ecological processes or loss of biodiversity) to high (causes acute disruptions of ecological processes, dominates and/or significantly alters the vegetation structure, composition and function of ecosystems).	L	Low impact species
		M	Medium impact species
		H	High impact species
		U	Unknown
Impact attributes	List of known ecological impact attribute, based on Platt et al (2005).	1	Changed fire regime
		2	Changed nutrient conditions
		3	Changed hydrological patterns
		4	Changed soil erosion patterns
		5	Changed geomorphological processes
		6	Changed biomass distribution
		7	Changed light distribution
		8	Loss of biodiversity
		9	Substantially reduces regeneration opportunities of native plants
		10	Allelopathic effects
Invasiveness	Rate of spread of a weed in native vegetation, encompassing factors of establishment, reproductions (time to seeding, seed production, vegetative reproductions) and dispersal (wind, water, flying animals, ground animals, deliberate human spread, vehicles, produce contaminant).	S	Slow
		M	Moderate
		R	Rapid
		U	Unknown
Feasibility of Control	The longer a coordinated control program takes to achieve its desired goal, the more expensive and less feasible it becomes. Key factors to consider include how widespread a weed is, ease of finding infestations, difficulty of limiting the weeds dispersal, willingness of landholders and governments to control the weed, and commercial use of the plant.	L	Low feasibility infestation
		M	Moderate feasibility infestation
		H	High feasibility infestation
		U	Unknown
General Trend	General trend in distribution and abundance across the region.	Decreasing	
		Increasing	
		Stable	
		Unknown	

Field	Description	Code	Code Description
Status	Define whether the species is outside the region, considered emerging (density class of occasional), established (density class of common or abundant) or unknown.	Outside	Occurs outside the region but known from WA
		Emerging	Density class of occasional
		Established	Density class of common or abundant
		Unknown	Current status in doubt or unknown

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Appendix E: Database Search Summary and Results

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Table E. 1: Details of database searches conducted.

Database name	Date search results received	Search focus	Search area
Protected Matters Search Tool (DSEWPC 2012c)	15 August 2012	Matters of National Environmental Significance including both listed ecological communities and flora species.	10 km buffer around central point: -29°08'57"S and 116°54'40"E.
DEC threatened ecological communities and priority ecological communities database (DEC 2012a)	29 August 2012	Western Australian listed threatened and priority ecological communities.	Polygon search from two points using coordinates: -28°54' 58" S, 116° 47' 41" E and -29°16' 38" S, 117° 0' 00" E.
DEC threatened (Declared Rare) and priority flora database (DEC 2012b)	22 August 2012	Western Australian listed Declared Rare (T) and priority flora species.	Polygon search within a 2 km buffer from two points using coordinates: -28°54' 58" S, 116° 47' 41" E and -29°16' 38" S, 117° 0' 00" E.
DEC threatened and priority flora list (DEC 2012c)			
Western Australian Herbarium specimen database (DEC 2012d)			
DEC NatureMap (DEC 2012e)	16 October 2012	Western Australian listed threatened and priority flora species.	10 km buffer around central point: -29°08'57"S and 116°54'40"E.

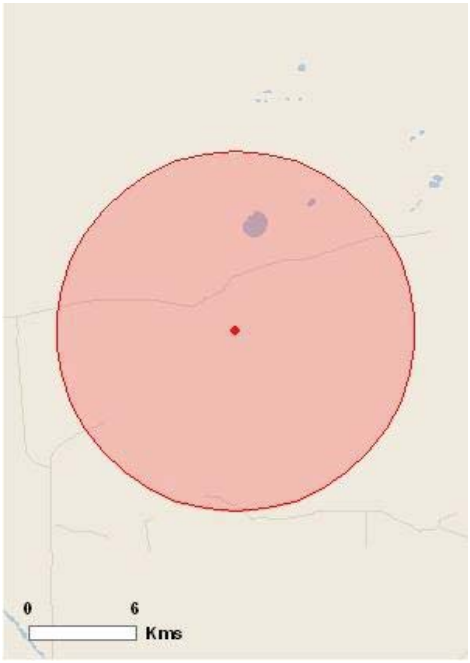
EPBC Act Protected Matters Report

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

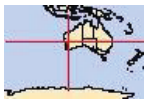
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

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

Report created: 09/10/12 12:35:33



Coordinates
Buffer: 10.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	8
Listed Migratory Species:	8

Other Matters Protected by the EPBC Act

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

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate.

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.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	5
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves:	None

Extra Information

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

Place on the RNE:	None
State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	5
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Acanthiza iredalei iredalei		
Slender-billed Thornbill (western) [25967]	Vulnerable	Species or species habitat likely to occur within area
Leipoa ocellata		
Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area
Rostratula australis		
Australian Painted Snipe [77037]	Vulnerable	Species or species habitat may occur within area
Plants		
Eremophila viscida		
Varnish Bush [2394]	Endangered	Species or species habitat likely to occur within area
Gyrostemon reticulatus		
Net-veined Gyrostemon [8491]	Critically Endangered	Species or species habitat likely to occur within area
Hybanthus cymulosus		
Ninghan Violet [2803]	Critically Endangered	Species or species habitat likely to occur within area
Pityrodia axillaris		
Native Foxglove, Woolly Foxglove [17376]	Critically Endangered	Species or species habitat may occur within area
Reptiles		
Egernia stokesii badia		
Western Spiny-tailed Skink [64483]	Endangered	Species or species habitat likely to occur within area

Listed Migratory Species [Resource Information]

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

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat may occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within area
Migratory Terrestrial Species		
Leipoa ocellata		
Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area
Merops ornatus		
Rainbow Bee-eater [670]		Species or species habitat may occur within area
Migratory Wetlands Species		
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat may occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato)		
Painted Snipe [889]	Vulnerable*	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Resource Information]

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

Name	Threatened	Type of Presence
Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat may occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within area
Merops ornatus		
Rainbow Bee-eater [670]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato)		
Painted Snipe [889]	Vulnerable*	Species or species habitat may occur within area

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
Mammals		
Capra hircus		
Goat [2]		Species or species habitat likely to occur within area
Felis catus		
Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Oryctolagus cuniculus		
Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Vulpes vulpes		
Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Cenchrus ciliaris		
Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area

Coordinates

-29.19137 116.77885

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

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

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.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

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

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

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

Acknowledgements

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

-Department of Environment, Climate Change and Water, New South Wales
-Department of Sustainability and Environment, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment and Natural Resources, South Australia
-Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts
-Environmental and Resource Management, Queensland
-Department of Environment and Conservation, Western Australia
-Department of the Environment, Climate Change, Energy and Water
-Birds Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-SA Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
-State Forests of NSW
-Geoscience Australia
-CSIRO
-Other groups and individuals

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

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

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NatureMap
Mapping Western Australia's biodiversity

NatureMap Species Report

Created By Guest user on 12/10/2012

Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 116°56' 12" E,29°36' 57" S
Buffer 20km
Group By Conservation Status

Conservation Status	Species	Records
Rare or likely to become extinct	2	12
Protected under international agreement	1	4
Other specially protected fauna	2	2
Priority 1	6	14
Priority 3	18	43
Priority 4	1	6
Non-conservation taxon	810	2062
TOTAL	**840**	**2143**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Rare or likely to become extinct					
1.	24557	*Leipoa ocellata (Malleefowl)*		T	
2.	31764	*Lepidosperma gibsonii*		T	
Protected under international agreement					
3.	24598	*Merops ornatus (Rainbow Bee-eater)*		IA	
Other specially protected fauna					
4.	24722	*Cacatua leadbeateri (Major Mitchell's Cockatoo)*		S	
5.	25624	*Falco peregrinus (Peregrine Falcon)*		S	
Priority 1					
6.	14058	*Acacia cerastes*		P1	
7.	14685	*Acacia nigripilosa subsp. latifolia*		P1	
8.	19154	*Acacia sp. Goodlands (B.R. Maslin 7761)*		P1	
9.	33280	*Lepidosperma sp. Blue Hills (A. Markey & S. Dillon 3468)*		P1	
10.	19513	*Mirbelia cordifolia*		P1	
11.	18511	*Philotheca nutans*		P1	
Priority 3					
12.	14076	*Acacia formidabilis*		P3	
13.	17232	*Austrostipa blackii*		P3	
14.	33023	*Bossiaea sp. Jackson Range (G. Cockerton & S. McNee LCS 13614)*		P3	
15.	31671	*Calotis sp. Perrinvale Station (R.J. Cranfield 7096)*		P3	
16.	19919	*Elatine macrocalyx*		P3	
17.	17914	*Euryomyrtus recurva*		P3	
18.	17721	*Gnephosis sp. Norseman (K.R. Newbey 8096)*		P3	
19.	12572	*Goodenia perryi*		P3	
20.	2100	*Grevillea subtiliflora*		P3	
21.	2809	*Gunniopsis rubra*		P3	
22.	2402	*Korthalsella leucothrix*		P3	
23.	30412	*Micromyrtus acuta*		P3	
24.	14569	*Persoonia pentasticha*		P3	
25.	12732	*Podotheca uniseta*		P3	
26.	19913	*Psammomoya implexa*		P3	
27.	14233	*Stenanthemum poicilum*		P3	
28.	29479	*Tricoryne sp. Morawa (G.J. Keighery & N. Gibson 6759)*		P3	
29.	19038	*Triglochin protuberans*		P3	
Priority 4					
30.	1399	*Wurmbea murchisoniana*		P4	
Non-conservation taxon					
31.		*Ablabesmyia notabilis*			
32.	14613	*Acacia acanthoclada subsp. glaucescens*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
33.	3199	*Acacia acuaria*			
34.	3200	*Acacia acuminata (Jam)*			
35.	3216	*Acacia andrewsii*			
36.	3217	*Acacia aneura (Mulga)*			
37.	12247	*Acacia anthochaera*			
38.	15467	*Acacia assimilis subsp. assimilis*			
39.	16112	*Acacia aulacophylla*			
40.	3235	*Acacia baxteri (Baxter's Wattle)*			
41.	3248	*Acacia burkittii (Sandhill Wattle)*			
42.	3264	*Acacia colletioides (Wait-a-while)*			
43.	3269	*Acacia coolgardiensis (Spinifex Wattle)*			
44.	16119	*Acacia dissona var. dissona*			
45.	3315	*Acacia duriuscula*			
46.	32118	*Acacia effusifolia*			
47.	3324	*Acacia erinacea*			
48.	3330	*Acacia exocarpoides*			
49.	15285	*Acacia heteroneura var. jutsonii*			
50.	12258	*Acacia inceana subsp. conformis*			
51.	3393	*Acacia jennerae*			
52.	3395	*Acacia jibberdingensis*			
53.	14610	*Acacia kalgoorliensis*			
54.	3403	*Acacia kochii*			
55.	32116	*Acacia latior*			
56.	3419	*Acacia ligulata (Umbrella Bush)*			
57.	15477	*Acacia lineolata subsp. lineolata*			
58.	3425	*Acacia longiphyllodinea (Long-leaved Wattle)*			
59.	3426	*Acacia longispinea*			
60.	3432	*Acacia mackeyana*			
61.	3452	*Acacia murrayana (Sandplain Wattle)*			
62.	15290	*Acacia neurophylla subsp. erugata*			
63.	3458	*Acacia nigripilosa*			
64.	3465	*Acacia obtecta*			
65.	3495	*Acacia prainii (Prain's Wattle)*			
66.	3510	*Acacia ramulosa (Horse Mulga)*			
67.	19499	*Acacia ramulosa var. ramulosa*			
68.	3513	*Acacia resinimarginea*			
69.	16145	*Acacia resinosa*			
70.	3515	*Acacia restiacea*			
71.	3539	*Acacia sericocarpa*			
72.	3545	*Acacia sibina*			
73.	18621	*Acacia sp. Kalannie (B.R. Maslin 7571)*			
74.	18622	*Acacia sp. Kalannie (B.R. Maslin 7706)*			
75.	29110	*Acacia sp. narrow phyllode (B.R. Maslin 7831)*			
76.	15294	*Acacia stereophylla var. stereophylla*			
77.	3577	*Acacia tetragonophylla (Kurara)*			
78.	3586	*Acacia tysonii*			
79.	31071	*Acacia umbraculiformis*			
80.	24559	*Acanthagenys rufogularis (Spiny-cheeked Honeyeater)*			
81.	24260	*Acanthiza apicalis (Broad-tailed Thornbill)*			
82.	24261	*Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*			
83.	24264	*Acanthiza robustirostris (Slaty-backed Thornbill)*			
84.	24265	*Acanthiza uropygialis (Chestnut-rumped Thornbill)*			
85.	1205	*Acanthocarpus canaliculatus*			
86.	27576	*Acarospora nodulosa*			
87.	28195	*Acarospora nodulosa var. reagens*			
88.	25535	*Accipiter cirrocephalus (Collared Sparrowhawk)*			
89.	25536	*Accipiter fasciatus (Brown Goshawk)*			
90.	7817	*Actinobole uliginosum (Flannel Cudweed)*			
91.	6204	*Actinotus humilis*			
92.	18163	*Actinotus sp. Comet Vale (A.V. Milewski AVM 1093)*			
93.		*Agraptocorixa parvipunctata*			
94.	1720	*Allocasuarina acutivalvis*			
95.	13904	*Allocasuarina acutivalvis subsp. acutivalvis*			
96.	13905	*Allocasuarina acutivalvis subsp. prinsepiana*			
97.	1721	*Allocasuarina campestris*			
98.		*Allodessus bistrigatus*			
99.		*Allotrissocladius sp. M*			
100.		*Alona macrocopa*			
101.	19465	*Aluta aspera subsp. hesperia*			
102.	4905	*Alyogyne hakeifolia*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
103.	4907	*Alyogyne pinoniana (Sand Hibiscus)*			
104.	6565	*Alyxia buxifolia (Dysentery Bush)*			
105.	196	*Amphipogon caricinus (Long Greybeard Grass)*			
106.	12025	*Amphipogon caricinus var. caricinus*			
107.	2382	*Amyema nestor*			
108.	2383	*Amyema preissii (Wireleaf Mistletoe)*			
109.	24312	*Anas gracilis (Grey Teal)*			
110.	24316	*Anas superciliosa (Pacific Black Duck)*			
111.	40910	*Androcalva luteiflora (Yellow-flowered Rulingia)*			
112.	40904	*Androcalva stowardii*			
113.	7836	*Angianthus tomentosus (Camel-grass)*			
114.		*Anisops thienemanni*			
115.	24561	*Anthochaera carunculata (Red Wattlebird)*			
116.	6952	*Anthotroche pannosa (Felted Anthotroche)*			
117.		*Antiporus gilberti*			
118.	25528	*Aphelocephala leucopsis (Southern Whiteface)*			
119.	24285	*Aquila audax (Wedge-tailed Eagle)*			
120.		*Arcella sp.*			Y
121.	7838	*Arctotheca calendula (Cape Weed)*	Y		
122.	24341	*Ardea pacifica (White-necked Heron)*			
123.	207	*Aristida contorta (Bunched Kerosene Grass)*			
124.	12063	*Aristida holathera var. holathera*			
125.	25566	*Artamus cinereus (Black-faced Woodswallow)*			
126.	24353	*Artamus cyanopterus (Dusky Woodswallow)*			
127.	24355	*Artamus minor (Little Woodswallow)*			
128.	1265	*Arthropodium curvipes*			
129.	1266	*Arthropodium dyeri*			
130.		*Asplanchnopus sp. nov. (Wannara)*			Y
131.	6336	*Astroloma serratifolium (Kondrung)*			
132.	2451	*Atriplex bunburyana (Silver Saltbush)*			
133.	2453	*Atriplex codonocarpa (Flat-topped Saltbush)*			
134.	2459	*Atriplex holocarpa (Pop Saltbush)*			
135.	11698	*Atriplex paludosa subsp. moquiniana*			
136.	2476	*Atriplex semilunaris (Annual Saltbush)*			
137.	2481	*Atriplex vesicaria (Bladder Saltbush)*			
138.		*Australocyclops similis*			
139.		*Austrolestes analis*			
140.		*Austrolestes annulosus*			
141.	17237	*Austrostipa elegantissima*			
142.	17239	*Austrostipa exilis*			
143.	17246	*Austrostipa nitida*			
144.	17251	*Austrostipa scabra*			
145.	17255	*Austrostipa trichophylla*			
146.	5344	*Baeckea elderiana*			
147.	16737	*Baeckea sp. Bencubbin-Koorda (M.E. Trudgen 5421)*			
148.	36063	*Baeckea sp. Wanarra (M.E. Trudgen MET 5376)*			
149.	38765	*Battarrea stevenii*			
150.	7852	*Bellida graminea (Rosy Bellida)*			
151.		*Bennelongia barangaroo*			
152.		*Berosus approximans*			
153.		*Berosus nutans*			
154.	7856	*Blennospora drummondii*			
155.		*Boeckella opaqua*			
156.		*Boeckella sp. nov. 2 (nr triarticulata)*			
157.	1267	*Borya constricta*			
158.	1273	*Borya sphaerocephala (Pincushions)*			
159.	3722	*Bossiaea walkeri*			
160.		*Brachionus quadridentatus*			
161.	7870	*Brachyscome cheilocarpa*			
162.	7872	*Brachyscome ciliocarpa*			
163.	7878	*Brachyscome iberidifolia*			
164.	7882	*Brachyscome perpusilla*			
165.	16823	*Brachyscome perpusilla var. tenella*			
166.	7883	*Brachyscome pusilla*			
167.	25244	*Brachyurophis fasciolata*			
168.		*Branchinella affinis*			
169.	253	*Bromus rubens (Red Brome)*	Y		
170.	7413	*Brunonia australis (Native Cornflower)*			
171.	19069	*Brunonia sp. Goldfields (K.R. Newbey 6044)*			
172.	3167	*Bursaria occidentalis*			

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173.	25714	*Cacatua pastinator (Western Long-billed Corella)*			
174.	25716	*Cacatua sanguinea (Little Corella)*			
175.	25598	*Cacomantis flabelliformis (Fan-tailed Cuckoo)*			
176.		*Caenestheria sp. nov. a (nr. lutraria)*			
177.		*Caenestheriella sp.*			
178.	29439	*Caesia sp. Wongan (K.F. Kenneally 8820)*			
179.	15355	*Caladenia hirta subsp. rosea*			
180.	15356	*Caladenia incensa*			
181.	1614	*Caladenia roei (Ant Orchid)*			
182.	18019	*Caladenia vulgata*			
183.	2846	*Calandrinia calyptrata (Pink Purslane)*			
184.	2853	*Calandrinia eremaea (Twining Purslane)*			
185.	2854	*Calandrinia granulifera (Pygmy Purslane)*			
186.	2862	*Calandrinia porifera*			
187.	2863	*Calandrinia primuliflora*			
188.	2865	*Calandrinia pumila*			
189.	40824	*Calandrinia sculpta*			
190.	20478	*Calandrinia sp. Blackberry (D.M. Porter 171)*			
191.	19455	*Calandrinia sp. Bungalbin (G.J. Keighery & N. Gibson 1656)*			
192.	30396	*Calandrinia translucens*			
193.	8466	*Callitris columellaris (White Cypress Pine)*			
194.	5408	*Calothamnus gilesii*			
195.	7903	*Calotis hispidula (Bindy Eye)*			
196.	7905	*Calotis multicaulis (Many-stemmed Burr-daisy)*			
197.	16492	*Calycopeplus paucifolius*			
198.	25717	*Calyptorhynchus banksii (Red-tailed Black-Cockatoo)*			
199.	5461	*Calytrix glutinosa*			
200.	5465	*Calytrix leschenaultii*			
201.	28241	*Calytrix sp. Paynes Find (F. & J. Hort 1188)*			
202.		*Candonocypris novaezelandiae*			
203.	6539	*Centaurium erythraea (Common Centaury)*	Y		
204.	1121	*Centrolepis aristata (Pointed Centrolepis)*			
205.	1129	*Centrolepis glabra (Smooth Centrolepis)*			
206.	1134	*Centrolepis polygyna (Wiry Centrolepis)*			
207.		*Centropyxis sp.*			
208.	7922	*Cephalipterum drummondii (Pompom Head)*			
209.		*Cephalodella gibba*			
210.	7924	*Ceratogyne obionoides (Wingwort)*			
211.		*Ceriodaphnia sp. nov. d (Berner sp.#5)*			
212.	24564	*Certhionyx variegatus (Pied Honeyeater)*			
213.	24186	*Chalinolobus gouldii (Gould's Wattled Bat)*			
214.	24187	*Chalinolobus morio (Chocolate Wattled Bat)*			
215.	1216	*Chamaexeros macranthera*			
216.	35640	*Chamelaucium pauciflorum subsp. Perenjori (B.J. Conn 2181)*			
217.	12796	*Cheilanthes adiantoides*			
218.	3168	*Cheiranthera filifolia*			
219.	31768	*Cheiranthera simplicifolia*			
220.	24321	*Chenonetta jubata (Australian Wood Duck)*			
221.		*Chironomus aff. alternans (V24)*			
222.	3756	*Chorizema genistoides*			
223.	27662	*Chrysothrix candelaris*			
224.	7933	*Chthonocephalus pseudevax (Woolly Groundheads)*			
225.	24833	*Cincloramphus cruralis (Brown Songlark)*			
226.	24396	*Climacteris rufa (Rufous Treecreeper)*			
227.	2778	*Codonocarpus cotinifolius (Native Poplar)*			
228.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
229.	4555	*Comesperma integerrimum*			
230.	4566	*Comesperma volubile (Love Creeper)*			
231.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
232.	24416	*Corvus bennetti (Little Crow)*			
233.	25592	*Corvus coronoides (Australian Raven)*			
234.	7944	*Cotula bipinnata (Ferny Cotula)*	Y		
235.	24671	*Coturnix pectoralis (Stubble Quail)*			
236.	24420	*Cracticus nigrogularis (Pied Butcherbird)*			
237.	25595	*Cracticus tibicen (Australian Magpie)*			
238.	25596	*Cracticus torquatus (Grey Butcherbird)*			
239.	17701	*Crassula closiana*			
240.	3137	*Crassula colorata (Dense Stonecrop)*			
241.	11709	*Crassula colorata var. acuminata*			
242.	11563	*Crassula colorata var. colorata*			

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243.	3138	*Crassula decumbens (Rufous Stonecrop)*			
244.	3139	*Crassula exserta*			
245.	3142	*Crassula natans*	Y		
246.	4791	*Cryptandra apetala*			
247.	15544	*Cryptandra apetala var. apetala*			
248.	14314	*Cryptandra imbricata*			
249.	15437	*Cryptandra micrantha*			
250.	30893	*Cryptoblepharus buchananii*			
251.	24871	*Ctenophorus cristatus (Bicycle Dragon)*			
252.	25460	*Ctenophorus maculatus (Spotted Military Dragon)*			
253.	24883	*Ctenophorus ornatus (Ornate Crevice Dragon)*			
254.	24886	*Ctenophorus reticulatus (Western Netted Dragon)*			
255.	24889	*Ctenophorus scutulatus*			
256.	25054	*Ctenotus mimetes*			
257.	25463	*Ctenotus pantherinus (Leopard Ctenotus)*			
258.	25074	*Ctenotus schomburgkii*			
259.	25075	*Ctenotus severus*			
260.	25465	*Ctenotus uber*			
261.		*Culicoides sp.*			
262.	6663	*Cuscuta epithymum (Lesser Dodder)*	Y		
263.	11021	*Cuscuta planiflora*	Y		
264.	15400	*Cyanicula amplexans*			
265.	6747	*Cyanostegia angustifolia (Tinsel-flower)*			
266.	809	*Cyperus rigidellus*			
267.		*Cypretta baylyi*			
268.		*Cypretta sp. 647*			
269.		*Cypricercus salinus*			
270.		*Cypricercus sp. 634*			
271.		*Cypricercus unicornis*			Y
272.	7438	*Dampiera eriocephala (Woolly-headed Dampiera)*			
273.	11326	*Dampiera incana var. fuscescens*			
274.	7451	*Dampiera lavandulacea*			
275.	7456	*Dampiera luteiflora (Yellow Dampiera)*			
276.	7486	*Dampiera wellsiana (Wells' Dampiera)*			
277.	25673	*Daphoenositta chrysoptera (Varied Sittella)*			
278.	5506	*Darwinia capitellata*			
279.	41025	*Dasymalla terminalis (Native Foxglove)*			
280.	6218	*Daucus glochidiatus (Australian Carrot)*			
281.	3813	*Daviesia grahamii*			
282.	3815	*Daviesia horrida (Prickly Bitter-pea)*			
283.	24997	*Delma butleri*			
284.	25766	*Delma fraseri (Fraser's Legless Lizard)*			
285.	1259	*Dianella revoluta (Blueberry Lily)*			
286.	11636	*Dianella revoluta var. divaricata*			
287.	25607	*Dicaeum hirundinaceum (Mistletoebird)*			
288.	18549	*Dicrastylis soliparma*			
289.		*Dicrotendipes 'CA1' (was lindae)*			
290.	2498	*Didymanthus roei*			
291.		*Difflugia gramen*			
292.		*Difflugia sp. b*			
293.	25469	*Diplodactylus granariensis*			
294.	24940	*Diplodactylus pulcher*			
295.	11681	*Disphyma crassifolium subsp. clavellatum*			
296.	4752	*Dodonaea adenophora*			
297.	4766	*Dodonaea inaequifolia*			
298.	11247	*Dodonaea viscosa subsp. angustissima*			
299.	24470	*Dromaius novaehollandiae (Emu)*			
300.	3092	*Drosera bulbosa (Red-leaved Sundew)*			
301.	3098	*Drosera glanduligera (Pimpernel Sundew)*			
302.	14298	*Drosera macrantha subsp. macrantha*			
303.	3107	*Drosera macrophylla (Showy Sundew)*			
304.	24650	*Drymodes brunneopygia (Southern Scrub-robin)*			
305.	6966	*Duboisia hopwoodii (Pituri)*			
306.	11632	*Dysphania glomulifera subsp. eremaea*			
307.	33597	*Dysphania melanocarpa forma melanocarpa (Black Goosefoot)*			
308.	1066	*Ecdeiocolea monostachya*			
309.	6681	*Echium plantagineum (Paterson's Curse)*	Y		
310.	25092	*Egernia depressa (Pygmy Spiny-tailed Skink)*			
311.	2409	*Emex australis (Doublegee)*	Y		
312.	2510	*Enchylaena lanata*			

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313.	19843	*Enekbatus sessilis*			
314.	19844	*Enekbatus stowardii*			
315.	24567	*Epthianura albifrons (White-fronted Chat)*			
316.	24570	*Epthianura tricolor (Crimson Chat)*			
317.	378	*Eragrostis dielsii (Mallee Lovegrass)*			
318.	13807	*Eremophila caperata*			
319.	7189	*Eremophila clarkei (Turpentine Bush)*			
320.	14895	*Eremophila decipiens subsp. decipiens*			
321.	7198	*Eremophila deserti*			
322.	7204	*Eremophila eriocalyx (Desert Pride)*			
323.	15052	*Eremophila forrestii subsp. forrestii*			
324.	17174	*Eremophila glabra subsp. elegans*			
325.	7216	*Eremophila glutinosa*			
326.	7230	*Eremophila latrobei (Warty Fuchsia Bush)*			
327.	17576	*Eremophila latrobei subsp. latrobei*			
328.	7242	*Eremophila miniata (Kopi Poverty Bush)*			
329.	15003	*Eremophila oldfieldii subsp. angustifolia*			
330.	17168	*Eremophila oldfieldii subsp. oldfieldii*			
331.	7247	*Eremophila oppositifolia (Weeooka)*			
332.	18570	*Eremophila oppositifolia subsp. angustifolia*			
333.	7269	*Eremophila serrulata (Serrate-leaved Eremophila)*			
334.	415	*Eriachne ovata*			
335.	417	*Eriachne pulchella (Pretty Wanderrie)*			
336.	20718	*Ericksonella saccharata*			
337.	4333	*Erodium cicutarium (Common Storksbill)*	Y		
338.	4335	*Erodium cygnorum (Blue Heronsbill)*			
339.	12720	*Erymophyllum glossanthus*			
340.	14376	*Erymophyllum ramosum subsp. involucratum*			
341.	14377	*Erymophyllum ramosum subsp. ramosum*			
342.	12740	*Erymophyllum tenellum*			
343.	5565	*Eucalyptus brachycorys (Cowcowing Mallee)*			
344.	11978	*Eucalyptus celastroides subsp. virella*			
345.	11637	*Eucalyptus erythronema var. marginata (Red-flowered Mallee)*			
346.	5641	*Eucalyptus ewartiana (Ewart's Mallee)*			
347.	5673	*Eucalyptus horistes*			
348.	19523	*Eucalyptus kochii subsp. amaryssia*			
349.	15670	*Eucalyptus kochii subsp. plenissima*			
350.	15682	*Eucalyptus leptophylla (Narrow-leaved Red Mallee)*			
351.	5696	*Eucalyptus leptopoda (Tammin Mallee)*			
352.	13057	*Eucalyptus leptopoda subsp. arctata*			
353.	5702	*Eucalyptus loxophleba (York Gum)*			
354.	13038	*Eucalyptus loxophleba subsp. supralaevis*			
355.	19323	*Eucalyptus moderata*			
356.	5742	*Eucalyptus petraea (Granite Rock Box)*			
357.	5766	*Eucalyptus salmonophloia (Salmon Gum)*			
358.	5767	*Eucalyptus salubris (Gimlet)*			
359.	5778	*Eucalyptus stowardii (Fluted Horn Mallee)*			
360.	12882	*Eucalyptus subangusta subsp. pusilla*			
361.	12883	*Eucalyptus subangusta subsp. subangusta*			
362.		*Euchlanis dilatata*			
363.	4626	*Euphorbia drummondii (Caustic Weed)*			
364.	10977	*Exocarpos aphyllus (Leafless Ballart)*			
365.		*Eylais sp.*			
366.	25621	*Falco berigora (Brown Falcon)*			
367.	25622	*Falco cenchroides (Australian Kestrel)*			
368.	25623	*Falco longipennis (Australian Hobby)*			
369.	5206	*Frankenia laxiflora (Loose Flowered Frankenia)*			
370.	5209	*Frankenia pauciflora (Seaheath)*			
371.	39031	*Fuligo cinerea*			Y
372.	39032	*Fuligo megaspora*			Y
373.	904	*Gahnia drummondii*			
374.	3907	*Gastrolobium laytonii (Breelya)*			
375.	24959	*Gehyra variegata*			
376.	25530	*Gerygone fusca (Western Gerygone)*			
377.	12780	*Gilberta tenuifolia*			
378.	7977	*Gilruthia osbornei*			
379.	33620	*Glischrocaryon angustifolium*			
380.	6144	*Glischrocaryon flavescens*			
381.	24735	*Glossopsitta porphyrocephala (Purple-crowned Lorikeet)*			
382.	7060	*Glossostigma diandrum*			

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383.	7061	*Glossostigma drummondii (Mudmat)*			
384.	7987	*Gnephosis acicularis (Zigzag Gnephosis)*			
385.	12624	*Gnephosis angianthoides*			
386.	8002	*Gnephosis tenuissima*			
387.	8004	*Gnephosis trifida*			
388.	15306	*Gomphrena sp. Belele (D.W. Goodall 3215)*			
389.	11801	*Gonocarpus confertifolius var. helmsii*			
390.	6159	*Gonocarpus nodulosus*			
391.	7495	*Goodenia berardiana*			
392.	7514	*Goodenia havilandii*			
393.	7531	*Goodenia occidentalis*			
394.	7534	*Goodenia pinifolia (Pine-leaved Goodenia)*			
395.	7535	*Goodenia pinnatifida (Cutleaf Goodenia)*			
396.	7541	*Goodenia pusilliflora (Smallflower Goodenia)*			
397.	24443	*Grallina cyanoleuca (Magpie-lark)*			
398.	1949	*Grevillea acuaria*			
399.	15763	*Grevillea biformis subsp. biformis*			
400.	1986	*Grevillea deflexa*			
401.	13453	*Grevillea didymobotrya subsp. didymobotrya*			
402.	15769	*Grevillea eremophila*			
403.	8832	*Grevillea excelsior (Flame Grevillea)*			
404.	2004	*Grevillea extorris*			
405.	13430	*Grevillea hakeoides subsp. stenophylla*			
406.	15844	*Grevillea juncifolia subsp. temulenta*			
407.	16797	*Grevillea levis*			
408.	2051	*Grevillea obliquistigma*			
409.	15983	*Grevillea obliquistigma subsp. cullenii*			
410.	15984	*Grevillea obliquistigma subsp. funicularis*			
411.	2057	*Grevillea paradoxa (Bottlebrush Grevillea)*			
412.	2068	*Grevillea pityophylla*			
413.	2077	*Grevillea pterosperma*			
414.	13461	*Grevillea sarissa subsp. anfractifolia*			
415.	2124	*Grevillea yorkrakinensis*			
416.	2805	*Gunniopsis intermedia (Yellow Salt Star)*			
417.	2807	*Gunniopsis quadrifida (Sturts Pigface)*			
418.	2808	*Gunniopsis rodwayi*			
419.	8553	*Gypsophila tubulosa*			
420.	27763	*Haematomma eremaeum*			
421.	2163	*Hakea francisiana (Emu Tree)*			
422.	2167	*Hakea invaginata*			
423.	2182	*Hakea minyma*			
424.	2196	*Hakea preissii (Needle Tree)*			
425.	17556	*Hakea recurva subsp. arida*			
426.	17557	*Hakea recurva subsp. recurva*			
427.	19131	*Hakea scoparia subsp. scoparia*			
428.	6687	*Halgania cyanea (Rough Halgania)*			
429.	29840	*Halgania cyanea var. Allambi Stn (B.W. Strong 676)*			
430.	30294	*Halgania gustafsenii var. Mid West (G. Perry 370)*			
431.	6691	*Halgania integerrima*			
432.	24295	*Haliastur sphenurus (Whistling Kite)*			
433.		*Haliplus sp.*			
434.	6180	*Haloragis trigonocarpa*			
435.	24297	*Hamirostra melanosternon (Black-breasted Buzzard)*			
436.	17725	*Hannafordia bissillii subsp. latifolia*			
437.	28253	*Hedypnois rhagadioloides subsp. cretica*	Y		
438.	29594	*Helichrysum luteoalbum (Jersey Cudweed)*			
439.		*Hemicordulia tau*			
440.	33778	*Hemigenia botryphylla*			
441.	33781	*Hemigenia ciliata*			
442.	18402	*Hemigenia sp. Yuna (A.C. Burns 95)*			
443.	27771	*Heppia lutosa*			
444.	24961	*Heteronotia binoei (Bynoe's Gecko)*			
445.	14459	*Hibbertia arcuata*			
446.	5130	*Hibbertia glomerosa (Guinea-flower)*			
447.	19779	*Hibbertia glomerosa var. glomerosa*			
448.	19683	*Hibbertia stenophylla*			
449.	24491	*Hirundo neoxena (Welcome Swallow)*			
450.	5806	*Homalocalyx aureus*			
451.	5815	*Homalocalyx thryptomenoides*			
452.	8085	*Hyalochlamys globifera*			

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453.	12742	*Hyalosperma demissum*			
454.	15447	*Hyalosperma glutinosum subsp. glutinosum*			
455.	15448	*Hyalosperma glutinosum subsp. venustum*			
456.	12756	*Hyalosperma zacchaeus*			
457.	5221	*Hybanthus floribundus*			
458.	12007	*Hybanthus floribundus subsp. floribundus*			
459.		*Hyphydrus elegans*			
460.	8086	*Hypochaeris glabra (Smooth Catsear)*	Y		
461.	11604	*Hypoxis glabella var. leptantha*			
462.		*Ilyodromus amplicolis*			
463.		*Ilyodromus candonites*			
464.		*Ilyodromus sp. 630*			
465.	14884	*Indigofera occidentalis*			
466.		*Ischnura heterosticta heterosticta*			
467.		*Isidorella sp.*			
468.	7	*Isoetes australis*			
469.	12	*Isoetes inflata*			
470.	8087	*Isoetopsis graminifolia (Cushion Grass)*			
471.	20200	*Isolepis cernua var. setiformis*			
472.	911	*Isolepis congrua*			
473.	7396	*Isotoma hypocrateriformis (Woodbridge Poison)*			
474.	7399	*Isotoma scapigera (Long-scaped Isotome)*			
475.	14779	*Jacksonia arida*			
476.	4026	*Jacksonia rhadinoclada*			
477.	1178	*Juncus bufonius (Toad Rush)*	Y		
478.		*Keratella australis*			
479.	5023	*Keraudrenia integrifolia (Common Firebush)*			
480.	19892	*Keraudrenia velutina subsp. velutina*			
481.	5840	*Kunzea pulchella (Granite Kunzea)*			
482.	20019	*Lachnagrostis filiformis*			
483.	19955	*Lachnagrostis plebeia*			
484.	6782	*Lachnostachys verbascifolia (Lambs' Tails)*			
485.	17209	*Lachnostachys verbascifolia var. verbascifolia*			
486.	13289	*Lawrencella davenportii*			
487.	13284	*Lawrencella rosea*			
488.	4954	*Lawrencia diffusa*			
489.	4959	*Lawrencia squamata*			
490.		*Lecane flexilis*			
491.		*Lecane latissima*			
492.		*Lecane ludwigii*			
493.	7583	*Lechenaultia macrantha (Wreath Leschenaultia)*			
494.		*Lepadella cf. patella*			
495.		*Lepadella ovalis*			
496.	3033	*Lepidium oxytrichum*			
497.	1075	*Lepidobolus preissianus*			
498.	930	*Lepidosperma costale*			
499.	29146	*Lepidosperma sp. Wolga Rock (S.D. Hopper 6513)*			
500.	118	*Lepilaena australis (Austral Water Mat)*			
501.	15428	*Leptosema aphyllum*			
502.	4056	*Leptosema daviesioides*			
503.	25137	*Lerista gerrardii*			
504.	30927	*Lerista kingi*			
505.	25155	*Lerista muelleri*			
506.	16049	*Leucopogon sp. Clyde Hill (M.A. Burgman 1207)*			
507.	20763	*Leucopogon sp. Coolgardie (M. Hislop & F. Hort MH 3197)*			
508.	7671	*Levenhookia leptantha (Trumpet Stylewort)*			
509.	7677	*Levenhookia stipitata (Common Stylewort)*			
510.	25005	*Lialis burtonis*			
511.	25659	*Lichenostomus leucotis (White-eared Honeyeater)*			
512.	24579	*Lichenostomus plumulus (Grey-fronted Honeyeater)*			
513.	24581	*Lichenostomus virescens (Singing Honeyeater)*			
514.	25661	*Lichmera indistincta (Brown Honeyeater)*			
515.		*Limnadia sp. a (nr badia)*			
516.		*Limnocythere ?porphyretica*			
517.	9289	*Lobelia anceps (Angled Lobelia)*			
518.	7405	*Lobelia rarifolia*			
519.	7409	*Lobelia winfridae (Little Lobelia)*			
520.	6508	*Logania flaviflora (Yellow Logania)*			
521.	1226	*Lomandra effusa (Scented Matrush)*			
522.		*Lynceus sp.*			

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523.	2396	*Lysiana casuarinae*			
524.		*Macrothrix hardingi*			
525.	2533	*Maireana amoena*			
526.	2536	*Maireana atkinsiana (Bronze Bluebush)*			
527.	2537	*Maireana brevifolia (Small Leaf Bluebush)*			
528.	2538	*Maireana carnosa (Cottony Bluebush)*			
529.	2540	*Maireana diffusa*			
530.	2544	*Maireana georgei (Satiny Bluebush)*			
531.	2545	*Maireana glomerifolia (Ball Leaf Bluebush)*			
532.	2550	*Maireana marginata*			
533.	2556	*Maireana planifolia (Low Bluebush)*			
534.	2566	*Maireana thesioides (Lax Bluebush)*			
535.	11662	*Maireana tomentosa subsp. tomentosa*			
536.	2568	*Maireana trichoptera (Downy Bluebush)*			
537.	5865	*Malleostemon roseus*			
538.	5866	*Malleostemon tuberculatus*			
539.	25654	*Malurus splendens (Splendid Fairy-wren)*			
540.	24583	*Manorina flavigula (Yellow-throated Miner)*			
541.	18631	*Marsilea costulifera*			
542.	74	*Marsilea drummondii (Common Nardoo)*			
543.		*Megaporus howitti*			
544.	15064	*Melaleuca acuminata subsp. websteri*			
545.	37580	*Melaleuca acutifolia*			
546.	20284	*Melaleuca atroviridis*			
547.	5895	*Melaleuca conothamnoides*			
548.	5896	*Melaleuca cordata*			
549.	5908	*Melaleuca eleuterostachya*			
550.	18528	*Melaleuca fabri*			
551.	5912	*Melaleuca fulgens (Scarlet Honeymyrtle)*			
552.	19486	*Melaleuca hamata*			
553.	5917	*Melaleuca hamulosa*			
554.	5929	*Melaleuca leiocarpa*			
555.	9183	*Melaleuca nematophylla (Wiry Honey-myrtle)*			
556.	5958	*Melaleuca radula (Graceful Honeymyrtle)*			
557.	20290	*Melaleuca scalena*			
558.	19449	*Melaleuca stereophloia*			
559.	5984	*Melaleuca uncinata (Broom Bush)*			
560.	25663	*Melithreptus brevirostris (Brown-headed Honeyeater)*			
561.	24736	*Melopsittacus undulatus (Budgerigar)*			
562.	25184	*Menetia greyii*			
563.		*Mesocyclops brooksi*			
564.	17643	*Microcorys sp. Mt Gibson (S. Patrick 2098)*			
565.	25693	*Microeca fascinans (Jacky Winter)*			
566.	17357	*Micromyrtus clavata*			
567.	6000	*Micromyrtus racemosa*			
568.	8105	*Millotia myosotidifolia*			
569.	12631	*Millotia perpusilla*			
570.	25542	*Milvus migrans (Black Kite)*			
571.	19514	*Mirbelia bursarioides*			
572.	4089	*Mirbelia depressa*			
573.	4093	*Mirbelia longifolia*			
574.	4094	*Mirbelia microphylla*			
575.	4097	*Mirbelia ramulosa*			
576.	4098	*Mirbelia rhagodioides*			
577.		*Moina cf. micrura*			
578.	24904	*Moloch horridus (Thorny Devil)*			
579.	490	*Monachather paradoxus*			
580.	29418	*Monoculus monstrosus*	Y		
581.	19584	*Monotaxis bracteata*			
582.	25190	*Morethia butleri*			
583.	25192	*Morethia obscura*			
584.	2412	*Muehlenbeckia adpressa (Climbing Lignum)*			
585.	24223	*Mus musculus (House Mouse)*			
586.	16286	*Myriocephalus gascoynensis*			
587.	8116	*Myriocephalus guerinae*			
588.	17925	*Myriocephalus oldfieldii*			
589.	14186	*Myriocephalus pygmaeus*			
590.		*Necterosoma penicillatus*			
591.		*Necterosoma wollastoni*			
592.	25248	*Neelaps bimaculatus (Black-naped Snake)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
593.	25425	*Neobatrachus kunapalari (Kunapalari Frog)*			
594.	25427	*Neobatrachus sutor (Shoemaker Frog)*			
595.	25428	*Neobatrachus wilsmorei (Plonking Frog)*			
596.	6972	*Nicotiana cavicola (Talara)*			
597.	6978	*Nicotiana rotundifolia (Round-leaved Tobacco)*			
598.	25748	*Ninox novaeseelandiae (Boobook Owl)*			
599.	24229	*Notomys mitchellii (Mitchell's Hopping-mouse)*			
600.	24194	*Nyctophilus geoffroyi (Lesser Long-eared Bat)*			
601.	24742	*Nymphicus hollandicus (Cockatiel)*			
602.	24407	*Ocyphaps lophotes (Crested Pigeon)*			
603.		*Oecetis sp.*			
604.	24978	*Oedura reticulata*			
605.	17943	*Olearia dampieri*			
606.	12734	*Olearia humilis*			
607.	8140	*Olearia muelleri (Goldfields Daisy)*			
608.	8145	*Olearia pimeleoides (Pimelea Daisybush)*			
609.	18256	*Opercularia spermacocea*			
610.	18255	*Opercularia vaginata (Dog Weed)*			
611.	17	*Ophioglossum lusitanicum (Adders Tongue)*			
612.	24618	*Oreoica gutturalis (Crested Bellbird)*			
613.	25679	*Pachycephala pectoralis (Golden Whistler)*			
614.	25680	*Pachycephala rufiventris (Rufous Whistler)*			
615.		*Paratendipes sp. A*			
616.	25682	*Pardalotus striatus (Striated Pardalote)*			
617.	7089	*Parentucellia latifolia (Common Bartsia)*	Y		
618.	12670	*Parietaria cardiostegia*			
619.	1762	*Parietaria debilis (Pellitory)*			
620.		*Paroster michaelseni*			
621.	1543	*Patersonia drummondii (Drummond's Patersonia)*			
622.	3674	*Petalostylis cassioides*			
623.	24659	*Petroica goodenovii (Red-capped Robin)*			
624.	2310	*Petrophile shuttleworthiana*			
625.	24409	*Phaps chalcoptera (Common Bronzewing)*			
626.	4497	*Phebalium canaliculatum*			
627.	16556	*Phebalium megaphyllum*			
628.	4504	*Phebalium tuberculosum*			
629.	18539	*Philotheca brucei*			
630.	18538	*Philotheca brucei subsp. brevifolia*			
631.	18537	*Philotheca brucei subsp. brucei*			
632.	18384	*Philotheca deserti*			
633.	18385	*Philotheca deserti subsp. deserti*			
634.	18513	*Philotheca glabra*			
635.	18508	*Philotheca sericea*			
636.	18507	*Philotheca thryptomenoides*			
637.	18506	*Philotheca tomentella*			
638.	3058	*Phlegmatospermum drummondii (Drummond's Phlegmatospermum)*			
639.	16824	*Phyllangium sulcatum*			
640.	39070	*Physarum leucophaeum*			
641.	5229	*Pimelea aeruginosa*			
642.	5231	*Pimelea angustifolia (Narrow-leaved Pimelea)*			
643.	5233	*Pimelea avonensis*			
644.	5245	*Pimelea forrestiana*			
645.	11185	*Pimelea microcephala subsp. microcephala*			
646.	12104	*Pimelea spiculigera var. thesioides*			
647.	19744	*Pittosporum angustifolium*			
648.	7297	*Plantago coronopus (Buckshorn Plantain)*	Y		
649.	7299	*Plantago debilis*			
650.	65	*Pleurosorus rutifolius (Blanket Fern)*			
651.	8172	*Podolepis canescens*			
652.	8173	*Podolepis capillaris (Wiry Podolepis)*			
653.	8177	*Podolepis lessonii*			
654.	8182	*Podotheca angustifolia (Sticky Longheads)*			
655.	8184	*Podotheca gnaphalioides (Golden Long-heads)*			
656.	25510	*Pogona minor*			
657.	8187	*Pogonolepis muelleriana*			
658.	8188	*Pogonolepis stricta*			
659.	24681	*Poliocephalus poliocephalus (Hoary-headed Grebe)*			
660.		*Polyarthra dolichoptera*			
661.		*Polypedilum nubifer*			
662.	25722	*Polytelis anthopeplus (Regent Parrot)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
663.	24683	*Pomatostomus superciliosus (White-browed Babbler)*			
664.	25706	*Pomatostomus temporalis (Grey-crowned Babbler)*			
665.	4691	*Poranthera microphylla (Small Poranthera)*			
666.	16688	*Prasophyllum gracile*			
667.		*Procladius paludicola*			
668.	15822	*Prostanthera althoferi subsp. althoferi*			
669.	6912	*Prostanthera campbellii*			
670.	6915	*Prostanthera eckersleyana (Crinkly Mintbush)*			
671.	6919	*Prostanthera magnifica (Magnificent Prostanthera)*			
672.	6920	*Prostanthera patens*			
673.	4725	*Psammomoya choretroides*			
674.		*Pseudomonospilus biocellatus*			Y
675.	24237	*Pseudomys hermannsburgensis (Sandy Inland Mouse)*			
676.	25263	*Pseudonaja modesta (Ringed Brown Snake)*			
677.	25264	*Pseudonaja nuchalis (Gwardar)*			
678.	25434	*Pseudophryne occidentalis (Western Toadlet)*			
679.	24390	*Psophodes occidentalis (Western Wedgebill)*			
680.	2708	*Ptilotus chamaecladus*			
681.	2718	*Ptilotus drummondii (Narrowleaf Mulla Mulla)*			
682.	11260	*Ptilotus drummondii var. drummondii (Pussytail)*			
683.	2719	*Ptilotus eriotrichus*			
684.	11577	*Ptilotus gaudichaudii var. gaudichaudii*			
685.	2729	*Ptilotus grandiflorus*			
686.	2731	*Ptilotus helipteroides (Hairy Mulla Mulla)*			
687.	2732	*Ptilotus holosericeus*			
688.	2746	*Ptilotus nobilis (Tall Mulla Mulla)*			
689.	2747	*Ptilotus obovatus (Cotton Bush)*			
690.	2751	*Ptilotus polystachyus (Prince of Wales Feather)*			
691.	41000	*Ptilotus sp. Goldfields (R. Davis 10796)*			
692.	25009	*Pygopus nigriceps*			
693.	24278	*Pyrrholaemus brunneus (Redthroat)*			
694.	8195	*Quinetia urvillei*			
695.		*Rak sp. nov. b (Venemores)*			
696.	25279	*Ramphotyphlops hamatus*			
697.	25285	*Ramphotyphlops pinguis*			
698.	2581	*Rhagodia drummondii*			
699.	2582	*Rhagodia eremaea (Thorny Saltbush)*			
700.	19495	*Rhagodia sp. Watheroo (R.J. Cranfield & P.J. Spencer 8183)*			
701.		*Rhantus suturalis*			
702.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
703.	13241	*Rhodanthe chlorocephala subsp. rosea*			
704.	13242	*Rhodanthe chlorocephala subsp. splendida*			
705.	13294	*Rhodanthe laevis*			
706.	13234	*Rhodanthe manglesii*			
707.	13296	*Rhodanthe polycephala*			
708.	13252	*Rhodanthe pygmaea*			
709.	13309	*Rhodanthe spicata*			
710.	13254	*Rhodanthe stricta*			
711.	4704	*Ricinocarpos velutinus*			
712.	11151	*Rostraria pumila*	Y		
713.	40425	*Rytidosperma caespitosum*			
714.	2356	*Santalum acuminatum (Quandong)*			
715.	2359	*Santalum spicatum (Sandalwood)*			
716.	7615	*Scaevola hamiltonii*			
717.	7639	*Scaevola restiacea*			
718.	13170	*Scaevola restiacea subsp. restiacea*			
719.	7644	*Scaevola spinescens (Currant Bush)*			
720.	8200	*Schoenia cassiniana (Schoenia)*			
721.	1002	*Schoenus nanus (Tiny Bog Rush)*			
722.	1013	*Schoenus sculptus (Gimlet Bog-rush)*			
723.	1015	*Schoenus subaphyllus*			
724.	17409	*Schoenus variicellae*			
725.	2595	*Sclerolaena alata*			
726.	2606	*Sclerolaena cuneata (Yellow Bindii)*			
727.	2607	*Sclerolaena densiflora*			
728.	2609	*Sclerolaena diacantha (Grey Copperburr)*			
729.	2610	*Sclerolaena drummondii*			
730.	2612	*Sclerolaena eurotioides (Fluffy Bindii)*			
731.	2615	*Sclerolaena fusiformis*			
732.	8877	*Sclerolaena gardneri*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
733.	24199	*Scotorepens balstoni (Inland Broad-nosed Bat)*			
734.	8207	*Senecio glossanthus (Slender Groundsel)*			
735.	25881	*Senecio lacustrinus*			
736.	17645	*Senna artemisioides*			
737.	12276	*Senna artemisioides subsp. filifolia*			
738.	12281	*Senna artemisioides subsp. petiolaris*			
739.	18447	*Senna flexuosa*			
740.	12305	*Senna glutinosa subsp. chatelainiana*			
741.	16378	*Senna pleurocarpa*			
742.	14579	*Senna sp. Austin (A. Strid 20210)*			
743.	18446	*Senna stowardii*			
744.	4970	*Sida calyxhymenia (Tall Sida)*			
745.	19712	*Sida sp. dark green fruits (S. van Leeuwen 2260)*			
746.	2910	*Silene nocturna (Mediterranean Catchfly)*	Y		
747.	14583	*Siloxerus multiflorus*			
748.	25266	*Simoselaps bertholdi (Jan's Banded Snake)*			
749.	28060	*Siphula coriacea*			
750.	3069	*Sisymbrium erysimoides (Smooth Mustard)*	Y		
751.	30948	*Smicrornis brevirostris (Weebill)*			
752.	24108	*Sminthopsis crassicaudata (Fat-tailed Dunnart)*			
753.	24109	*Sminthopsis dolichura (Little long-tailed Dunnart)*			
754.	24111	*Sminthopsis gilberti (Gilbert's Dunnart)*			
755.	24112	*Sminthopsis granulipes (White-tailed Dunnart)*			
756.	24114	*Sminthopsis hirtipes (Hairy-footed Dunnart)*			
757.	6999	*Solanum coactiliferum (Western Nightshade)*			
758.	7018	*Solanum lasiophyllum (Flannel Bush)*			
759.	7023	*Solanum nummularium (Money-leaved Solanum)*			
760.	7025	*Solanum oldfieldii*			
761.	11241	*Solanum orbiculatum subsp. orbiculatum (Round-leaved Solanum)*			
762.	2915	*Spergularia rubra (Sand Spurry)*	Y		
763.	20538	*Stachystemon intricatus*			
764.	4733	*Stackhousia monogyna*			
765.	3076	*Stenopetalum filifolium*			
766.		*Sternopriscus multimaculatus*			
767.	25597	*Strepera versicolor (Grey Currawong)*			
768.	25590	*Streptopelia senegalensis (Laughing Turtle-Dove)*			
769.	24936	*Strophurus michaelseni*			
770.	7685	*Stylidium arenicola*			
771.	7704	*Stylidium confluens*			
772.	7751	*Stylidium limbatum (Fringed-leaved Triggerplant)*			
773.	18417	*Stylidium warriedarense*			
774.	4229	*Swainsona gracilis*			
775.	4237	*Swainsona oliveri*			
776.	13589	*Swainsona perlonga*			
777.	7363	*Synaptantha tillaeacea*			
778.	25705	*Tachybaptus novaehollandiae (Australasian Grebe)*			
779.	24185	*Tadarida australis (White-striped Freetail-bat)*			
780.	24331	*Tadorna tadornoides (Australian Shelduck)*			
781.	30870	*Taeniopygia guttata (Zebra Finch)*			
782.	31492	*Tecticornia disarticulata*			
783.	31918	*Tecticornia doleiformis (Samphire)*			
784.	33236	*Tecticornia halocnemoides (Shrubby Samphire)*			
785.	33319	*Tecticornia indica subsp. bidens*			
786.	34823	*Tecticornia loriae*			
787.	31618	*Tecticornia pruinosa*			
788.		*Testudinella patina*			
789.	2821	*Tetragonia diptera*			
790.	1701	*Thelymitra antennifera (Vanilla Orchid)*			
791.	20732	*Thelymitra petrophila*			
792.	1718	*Thelymitra villosa (Custard Orchid)*			
793.	24845	*Threskiornis spinicollis (Straw-necked Ibis)*			
794.	19696	*Thryptomene costata*			
795.	6053	*Thryptomene cuspidata*			
796.	1343	*Thysanotus patersonii*			
797.	1348	*Thysanotus rectantherus*			
798.	29456	*Thysanotus sp. Twining Wheatbelt (N.H. Brittan 81/29)*			
799.	25203	*Tiliqua occipitalis (Western Bluetongue)*			
800.	6268	*Trachymene cyanopetala*			
801.	6279	*Trachymene ornata (Spongefruit)*			
802.		*Trichocerca rattus carinata*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
803.		*Trichocerca sp. nov. a (Wannara)*			
804.	1361	*Tricoryne elatior (Yellow Autumn Lily)*			
805.	4297	*Trifolium glomeratum (Cluster Clover)*	Y		
806.	4313	*Trifolium subterraneum (Subterranean Clover)*	Y		
807.	33276	*Triglochin isingiana*			
808.	33221	*Triglochin longicarpa*			
809.		*Triplectides australis*			
810.	705	*Tripogon loliiformis (Five Minute Grass)*			
811.	8255	*Ursinia anthemoides (Ursinia)*	Y		
812.	24386	*Vanellus tricolor (Banded Lapwing)*			
813.	25211	*Varanus caudolineatus*			
814.	7656	*Velleia cycnopotamica*			
815.	7658	*Velleia discophora (Cabbage Poison)*			
816.	7661	*Velleia hispida (Hispid Velleia)*			
817.	7664	*Velleia rosea (Pink Velleia)*			
818.	6073	*Verticordia chrysantha*			
819.	12436	*Verticordia interioris*			
820.	6114	*Verticordia rennieana*			
821.	24202	*Vespadelus baverstocki (Inland Forest Bat)*			
822.	722	*Vulpia bromoides (Squirrel Tail Fescue)*	Y		
823.	7393	*Wahlenbergia tumidifructa*			
824.	13331	*Waitzia acuminata var. acuminata*			
825.	6942	*Wrixonia prostantheroides*			
826.	31272	*Wurmbea sp. Paynes Find (C.J. French 1237)*			
827.	35340	*Wurmbea sp. Wanarra (T.D. Macfarlane et al. TDM 4348)*			Y
828.	35339	*Wurmbea sp. White Wells (T.D. Macfarlane et al. TDM 4345)*			Y
829.	1403	*Wurmbea tenella (Eight Nancy)*			
830.	28139	*Xanthoparmelia gongylodes*			
831.	28326	*Xanthoparmelia incantata*			
832.	28172	*Xanthoparmelia reptans*			
833.	28356	*Xanthoparmelia verrucella*			
834.	12685	*Xanthosia bungei*			
835.	1248	*Xerolirion divaricata (Basil's Asparagus)*			
836.	4389	*Zygophyllum eremaeum*			
837.	4390	*Zygophyllum fruticulosum (Shrubby Twinleaf)*			
838.	4394	*Zygophyllum ovatum (Dwarf Twinleaf)*			
839.	4395	*Zygophyllum retivalve*			
840.	12359	*Zygophyllum simile*			

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.

Department of
Environment and Conservation

Our environment, our future

Your Ref: **16001-12**
Our Ref: **54-0812FL**
Enquiries: Jessica Donaldson
Phone: (08) 9334 0123
Fax: (08) 9334 0278
Email: jessica.donaldson@dec.wa.gov.au

Astron Environmental Services
129 Royal Street
East Perth WA 6004

Attention: Natalie Krawczyk

Dear Natalie Krawczyk,

REQUEST FOR THREATENED AND PRIORITY FLORA INFORMATION

I refer to your request of 15 August 2012 for Threatened (Declared Rare) and Priority Flora information in the area approximately 60km north-east of Perenjori. The search was conducted within the area of the coordinates you submitted with an additional 2km buffer area.

A search was undertaken for this area of **(1)** the Department's *Threatened (Declared Rare) and Priority Flora* database (for results, *if any*, see "TPFL" – coordinates are GDA94), **(2)** the *Western Australian Herbarium Specimen* database for priority species opportunistically collected in the area of interest (for results, *if any*, see "WAHERB"- coordinates are GDA94 – see condition number 9 in the attached 'Conditions in Respect of Supply' and **(3)**, the Department's *Threatened and Priority Flora List* [this list is searched using 'place names'. This list, which may also be used as a species target list, contains species that are declared rare (Conservation Code R or X for those presumed to be extinct), poorly known (Conservation Codes 1, 2 or 3), or require monitoring (Conservation Code 4) – for results, *if any*, see "TP List"]. The results are attached electronically to this email.

Attached also are the conditions under which this information has been supplied. Your attention is specifically drawn to the seventh point, which refers to the requirement to undertake field investigations for the accurate determination of Threatened and Priority flora occurrence at a site. *The information supplied should be regarded as an indication only of the Threatened and Priority flora that may be present and may be used as a target list in any surveys undertaken.*

The information provided does not preclude you from obtaining and complying with, where necessary, land clearing approvals from other agencies.

An invoice for $300 (plus GST) to supply this information will be forwarded.

It would be appreciated if any populations of Threatened and Priority flora you encounter in the area could be reported to this Department to ensure their ongoing management.

If you require any further details, or wish to discuss Threatened and Priority flora management, please contact Dr Ken Atkins, Manager, Species and Communities Branch, on (08) 9334 0455.

Yours faithfully

Jessica Donaldson
.....
for Keiran McNamara
DIRECTOR GENERAL

22 August 2012

DEPARTMENT OF ENVIRONMENT AND CONSERVATION

THREATENED (DECLARED RARE) AND PRIORITY FLORA INFORMATION

CONDITIONS IN RESPECT OF SUPPLY OF INFORMATION

1. All requests for data to be made in writing to the Director General, Department of Environment and Conservation, Attention: Threatened Flora Database Officer, Species and Communities Branch.

2. The data supplied may not be supplied to other organisations, nor be used for any purpose other than for the project for which they have been provided, without the prior written consent of the Director General, Department of Environment and Conservation.

3. Specific locality information for Threatened and Priority Flora is regarded as confidential, and should be treated as such by receiving organisations. Specific locality information may not be used in public reports without the written permission of the Director General, Department of Environment and Conservation. Publicly available reports may only show generalised locations or, where necessary, show specific locations without identifying species. Species and Communities Branch is to be contacted for guidance on the presentation of Threatened and Priority Flora information.

4. Note that the Department of Environment and Conservation respects the privacy of private landowners who may have Threatened and Priority Flora on their property. Threatened and Priority Flora locations identified in the data as being on private property should be treated in confidence, and contact with property owners made through the Department of Environment and Conservation.

5. Receiving organisations should note that while every effort has been made to prevent errors and omissions in the data provided, they may be present. The Department of Environment and Conservation accepts no responsibility for this.

6. Receiving organisations must also recognise that the database is subject to continual updating and amendment, and such considerations should be taken into account by the user.

7. **It should be noted that the supplied data do not necessarily represent a comprehensive listing of the Threatened and Priority Flora of the area in question. Its comprehensiveness is dependant on the amount of survey carried out within the specified area. The receiving organisation should employ a botanist, if required, to undertake a survey of the area under consideration.**

8. Acknowledgment of the Department of Environment and Conservation as source of the data is to be made in any published material. The unique reference number that is given upon the request for information should be quoted when referencing the data. Copies of all such publications are to be forwarded to the Department of Environment and Conservation, Attention: The Manager, Species and Communities Branch.

9. The development of the PERTH Herbarium database was not originally intended for electronic mapping (eg. GIS ArcView). The latitude and longitude coordinates for each entry are not verified prior to being databased. It is only in recent times that collections have been submitted with GPS coordinates. Therefore, be aware when using this data in ArcView that some records may not plot to the locality description given with each collection.

Species and Communities Branch
17 Dick Perry Ave, Technology Park, Kensington
Phone: (08) 9334 0455 Fax: (08) 9334 0278
Locked Bag 104, Bentley Delivery Centre, Bentley, Western Australia 6983

www.dec.wa.gov.au

DECLARED RARE AND PRIORITY FLORA LIST

CONSERVATION CODES

for Western Australian taxa

T: **Threatened Flora** (Declared Rare Flora - Extant)
Schedule 1 under the *Wildlife Conservation Act 1950* Rare Flora Notice

Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.

X: **Presumed Extinct Flora** (Declared Rare Flora – Extinct)
Schedule 2 under the *Wildlife Conservation Act 1950* Rare Flora Notice

Taxa which have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such.

Threatened Flora (Schedule 1)are further ranked by the Department according to their level of threat using IUCN Red List criteria:

CR: **Critically Endangered -** considered to be facing an extremely high risk of extinction in the wild.

EN: **Endangered** –considered to be facing a very high risk of extinction in the wild.

VU: **Vulnerable** - considered to be facing a high risk of extinction in the wild.

A list of the current rankings can be downloaded from DEC's Listing of species and ecological communities webpage at
http://www.dec.wa.gov.au/content/view/852/2010/

Species and Communities Branch
17 Dick Perry Ave, Technology Park, Kensington
Phone: (08) 9334 0455 Fax: (08) 9334 0278
Locked Bag 104, Bentley Delivery Centre, Bentley, Western Australia 6983

www.dec.wa.gov.au

Possibly threatened species that have not been adequately surveyed to be listed as Threatened are added to the Priority Flora List under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened flora. Species that are adequately known, are rare but not threatened, or meet criteria for Near Threatened, or that have been recently removed from the threatened list for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring. Conservation Dependent species are placed in Priority 5.

1: Priority One: Poorly-known species

Species that are known from one or a few collections or sight records (generally less than five), all on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, Shire, Westrail and Main Roads WA road, gravel and soil reserves, and active mineral leases and under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes.

2: Priority Two: Poorly-known species

Species that are known from one or a few collections or sight records, some of which are on lands not under imminent threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes.

3: Priority Three: Poorly-known species

Species that are known from collections or sight records from several localities not under imminent threat, or from few but widespread localities 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 localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them.

4: 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.
(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.

5: Priority Five: Conservation Dependent species

Species 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.

Recommendations for additions, deletions or changes to the Declared Rare and Priority Flora List should be forwarded to the Flora Administration Officer or Senior Botanist Species and Communities Branch, DEC.

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ABBREVIATIONS USED IN THREATENED AND PRIORITY FLORA DATABASE

VESTING

AAP	Aboriginal Planning Authority
AGR	Chief Executive, Dep. of Agriculture
ALT	Aboriginal Land Trust
APB	Agricultural Protection Board of WA
BGP	Botanical Gardens & Parks Authority
BSA	Boy Scouts Association
CC	Conservation Commission – NPNCA - LFC
CGT	Crown Grant in Trust
COM	Commonwealth of Australia
CRO	Crown Freehold-Govt Ownership
CRW	Crown
DAG	Dep. of Agriculture
DOW	Dep. of Water
DPI	Dep. of Planning
EXD	Exec Direc CALM
FES	Fire and Emergency Services Aust.
HOW	Dep. of Housing/State Housing Commission
ILD	Industrial Lands Develop. Auth
LAC	LandCorp
LGA	Shire/LGA
MAG	Minister for Agriculture
MCB	Metropolitan Cemeteries Board
MED	Ministry of Education
MHE	Minister for Health
MIN	Minister for Mines
MPL	Ministry for Planning
MPR	Minister for Prisons
MRD	Main Roads WA
MTR	Minister for Transport
MWA	Minister for Water Resources
MWO	Minister for Works
NAT	Natural Trust of Australia WA
NON	Not Vested
PLB	Pastoral Lands Board
PRI	Private/Freehold
RAI	Public Transport Authority
REL	Religious Organisation
SPC	State Planning Commission
SYN	Synergy (ex Western Power)
SWA	State of Western Australia
TEL	Telstra
UNK	Unknown
WAT	Water Corporation
WEL	Minister Community Welfare
WRC	Water & Rivers Commission
XPL	Ex-Pastoral Lease

PURPOSES

ABR	Aboriginal Reserve
ACC	Access Track
AER	Aerodrome
AIR	Airport
ARS	Agricultural Research Station
BAP	Baptist Union of WA
CAM	Camping
CAR	Caravan park
CEM	Cemetery
CFA	Conservation of Fauna
CFF	Conservation Of Flora & Fauna
CFL	Conservation of Flora
CHU	Church
CMN	Communications
COM	Common
CON	Conservation Park
CPK	Car Park
CRM	Conservation & Resource Management
DEF	Defence
DRA	Drain
EDE	Educational Endowment
EDU	Educational purposes UWA
ENE	Enjoyment of Natural Environ.
EPL	Ex-pastoral Lease (Sect 33(2) CALM Act)
EPS	Explosives
EXC	Excepted from sale
EXL	Exploration Lease
EXP	Experimental Farm
FIR	Firing Range
FOR	State Forest
FP	Foreshore Purposes
GE	General Lease
GHA	Grain Handling
GOL	Golf
GRA	Gravel Pit
GVT	Government Requirements
HAR	Harbour Purposes
HEP	Heritage Purposes
HER	Heritage trail
HOS	Hospital
KEN	Kennels
LGA	LGA/Shire Requirements
LPR	Landscape Protection
MIN	Mining lease
MUN	Municipal Purposes
NPK	National Park
NRE	Nature Reserve
OTH	Other
PAR	Parkland (& Recreation)
PAS	Pastoral lease
PCR	Proposed for Conservation
PFF	Protection of Flora & Fauna
PFL	Protection of Flora
PIC	Picnic ground
PLA	Plantation
PMC	Protection of Meteorite Crater
POS	Public Open Space
PPA	Public parkland
PRS	Prison site
PUR	Purchase Lease
PUT	Public Utility
QUA	Quarry
RAC	Racecourse
RAD	Radio Station
REC	Recreation
REH	Rehabilitation/Re-establish Native Plants
RRE	Railway Reserve
RUB	Rubbish
SAL	Saleyards
SAN	Sand
SCH	School-site
SET	Settlers requirements
SHO	Showgrounds
SNN	Sanitary
SOI	Soil Conservation
STO	Stopping place
STK	Stock Route
TIM	Timber
TOU	Tourism
TOW	Town-site
TRA	Training Ground
TRI	Trig station
UCL	Unallocated Crown Land
UNK	Unknown
VER	Road Verge
VPF	Vermin Proof Fence
WAT	Water
WLS	Wildlife Sanctuary
WOO	Firewood

DEPARTMENT OF ENVIRONMENT AND CONSERVATION

THREATENED AND PRIORITY ECOLOGICAL COMMUNITIES INFORMATION

CONDITIONS IN RESPECT OF SUPPLY OF INFORMATION

1. All requests for data are to be made in writing to the Director General, Department of Environment and Conservation Attention: Species and Communities Branch

2. The data supplied may not be supplied to other organisations, nor be used for any purpose other than for the project for which they have been provided, without the prior written consent of the data custodian (Val English), Species and Communities Branch.

3. Specific locality information for threatened and priority ecological communities (TECs/PECs) is regarded as confidential, and should be treated as such by receiving organisations. Specific locality information for TECs/PECs may not be used in public reports without the written permission of the Director General, Department of Environment and Conservation. Publicly available reports may only show generalised locations (ie buffer locations). The TEC database manager is to be contacted for guidance on the presentation of TEC/PEC information.

4. Note that the Department of Environment and Conservation respects the privacy of private landowners who may have threatened and priority ecological communities on their property. Locations of TECs/PECs identified in the data as being on private property should be treated in confidence, and contact with property owners made through the Department of Environment and Conservation.

5. Receiving organisations should note that while every effort has been made to prevent errors and omissions in the data provided, they may be present. The Department of Environment and Conservation accepts no responsibility for this.

6. Receiving organisations must also recognise that the Threatened Ecological Communities database is subject to continual updating and amendment, and such considerations should be taken into account by the user.

7. It should be noted that the supplied data do not necessarily represent a comprehensive listing of the threatened and priority ecological communities of the area in question. Its comprehensiveness is dependant on the amount of survey carried out within the specified area. Private property has been relatively little surveyed. The receiving organisation should employ a consultant, if there is any likelihood of the presence of any threatened or priority ecological community, to undertake a survey of the area under consideration.

8. Acknowledgment of the Department of Environment and Conservation as source of the data is to be made in any published material. Copies of all such publications are to be forwarded to the Department of Environment and Conservation, Attention: Manager, Species and Communities Branch.

OID_	POPID	NAMEID	TAXON	CONSSTATUS	WARANK	POPNUMBER	SUBPOPCODE	GDA94LAT	GDA94LONG	POPSTATUS	VESTING	PURPOSE1	PURPOSE2	COUNTDATE
	96077	32017	Acacia sulcaticaulis	1		1		-29.177777	116.965916		EXD	UCL	MIN	24/04/2007 0:00
	96078	32017	Acacia sulcaticaulis	1		2		-29.170166	116.965722		EXD	UCL	MIN	11/12/2007 0:00
	96079	32017	Acacia sulcaticaulis	1		3		-29.179888	116.972138		EXD	UCL	MIN	2/10/2007 0:00
	95794	30460	Acacia woodmaniorum	T	VU	1		-29.136916	116.906638		XPL	CON		24/06/2004 0:00
	95795	30460	Acacia woodmaniorum	T	VU	2		-29.139305	116.864777		XPL	CON		5/07/2004 0:00
	95796	30460	Acacia woodmaniorum	T	VU	3		-29.140833	116.883055		XPL	CON		16/07/2004 0:00
	95797	30460	Acacia woodmaniorum	T	VU	4		-29.091888	116.904138		XPL	CON		4/05/2006 0:00
	95798	30460	Acacia woodmaniorum	T	VU	5		-29.091888	116.904138		XPL	CON		30/03/2007 0:00
	93866	17232	Austrostipa blackii	3		12		-29.153388	116.910527		NON	UCL	MIN	16/09/2005 0:00
	96445	33023	Bossiaea sp. Jackson Range (G. Cockerton & S. McNee LCS 13614)	3		7		-29.111083	116.999638		RDL	COM	EXL	13/07/2009 0:00
	95728	29694	Calandrinia kalanniensis	2		6		-29.187583	116.944		PLB	PAS		14/11/2005 0:00
	96072	32016	Chamelaucium sp. Warriedar (A.P. Brown & S. Patrick APB 1100)	1		1		-29.130404	116.998658		RDL	COM		17/07/1994 0:00
	96073	32016	Chamelaucium sp. Warriedar (A.P. Brown & S. Patrick APB 1100)	1		2		-29.148388	116.968694		EXD	UCL		17/03/2004 0:00
	96074	32016	Chamelaucium sp. Warriedar (A.P. Brown & S. Patrick APB 1100)	1		3		-29.135166	116.984888		RDL	COM	EXL	1/10/2004 0:00
	96075	32016	Chamelaucium sp. Warriedar (A.P. Brown & S. Patrick APB 1100)	1		4		-29.204	116.871388		EXD	UCL		24/09/2007 0:00
	96076	32016	Chamelaucium sp. Warriedar (A.P. Brown & S. Patrick APB 1100)	1		5		-29.170916	116.970888		EXD	UCL		29/07/2008 0:00
	92723	14728	Chamelaucium sp. Yalgoo (Y. Chadwick 1816)	1		2		-29.164027	116.961888		EXD	UCL		2/09/2003 0:00
	92724	14728	Chamelaucium sp. Yalgoo (Y. Chadwick 1816)	1		3		-29.072527	116.971805		RDL	COM	EXL	3/09/2003 0:00
	92725	14728	Chamelaucium sp. Yalgoo (Y. Chadwick 1816)	1		4		-29.081916	116.972611		RDL	COM	EXL	3/09/2003 0:00
	92726	14728	Chamelaucium sp. Yalgoo (Y. Chadwick 1816)	1		5		-28.954333	116.9525		PLB	PAS	MIN	4/09/2003 0:00
	92727	14728	Chamelaucium sp. Yalgoo (Y. Chadwick 1816)	1		6		-28.947305	116.947138		PLB	PAS	MIN	4/09/2003 0:00
	92728	14728	Chamelaucium sp. Yalgoo (Y. Chadwick 1816)	1		7		-28.934166	116.961666		PLB	PAS	MIN	4/09/2003 0:00
	92729	14728	Chamelaucium sp. Yalgoo (Y. Chadwick 1816)	1		8		-28.924944	116.954111		PLB	PAS		4/09/2003 0:00
	92730	14728	Chamelaucium sp. Yalgoo (Y. Chadwick 1816)	1		9		-28.914444	116.958916		PLB	PAS		5/09/2003 0:00
	92717	14728	Chamelaucium sp. Yalgoo (Y. Chadwick 1816)	1		10		-29.103861	117.002222		RDL	COM	MIN	15/01/2004 0:00
	92718	14728	Chamelaucium sp. Yalgoo (Y. Chadwick 1816)	1		11		-29.14975	116.967222		EXD	UCL		21/01/2004 0:00
	95983	31814	Eucalyptus jutsonii subsp. kobela	1		1		-29.038333	116.795555		EXD	EPL	CON	28/05/2006 0:00
	85787	2090	Grevillea scabrida	3		5		-29.201794	116.945603		LGA	VER		17/07/1994 0:00
	98054	2090	Grevillea scabrida	3		7	A	-29.130404	116.998658		LGA	VER		17/07/1994 0:00
	98055	2090	Grevillea scabrida	3		7	B	-29.130404	116.998658		RDL	PAS		17/07/1994 0:00
	85825	2100	Grevillea subtiliflora	3		9		-29.164138	116.972388		EXD	UCL	MIN	2/09/2003 0:00
	85812	2100	Grevillea subtiliflora	3		10		-29.169944	116.960472		EXD	UCL	MIN	27/09/2004 0:00
	85813	2100	Grevillea subtiliflora	3		11		-29.141888	116.969		RDL	COM	MIN	28/09/2004 0:00
	85815	2100	Grevillea subtiliflora	3		13		-29.194194	116.966694		PLB	PAS	MIN	24/04/2007 0:00
	86116	2803	Gunniopsis divisa	3		3		-29.163527	116.786805		EXD	EPL	EXL	27/09/2005 0:00
	86118	2803	Gunniopsis divisa	3		5		-29.137944	116.877666		EXD	EPL	MIN	27/10/2005 0:00
	86125	2809	Gunniopsis rubra	3		15		-29.07325	116.839333		NON	UCL		21/09/2005 0:00
	86126	2809	Gunniopsis rubra	3		16		-29.163527	116.786805		NON	UCL		27/09/2005 0:00
	92900	14993	Hydrocotyle sp. Warriedar (P.G. Wilson 12267)	1		1		-29.169944	116.960472		EXD	UCL	MIN	27/09/2004 0:00
	92902	14993	Hydrocotyle sp. Warriedar (P.G. Wilson 12267)	1		3		-29.160944	116.959527		EXD	UCL	MIN	29/09/2004 0:00
	96451	33280	Lepidosperma sp. Blue Hills (A. Markey & S. Dillon 3468)	1		1		-29.190166	116.773166		EXD	UCL	MIN	23/09/2005 0:00
	96452	33280	Lepidosperma sp. Blue Hills (A. Markey & S. Dillon 3468)	1		2		-29.188444	116.778222		EXD	UCL	MIN	23/09/2005 0:00
	96453	33280	Lepidosperma sp. Blue Hills (A. Markey & S. Dillon 3468)	1		3		-29.173944	116.782972		EXD	UCL	MIN	26/09/2005 0:00
	95783	30412	Micromyrtus acuta	3		4		-29.129833	116.905722		EXD	UCL	MIN	17/09/2005 0:00
	95784	30412	Micromyrtus acuta	3		5		-29.070194	116.923111		EXD	UCL	EXL	20/09/2005 0:00
	95785	30412	Micromyrtus acuta	3		6		-29.085027	116.909527		EXD	UCL	EXL	22/09/2005 0:00
	95786	30412	Micromyrtus acuta	3		7		-29.180916	116.961944		EXD	UCL	MIN	24/04/2007 0:00
	95787	30412	Micromyrtus acuta	3		8		-29.269472	116.835333		EXD	UCL	EXL	17/05/2007 0:00
	95780	30412	Micromyrtus acuta	3		10		-29.230722	116.986722		PLB	PAS	EXL	29/07/2008 0:00
	96003	31845	Micromyrtus trudgenii	3		3		-28.919222	116.970472		RDL	PAS	MIN	22/06/2000 0:00
	96004	31845	Micromyrtus trudgenii	3		4		-28.919805	116.970638		RDL	PAS	MIN	22/06/2000 0:00
	92168	14335	Millotia dimorpha	1		1		-29.187305	116.772527		EXD	EPL	MIN	23/09/2005 0:00
	92169	14335	Millotia dimorpha	1		2		-29.188444	116.778222		EXD	EPL	MIN	23/09/2005 0:00
	92170	14335	Millotia dimorpha	1		3		-29.179861	116.774944		EXD	EPL	MIN	25/09/2005 0:00
	92171	14335	Millotia dimorpha	1		4		-29.173722	116.785305		EXD	EPL	MIN	27/09/2005 0:00
	92253	14441	Petrophile pauciflora	3		9		-29.105972	116.781555		NON	UCL		7/02/2007 0:00
	92244	14441	Petrophile pauciflora	3		11		-29.27525	116.82275		NON	UCL		17/05/2007 0:00
	95741	29917	Polianthion collinum	3		2		-28.918541	116.972071		RDL	PAS		22/06/2000 0:00
	95742	29917	Polianthion collinum	3		3		-28.930847	116.970377		RDL	PAS		22/06/2000 0:00
	90896	13243	Rhodanthe collina	1		2		-29.161472	116.958611		EXD	EPL	MIN	2/09/2003 0:00
	90899	13243	Rhodanthe collina	1		3		-29.169666	116.957833		EXD	EPL	MIN	27/09/2004 0:00
	90900	13243	Rhodanthe collina	1		4		-29.177138	116.972222		EXD	EPL	MIN	28/09/2004 0:00
	90901	13243	Rhodanthe collina	1		5		-28.992444	116.961555		EXD	EPL		4/09/2003 0:00
	90902	13243	Rhodanthe collina	1		6		-29.181277	116.825777		EXD	EPL		28/09/2004 0:00
	90903	13243	Rhodanthe collina	1		7		-29.181611	116.814694		EXD	EPL		29/09/2004 0:00
	90904	13243	Rhodanthe collina	1		8		-29.152055	117.020305		EXD	EPL		1/10/2004 0:00
	90905	13243	Rhodanthe collina	1		9		-28.909472	117.018388		EXD	EPL		5/08/2005 0:00
	90887	13243	Rhodanthe collina	1		10		-29.140666	116.883444		EXD	EPL		27/10/2005 0:00
	90888	13243	Rhodanthe collina	1		11		-29.129833	116.905722		EXD	EPL		17/09/2005 0:00
	90890	13243	Rhodanthe collina	1		14		-29.071722	116.921333		EXD	EPL		20/09/2005 0:00
	90891	13243	Rhodanthe collina	1		15		-29.190166	116.773166		EXD	EPL	MIN	23/09/2005 0:00
	90895	13243	Rhodanthe collina	1		19		-29.187972	116.831305		EXD	EPL	EXL	9/09/2008 0:00
	90898	13243	Rhodanthe collina	1		21		-29.123861	116.856833		EXD	EPL		29/09/2004 0:00
	95330	20767	Spartothamnella sp. Helena & Aurora Range (P.G. Armstrong 155-109)	3		22		-29.133333	116.866666		NON	UCL		22/11/1992 0:00
	91984	14233	Stenanthemum poicilum	3		4		-29.198583	116.876083		NON	UCL		16/11/2005 0:00
	91985	14233	Stenanthemum poicilum	3		5		-29.133333	117.016666		NON	COM		22/11/1992 0:00
	91977	14233	Stenanthemum poicilum	3		10		-29.138888	116.899166		NON	UCL		21/10/2003 0:00
	91979	14233	Stenanthemum poicilum	3		12		-29.192722	117.007222		NON	UCL		25/04/2007 0:00
	91981	14233	Stenanthemum poicilum	3		14		-29.126166	117.009638		RDL	COM		31/08/2008 0:00
	96494	33556	Stylidium sp. Yalgoo (D. Coultas et al. Opp 01)	T	VU	1		-29.129638	116.884888		NON	UCL	MIN	7/09/2009 0:00
	96504	33556	Stylidium sp. Yalgoo (D. Coultas et al. Opp 01)	T	VU	2		-29.130027	116.902638		NON	UCL	MIN	9/09/2009 0:00
	96514	33556	Stylidium sp. Yalgoo (D. Coultas et al. Opp 01)	T	VU	3		-29.128416	116.914166		NON	UCL	MIN	9/09/2009 0:00
	96515	33556	Stylidium sp. Yalgoo (D. Coultas et al. Opp 01)	T	VU	4		-29.094888	116.905944		NON	UCL	MIN	10/09/2009 0:00
	96516	33556	Stylidium sp. Yalgoo (D. Coultas et al. Opp 01)	T	VU	5		-29.119833	116.939916		NON	UCL	MIN	9/09/2009 0:00
	96517	33556	Stylidium sp. Yalgoo (D. Coultas et al. Opp 01)	T	VU	6		-29.074722	116.949666		NON	UCL	MIN	9/09/2009 0:00
	96518	33556	Stylidium sp. Yalgoo (D. Coultas et al. Opp 01)	T	VU	7		-29.080555	116.960027		NON	COM	MIN	9/09/2009 0:00
	96519	33556	Stylidium sp. Yalgoo (D. Coultas et al. Opp 01)	T	VU	8		-29.108361	116.97		NON	COM	MIN	9/09/2009 0:00
	96520	33556	Stylidium sp. Yalgoo (D. Coultas et al. Opp 01)	T	VU	9		-29.11175	116.9905		NON	COM	MIN	10/09/2009 0:00
	96495	33556	Stylidium sp. Yalgoo (D. Coultas et al. Opp 01)	T	VU	10		-29.149944	116.93875		NON	UCL	MIN	11/09/2009 0:00
	96496	33556	Stylidium sp. Yalgoo (D. Coultas et al. Opp 01)	T	VU	11		-29.153555	116.94125		NON	UCL	MIN	9/09/2009 0:00
	96497	33556	Stylidium sp. Yalgoo (D. Coultas et al. Opp 01)	T	VU	12		-29.177555	116.94		NON	UCL	MIN	9/09/2009 0:00
	96498	33556	Stylidium sp. Yalgoo (D. Coultas et al. Opp 01)	T	VU	13		-28.953083	116.90725		PLB	PAS	MIN	9/09/2009 0:00

OID_	POPID	NAMEID	TAXON	CONSSTATUS	WARANK	POPNUMBER	SUBPOPCODE	GDA94LAT	GDA94LONG	POPSTATUS	VESTING	PURPOSE1	PURPOSE2	COUNTDATE
	96499	33556	Stylidium sp. Yalgoo (D. Coultas et al. Opp 01)	T	VU	14		-28.960555	116.932611		NON	UCL	MIN	9/09/2009 0:00
	105132	33556	Stylidium sp. Yalgoo (D. Coultas et al. Opp 01)	T	VU	15	A	-28.959916	116.950666		PLB	PAS	MIN	9/09/2009 0:00
	105133	33556	Stylidium sp. Yalgoo (D. Coultas et al. Opp 01)	T	VU	15	B	-28.960916	116.949944		RDL	UCL	MIN	9/09/2009 0:00
	96500	33556	Stylidium sp. Yalgoo (D. Coultas et al. Opp 01)	T	VU	16		-28.954194	116.952416		PLB	PAS	MIN	9/09/2009 0:00
	96501	33556	Stylidium sp. Yalgoo (D. Coultas et al. Opp 01)	T	VU	17		-28.998	116.954888		NON	UCL	MIN	8/09/2009 0:00

OID_	SHEET_NO	TAXON	CONS_CODE	SITE	VEGETATION	LOCALITY	LAT	LONG_	COLL_DATE
	PERTH 07577451	Acacia diallaga	2	Low hill, moderate slope. Red silty loam over basalt.	Open mixed Acacia thicket with Allocasuarina dielsiana, Grevi	Karara Station, ca 7 km S of old Mungada mine	-29.20399	116.871656	04 09 2007
	PERTH 07424396	Acacia diallaga	2	Near crest of stoney (basalt), rise, gentle slope.	With Borya sphaerocephala, Acacia sp. Karara, Acacia acumin	Gindalbie Iron Ore Project, Karara Station	-29.14971	116.968855	13 09 2006
	PERTH 07424361	Acacia diallaga	2	Growing on basalt rise. Shallow red/brown silty loam.	With Borya sphaerocephala, Acacia sp. Karara, A. acuminata.	Gindalbie Iron Ore Project, Karara Station	-29.20398	116.871544	08 08 2006
	PERTH 07534744	Acacia diallaga	2	Moderate hillslope. Red silty loam over basalt.	Open mixed Acacia thicket with Grevillea scabrida, G. subtilifl	Mount Mulgine area, Warriedar Station	-29.15511	116.976527	24 04 2007
	PERTH 07703651	Acacia diallaga	2	Low hill, gentle slope. Red silty loam over basalt outcropping.	Open mixed Acacia thicket, with Allocasuarina dielsiana, Grev	Warriedar Station ca 2 km N of Perenjori-Rothsay road, near old Minjar Haul road	-29.10572	116.994583	11 12 2007
	PERTH 07540043	Acacia diallaga	2	Skeletal soil on lower slope of basalt hill.	In regenerating Allocasuarina shrubland (previously burnt).	ca 90 km due E of Morawa on Warriedar - Perenjori road 16.7 km W of Yalgoo - Great Northern Highway road (near Mt Mulgine)	-29.14375	116.9685	17 07 2007
	PERTH 07424388	Acacia diallaga	2	Growing on basalt rise. Shallow red/brown silty loam.	With Borya sphaerocephala, Acacia sp. Karara.	Gindalbie Iron Ore Project, Karara Station	-29.20398	116.871544	13 09 2006
	PERTH 07534752	Acacia diallaga	2	Low hill, moderate slope. Red silty loam over basalt.	Open mixed Acacia thicket with Allocasuarina dielsiana, Grevi	Karara Station, ca 10 km S of Windanning Hill	-29.204	116.871555	13 09 2006
	PERTH 07889488	Acacia diallaga	2	Low hill. Brown clay loam over basalt.	Open thicket with Chamelaucium sp. Warriedar, Acacia karin	Just E of Mount Mulgine, ca 70 km W of Paynes Find	-29.17925	117.007222	29 07 2008
	PERTH 08021120	Acacia karina	2	Low hill. Brown clay loam over granite and quartz.	Open thicket with Borya sphaerocephala, Acacia jibberdinger	Southern end of Mount Mulgine, off main part of mountain but still similar geology, ca 70 km W of Paynes Find	-29.19419	116.972277	25 07 2008
	PERTH 07299478	Acacia karina	2	Red-brown silty clay loam with ironstone pebbles and quartz.		Karara Station, Mt Karara, between Perenjori and Paynes Find	-29.16263	116.80458	19 05 2006
	PERTH 07406185	Acacia karina	2	North-east facing moderately inclined midslope of laterised b	Open shrubland of Allocasuarina acutivalvis subsp. prinsepiar	Blue Hills Range, Mount Karara, survey site KARA03. On Karara Station c. 3.5 km ESE of Blue Well Bore and 3.5 km WSW of Euro Bore. c. 87 km W of Paynes Find	-29.1897	116.776818	23 09 2005
	PERTH 07300034	Acacia karina	2	Rocky rise. Red silty gravel.		Mid-west Lease, Karara Station, Mungada Ridge, N of Windaning Hill, between Perenjori and Paynes Find	-29.19858	116.876097	16 11 2005
	PERTH 07299494	Acacia karina	2	Upperslope. Banded Ironstone Formation.		Gindalbie Lease, Karara Station, Mungada Ridge, N of Windaning Hill, between Perenjori and Paynes Find	-29.13751	116.898314	03 05 2006
	PERTH 07299486	Acacia karina	2	Upperslope. Banded Ironstone Formation.		Gindalbie Lease, Karara Station, Mungada Ridge, N of Windaning Hill, between Perenjori and Paynes Find	-29.13955	116.907318	22 04 2006
	PERTH 07300026	Acacia karina	2	Crest. Banded Ironstone Formation.		Blue Hill Range, Karara Station, between Mt Karara and Windaning Hill	-29.15131	116.821135	23 06 2004
	PERTH 07296991	Acacia karina	2	Ironstone Banded Ironstone Formation, clay silt.		Blue Hill Range, Karara Station, between Mount Karara and Windaning Hill	-29.15122	116.823818	16 05 2006
	PERTH 07299451	Acacia karina	2	Ironstone, Banded Ironstone Formation, clay silt.		Blue Hill Range, Karara Station, between Mt Karara and Windaning Hill	-29.15148	116.822995	16 05 2006
	PERTH 07299508	Acacia karina	2	Ridge, quartz, rocky.		Gindalbie Lease, Karara Station, Mungada Ridge, N of Windaning Hill, between Perenjori and Paynes Find	-29.19267	116.973005	28 09 2004
	PERTH 07299443	Acacia karina	2	Red-brown clay silt, near Banded Ironstone Formation area. M		Karara Station, Mount Karara between Perenjori and Paynes Find	-29.18815	116.778951	18 05 2006
	PERTH 07540426	Acacia karina	2	On granite - greenstone.	In open mixed Acacia thicket of Acacia aff. subsessilis, Borya s	Along fence lines E and S of Windanning Hill, Karara Station	-29.21823	116.875528	22 03 2007
	PERTH 07540418	Acacia karina	2	On steep upper slope of Banded Ironstone.	In thickets with Acacia woodmaniorum, A. aulacophylla, A. an	On Mungada Ridge, ca 3 km N of Windanning Hill, Karara Station	-29.18973	116.901451	29 03 2007
	PERTH 07406193	Acacia karina	2	South-east facing moderately inclined lower hillslope of lateri	Sparse shrubland of Allocasuarina acutivalvis subsp. prinsepia	Blue Hills Range, Mount Karara, survey site KARA19. On Karara Station c. 4 km ENE of Blue Well Bore and 3 km WNW of Euro Bore. c. 87 km W of Paynes Find	-29.17373	116.785311	27 09 2005
	PERTH 07406177	Acacia karina	2	North north-west facing moderately inclined hillcrest of band	Open shrubland of Allocasuarina acutivalvis subsp. prinsepiar	Blue Hills Range, Mount Karara, survey site KARA05. On Karara Station c. 2 km ESE of Blue Well Bore and 4 km WSW of Euro Bore, c. 87 km W of Paynes Find	-29.18731	116.772528	23 09 2005
	PERTH 07797907	Acacia karina	2	Hilltop. Brown-red loam, boulders, basalt.	Thicket. Allocasuarina dielsiana, Acacia burkittii.	Low hill N of Mt Mulgine, on Warriedar Station, 80 km E of Perenjori	-29.19419	116.966694	24 04 2007
	PERTH 07797974	Acacia karina	2	Slope. Brown-red clay - loam.	Thicket. Acacia spp., Santalum spicatum.	Damperwah Hills area, on Karara Station, 80 km E of Perenjori	-29.27183	116.831305	17 05 2007
	PERTH 08060061	Acacia karina	2			Karara Ridge	-29.18304	116.77379	14 10 2008
	PERTH 07692706	Acacia sulcaticaulis	1	Rocky creekline between low hills, moderate slope. Red silty l	Dense thicket with Allocasuarina acutivalvis and Acacia burkit	Mount Mulgine, Warriedar Station, ca 80 km E of Morawa	-29.17016	116.965723	11 12 2007
	PERTH 07464436	Acacia sulcaticaulis	1	Low hill, moderate slope. Red silty loam over granite/greenst	Thicket of Allocasuarina acutivalvis.	Mount Mulgine area, Warriedar Station, ca 5 km E of Perenjori-Rothsay Road	-29.17011	116.966	18 05 2007
	PERTH 07577508	Acacia sulcaticaulis	1	Red silty loam over granite/greenstone. Rocky creekline betw	Dense thicket with Allocasuarina acutivalvis and Acacia burkit	Mount Mulgine, Warriedar Station, ca 80 km E of Morawa	-29.17016	116.965723	29 10 2007
	PERTH 07466234	Acacia sulcaticaulis	1	Low hill, moderate slope. Red silty loam over granite/greenst	Thicket of Allocasuarina acutivalvis.	Mt Mulgine area, Warriedar Station, ca 5 km E of Perenjori - Rothsay	-29.17777	116.965916	24 04 2007
	PERTH 07777418	Acacia sulcaticaulis	1	Skeletal soil amoung quartz rocks at base of hill.		Mt Mulgine about 90 km due E of Morawa	-29.18162	116.975742	02 10 2007
	PERTH 07777264	Acacia sulcaticaulis	1	Low rocky ridge.		Mt Mulgine about 90 km due E of Morawa	-29.17862	116.973575	02 10 2007
	PERTH 07577478	Acacia sulcaticaulis	1	Rocky creekline between low hills, moderate slope. Red silty l	Dense thicket with Allocasuarina acutivalvis and Acacia burkit	Mount Mulgine, Warriedar Station, ca 80 km E of Morawa	-29.17016	116.965723	04 09 2007

OID_	SHEET_NO	TAXON	CONS_CODE	SITE	VEGETATION	LOCALITY	LAT	LONG_	COLL_DATE
	PERTH 07540019	Acacia sulcaticaulis	1	Skeletal loam with quartzite rock on lower slopes of hill, grow		Base of Mt Mulgine, ca 90 km due E of Morawa	-29.18402	116.973833	17 07 2007
	PERTH 07889461	Acacia sulcaticaulis	1	Lower slope. Brown clay loam over granite and quartz.	Open thicket with Borya sphaerocephala, Allocasuarina camp	NE lower slope of Mount Mulgine, off main part of mountain but still similar geology, ca 70 km W of Paynes Find	-29.18294	116.99525	20 07 2008
	PERTH 03024571	Acacia woodmaniorum	T	Red brown clay, banded ironstone hill (mine site).	Open scrub.	Blue Hill Range	-29.13333	116.866666	22 11 1992
	PERTH 07343566	Acacia woodmaniorum	T	Steep ironstone slope, mid-slope. Skeletal red silt over ironst	Eucalyptus petraea, Dodonaea petiolaris, Acacia exocarpoide	Gindalbie Metals Ltd. Mungada Hematite project, (West Mungada Ridge), Mungada Ridge, ca 60 km S of Yalgoo, Midwest region, Geraldton Shire	-29.13653	116.904422	22 04 2006
	PERTH 07343523	Acacia woodmaniorum	T	Old mine pit with associated tracks and waste rock dumps. Rc	Disturbed.	Gindalbie Metals Ltd. Mungada Hematite project (old Mungada mine), Mungada Ridge, ca 60 km S of Yalgoo, Midwest Region, Geraldton District	-29.14199	116.861596	23 04 2006
	PERTH 07343531	Acacia woodmaniorum	T	Mid slope. Banded Ironstone Formation.	Acacia quadrimarginea, Santalum spicatum, Melaleuca nema	Gindalbie Metals Ltd. Mungada Hematite project, Mungada Ridge, ca 60 km S of Yalgoo, Midwest Region, Geraldton District	-29.13314	116.909113	26 04 2006
	PERTH 07410743	Acacia woodmaniorum	T	Small ironstone ridge. Skeletal red silt over ironstone.	Micromyrtus sp. Warriedar.	N of Jasper Hill, Gindalbie Metals Ltd., Mungada Haematite project, Mungada Ridge, c. 60 km S of Yalgoo, Midwest Region, Geraldton district, Shire of Perenjori, CALM managed land	-29.08647	116.908083	04 05 2006
	PERTH 07410808	Acacia woodmaniorum	T	Ironstone ridge, side of hill. Skeletal red silt over ironstone.		On Jasper Hill, N of Gindalbie Metals Ltd, Mungada Haematite project, Mungada Ridge, c. 60 km S of Yalgoo, Midwest Region, Geraldton district, Shire of Perenjori, CALM managed land	-29.09188	116.904134	04 05 2006
	PERTH 06985149	Acacia woodmaniorum	T	Ironstone range. Red loam-shallow. Banded ironstone.	Melaleuca with tall open shrubland.	Mungada Mine, Blue Hills, Lochada Station	-29.13929	116.864769	05 07 2004
	PERTH 07406169	Acacia woodmaniorum	T	North-west facing steep midslope of banded ironstone and la	Open shrubland of Acacia aneura and Micromyrtus sp. Warri	Blue Hills Range, Windaning Hill, adjacent to survey site WIND04. On Karara Station c. 5.5 km NNE of Mulga Bore and 77 km W of Paynes Find	-29.13691	116.906649	15 09 2005
	PERTH 07406150	Acacia woodmaniorum	T	West facing steep mid to upper hillslope of banded ironstone	Shrubland of Dodonaea viscosa subsp. mucronata, Acacia mir	Blue Hills Range, Windaning Hill, survey site WIND02. On Karara Station c. 4.5 km N of Mulga Bore and 77 km W of Paynes Find	-29.14046	116.883775	14 09 2005
	PERTH 07343558	Acacia woodmaniorum	T	Steep ironstone slope, mid-slope. Skeletal red silt over ironst	Thicket. Allocasuarina acutivalvis subsp. prinsepiana, Xanthos	Gindalbie Metals Ltd. Mungada Hematite project (Tor area), Mungada Ridge, ca 60 km S of Yalgoo, Midwest Region, Geraldton District	-29.14019	116.909312	22 04 2006
	PERTH 06962726	Acacia woodmaniorum	T	Crest of rocky hill, banded ironstone, very steep.	Open Low Woodland of Eucalyptus petraea over Scrub of Doc	Mt Mungada, Karara Station, MidWest Region	-29.13626	116.905738	24 06 2004
	PERTH 07526180	Acacia woodmaniorum	T			Karara Station (between Perenjori and Paynes Find), Mungada Ridge, ca 3 km N of Windaning Hill	-29.13916	116.908888	27 06 2006
	PERTH 07540434	Acacia woodmaniorum	T			On Mungada Ridge, ca 3 km N of Windaning Hill, Karara Station	-29.13558	116.901503	30 03 2007
	PERTH 07414897	Acacia woodmaniorum	T	Scattered among rock, Banded Ironstone Formation (Haemat		Karara Station (between Perenjori and Paynes Find) Mungada Ridge, ca 3 km N of Windaning Hill	-29.13916	116.908888	27 06 2006
	PERTH 08340889	Acacia woodmaniorum	T	Hill slope. Dry, red clay loam.	Dense shrubland of Allocasuarina acutivalvis subsp. prinsepia	Mungada Ridge, Blue Hills Range	-29.1363	116.895756	16 09 2011
	PERTH 07350759	Austrostipa blackii	3	West south-west facing moderately inclined upper hillslope o	Shrubland of Acacia tetragonophylla, Acacia burkittii, Acacia a	Blue Hills Range, Windaning Hill, survey site WIND09. On Karara Station c. 5 km NE of Mulga Bore and 77 km Wof Paynes Find	-29.15339	116.910516	16 09 2005
	PERTH 08100292	Bossiaea sp. Jackson Range (G. Cockerton & S. McNee LCS 13614)	3	Low breakaway. Red-brown silty clay loam over ? laterite out	Open woodland of Eucalyptus striaticalyx and E. loxophleba w	Gindalbie Metals Porcupine Prospect, near disused Minjar haulroad on unmanaged Crown Reserve bounded by Karara and Warriedar Stations, c. 2 km NW of Warriedar Coppermine Rd, 70 km WNW of Paynes Find.	-29.11108	116.999638	13 07 2009
	PERTH 07215568	Calandrinia kalanniensis	2	Gentle slope near drainage line with some granitic outcroppir	Tall thicket with open patches. Characteristic species: Melale	Gindalbie Gold lease (Mungada Project), near Blue Hills Range, Karara Station, W of Paynes Find	-29.18759	116.944001	14 11 2005
	PERTH 07991444	Calandrinia sp. Warriedar (F. Obbens 04/09)	2	Site is on the lower slope of a small ironstone range. Soil red	Open shrubland surrounding granite with a low heath/herbfi	Site is called Hinge prospect and is ca 11 km N of Mt Mungada on the Gindalbie exploration lease, Karara Station	-29.03399	116.867646	23 09 2008
	PERTH 08152179	Calandrinia sp. Warriedar (F. Obbens 04/09)	2	Flat area on top of low rise. Red brown clay loam (shallow an	Very open shrubland and herbfields. With Thryptomene costa	Beside 'Syncline Track' on Warriedar Station (Gindalbie lease area)	-29.11933	116.940105	10 09 2009
	PERTH 07350627	Calotis sp. Perrinvale Station (R.J. Cranfield 7096)	3	North facing gently inclined midslope of banded ironstone, qu	Open shrubland of Acacia sp. Murchison, Melaleuca nematop	Blue Hills Range, Jasper Hill, survey site JASP06. On Karara Station c. 3.5 km NE of Mungada Well and 1 km NE of Jasper Hill (SH 454). c. 77 km W of Paynes Find	-29.08335	116.91002	22 09 2005
	PERTH 07350619	Calotis sp. Perrinvale Station (R.J. Cranfield 7096)	3	West south-west facing moderately inclined midslope of banc	Emergent Eucalyptus leptopoda subsp. arctata over open shr	Blue Hills Range, Windaning Hill, survey site WIND08. On Karara Station c. 5 km NE of Mulga Bore and 77 km W of Paynes Find	-29.15163	116.908564	16 09 2005

OID_	SHEET_NO	TAXON	CONS_CODE	SITE	VEGETATION	LOCALITY	LAT	LONG_	COLL_DATE
	PERTH 07350635	Calotis sp. Perrinvale Station (R.J. Cranfield 7096)	3	South-west facing gently inclined hillcrest of banded ironston	Open shrubland of Melaleuca hamata, Melaleuca nematophy	Blue Hills Range, Windaning Hill, survey site WIND15. On Karara Station c. 5 km NE of Mulga Bore and 77 km W of Paynes Find	-29.15157	116.912259	18 09 2005
	PERTH 07350767	Calotis sp. Perrinvale Station (R.J. Cranfield 7096)	3	East south-east facing moderately inclined upper hillslope of	Emergent Eucalyptus kochii subsp. amaryssia in sparse shrubl	Blue Hills Range, Mount Karara, survey site KARA14. On Karara Station c. 4 km ENE of Blue Well Bore and 3 km WNW of Euro Bore. c. 87 km W of Paynes Find	-29.17394	116.782971	26 09 2005
	PERTH 07350643	Calotis sp. Perrinvale Station (R.J. Cranfield 7096)	3	North north-west facing moderately inclined midslope of ban	Sparse shrubland of Calycopeplus paucifolius, Acacia ramulos	Blue Hills Range, Mount Karara, survey site KARA07. On Karara Station c. 2 km ESE of Blue Well Bore and 4 km WSW of Euro Bore. c. 87 km W of Paynes Find	-29.18697	116.771335	24 09 2005
	PERTH 07350678	Calotis sp. Perrinvale Station (R.J. Cranfield 7096)	3	East north-east facing gently inclined pediment of banded iro	Open woodland of Callitris glaucophylla over open shrubland	Blue Hills Range, survey site MNJR25. On Badja Station c. 3.5 km NE of Chullar Well and 15.5 km SSW of Golden Grove Mine. Golden Grove Mine is c. 92 km NW of Paynes Find and 55 km SSE of Yalgoo	-28.9064	116.934107	20 10 2005
	PERTH 07352131	Calotis sp. Perrinvale Station (R.J. Cranfield 7096)	3	South south east facing gently inclined pediment of banded ir	Open woodland of Melaleuca leiocarpa over open shrubland	Blue Hills Range, Jasper Hill, survey site JASP04. On Karara Station c. 5.5 km NE of Mungada Well and 3 km NE of Jasper Hill (SH 454). c. 77 km W of Paynes Find	-29.07352	116.923361	20 09 2005
	PERTH 07350775	Calotis sp. Perrinvale Station (R.J. Cranfield 7096)	3	West facing moderately inclined lower hillslope of banded iro	Open shrubland of Acacia sibina, Acacia aneura and Acacia ra	Blue Hills Range, Windaning Hill, survey site WIND20. On Karara Station c. 4.5 km N of Mulga Bore and 77 km W of Paynes Find	-29.13972	116.878916	19 09 2005
	PERTH 07350651	Calotis sp. Perrinvale Station (R.J. Cranfield 7096)	3	North-west facing steep breakaway of laterite and siltstone. \	Sparse shrubland of Acacia ramulosa var. ramulosa and Calyc	Blue Hills Range, Mount Karara, survey site KARA16. On Karara Station c. 4 km ENE of Blue Well Bore and 3 km WNW of Euro Bore. c. 87 km W of Paynes Find	-29.16412	116.78635	26 09 2005
	PERTH 08124779	Calotis sp. Perrinvale Station (R.J. Cranfield 7096)	3	Vacant crown land.		Karara Station, Perenjori Geraldton	-29.17692	116.940257	11 09 2009
	PERTH 06213308	Chamelaucium sp. Warriedar (A.P. Brown & S. Patrick APB 1100)	1			55 km NE of Perenjori on road to Rothsay	-29.28333	116.866666	24 08 1971
	PERTH 05573629	Chamelaucium sp. Warriedar (A.P. Brown & S. Patrick APB 1100)	1	Hill slope, brown loam and dolerite boulders.	Tall shrubland of Melaleuca uncinata and Acacia sp. over scat	Warriedar Coppermine Road at 8.3 km NNE of landing ground at Mount Mulgine	-29.13166	116.997222	17 07 1994
	PERTH 06353584	Chamelaucium sp. Warriedar (A.P. Brown & S. Patrick APB 1100)	1	Red/brown, dry loam. Rock form: boulder. Rock type: dolerite	Tall shrubland of Melaleuca uncinata, Acacia spp. over scatte	Warriedar - Copper Mine Road, ca 8.3 km NNE of Landing ground (airstrip), N of Mount Mulgine adjacent to creek crossing (seasonal)	-29.1304	116.998658	17 07 1994
	PERTH 06962866	Chamelaucium sp. Warriedar (A.P. Brown & S. Patrick APB 1100)	1	Rocky slope just off drainage line, loamy clay with hard subst	Melaleuca hamata, Acacia acuminata, Allocasuarina acutivalv	Location 68. Near Shire Road, east of Keronima - Black Dog project area. Reserve 16273. Yalgoo Shire	-29.13516	116.984887	01 10 2004
	PERTH 07319045	Chamelaucium sp. Warriedar (A.P. Brown & S. Patrick APB 1100)	1			Gindalbie Gold [Lease], NW of Paynes Find	-29.18333	116.933333	17 03 2004
	PERTH 07889429	Chamelaucium sp. Warriedar (A.P. Brown & S. Patrick APB 1100)	1	Low hill. Brown clay loam over basalt.	Thicket, Melaleuca hamata, Allocasuarina campestris and Aca	Just N of Mount Mulgine, ca. 70 km W of Paynes Find	-29.17091	116.970888	29 07 2008
	PERTH 07640781	Chamelaucium sp. Warriedar (A.P. Brown & S. Patrick APB 1100)	1	On low rocky hill, skeletal silty clay loam over granite/greenst	With Allocasuarina dielsiana, Grevillea scabridga, G. subtiliflo	Karara Station, 5 km S of Mount Mungada, ca 80 km E of Morawa	-29.204	116.871388	24 09 2007
	PERTH 08283737	Chamelaucium sp. Warriedar (A.P. Brown & S. Patrick APB 1100)	1	Flat, red clay.	Shrublands. With Acacia acuminata, Melaleuca acuminata, Al	8.3 km E of the old airfield, Old Warriedar	-29.13158	116.998666	25 09 2008
	PERTH 07343779	Chamelaucium sp. Yalgoo (Y. Chadwick 1816)	1	Upper slope. Red loamy clay on rocky ground.	Thicket to Scrub dominated by Melaleuca hamata, Allocasuar	Gindalbie Metals Ltd, Minjar project area, near Blue Hills Range, ca 60 km S of Yalgoo, Geraldton District	-29.16403	116.96189	02 09 2003
	PERTH 08124787	Cyanicula fragrans	3	Vacant crown land.		Badja Station, Yalgoo Geraldton	-28.95291	116.906428	08 09 2009
	PERTH 07889437	Dicrastylis linearifolia	3	Flat plain. Red sandy loam.	Woodland with Eucalyptus kochii, Acacia ramulosa, Microcon	Just S of Mount Mulgine, ca 70 km W of Paynes Find	-29.23336	116.98	29 07 2008
	PERTH 03024342	Drummondita fulva	3	Red brown clay, banded ironstone hill (mine site).	Open scrub.	Blue Hill Range	-29.13333	116.866666	22 11 1992
	PERTH 07685459	Drummondita fulva	3	On BIF slopes.	Shrubland.	Near old mine, c. 2.5 km WSW of Windaning Hill, Lochada Station	-29.14083	116.883056	16 07 2004
	PERTH 07349882	Drummondita fulva	3	South-west facing gently inclined hillcrest of banded ironston	Open shrubland of Melaleuca hamata, Melaleuca nematophy	Blue Hills Range, Windaning Hill, survey site WIND15. On Karara Station c. 5 km NE of Mulga Bore and 77 km W of Paynes Find	-29.15157	116.912259	18 09 2005
	PERTH 07349874	Drummondita fulva	3	East north-east facing gently inclined hillcrest of haematite-ri	Open shrubland of Acacia aneura, Acacia sibina, Calycopeplus	Blue Hills Range, survey site CHUL02. On Badja Station c. 5 km SE of Chullar Well and 21 km S of Golden Grove Mine. Golden Grove Mine is c. 92 km NW of Paynes Find and 55 km SSE of Yalgoo	-28.96026	116.940854	21 10 2005
	PERTH 07349866	Drummondita fulva	3	South south-west facing gently inclined lower hillslope of ban	Open shrubland of Melaleuca nematophylla, Acacia sibina an	Blue Hills Range, Jasper Hill, survey site JASP01. On Karara Station c. 5.5 km NE of Mungada Well and 3 km NE of Jasper Hill (SH 454). c. 77 km W of Paynes Find	-29.07455	116.918296	19 09 2005
	PERTH 07349890	Drummondita fulva	3	West south-west facing moderately inclined upper hillslope o	Shrubland of Acacia tetragonophylla, Acacia burkittii, Acacia a	Blue Hills Range, Windaning Hill, survey site WIND09. On Karara Station c. 5 km NE of Mulga Bore and 77 km W of Paynes Find	-29.15339	116.910516	16 09 2005

OID_	SHEET_NO	TAXON	CONS_CODE	SITE	VEGETATION	LOCALITY	LAT	LONG_	COLL_DATE
	PERTH 07349734	Drummondita fulva		3 West south-west facing moderately inclined midslope of ban	Emergent Eucalyptus leptopoda subsp. arctata over open shr	Blue Hills Range, Windaning Hill, survey site WIND08. On Karara Station c. 5 km NE of Mulga Bore and 77 km W of Paynes Find	-29.15163	116.908564	16 09 2005
	PERTH 08143102	Drummondita fulva		3 W facing steep mid to upper hillslope of banded ironstone an	Shrubland of Dodonaea viscosa subsp. mucronata, Acacia mir	Blue Hills Range, Windaning Hill, adjacent to survey site WIND02. On Karara Station, ca 4.5 km N of Mulga Bore and 77 km W of Paynes Find	-29.14047	116.883777	03 09 2008
	PERTH 08143080	Drummondita fulva		3 W facing steep mid to upper hillslope of banded ironstone an	Shrubland of Dodonaea viscosa subsp. mucronata, Acacia mir	Blue Hills Range, Windaning Hill, adjacent to survey site WIND02. On Karara Station, ca 4.5 km N of Mulga Bore and 77 km W of Paynes Find	-29.14047	116.883777	03 09 2008
	PERTH 08143099	Drummondita fulva		3 W facing steep mid to upper hillslope of banded ironstone an	Shrubland of Dodonaea viscosa subsp. mucronata, Acacia mir	Blue Hills Range, Windaning Hill, adjacent to survey site WIND02. On Karara Station, ca 4.5 km N of Mulga Bore and 77 km W of Paynes Find	-29.14047	116.883777	03 09 2008
	PERTH 08200459	Eremophila sp. Rothsay (D. Coultas & J. Kelt s.n. PERTH 08200440)		1 Low rise with red-brown rocky ?basalt-derived soil.	Eucalyptus loxophloeba woodland, some Eucalyptus salubris.	Karara Station, ca. 8 km S of Mungada Ridge on Mulga track	-29.21286	116.875916	26 10 2009
	PERTH 08200440	Eremophila sp. Rothsay (D. Coultas & J. Kelt s.n. PERTH 08200440)		1 Low rise with red-brown silty clay loam over ?dolerite outcro	Eucalyptus loxophloeba woodland.	Karara Station c. 7.5 km S of Mungada Ridge on Mulga track	-29.21287	116.875915	16 11 2009
	PERTH 06725961	Eucalyptus jutsonii subsp. kobela		1 In deep yellow sand on high but very broad rise.	With Eucalyptus leptopoda subsp. arctata in dense Acacia shr	Karara Station, NE of Perenjori	-29.02429	116.796712	03 08 2002
	PERTH 07376626	Eucalyptus jutsonii subsp. kobela		1 Deep red sandy rise.	Callitris. Characteristic species: Eucalyptus jutsonii x E. kochii	Karara Station, NE of Perenjori	-29.03833	116.795555	28 05 2006
	PERTH 08124736	Eucalyptus synandra	T	Pastoral lease.		Badja Station Yalgoo, Geraldton	-28.95253	116.90923	30 11 2009
	PERTH 06095801	Grevillea globosa		3 Flat. Dry, brown loam-sand.	Tall shrubland. Acacia sp.	Golden Grove gridlines, throughout mine site, SE of Yalgoo	-28.91595	116.949766	22 06 2000
	PERTH 07341814	Grevillea globosa		3 Lower slope. Red clay.	Thicket. Acacia ramulosa var. ramulosa, Acacia sabina, Eucaly	Gindalbie Metals Ltd. Mungada Survey Area, near Blue Hills Range, ca 60 km S of Yalgoo	-29.24831	116.903205	16 11 2005
	PERTH 07341849	Grevillea globosa		3 Lower slope. Brown-red clay.	Thicket to Dense Thicket of Acacia ramulosa var. ramulosa ov	Gindalbie Metals Ltd. Mungada Survey Area, near Blue Hills Range, ca 60 km S of Yalgoo	-29.18136	116.791194	18 05 2004
	PERTH 07343833	Grevillea globosa		3 Plain - lower slope. Red-brown clay-gravel. Stoney plains.	Thicket to dense thicket of Acacia ramulosa var. ramulosa ove	Gindalbie Metals Ltd. Mt Karara project area, near Blue Hills Range, ca 60 km S of Yalgoo	-29.15758	116.805731	20 05 2004
	PERTH 07797966	Grevillea globosa		3 Slope. Red-brown loam - clay.	Thicket, Acacia coolgardiensis subsp. latior, Acacia sibina, Euc	Damperwah Hills, on Karara Station, 80 km E of Perenjori	-29.26461	116.830194	17 05 2007
	PERTH 04001907	Grevillea scabrida		3 Slope with N aspect, brown loam & dolerite.	Open tall scrub of Melaleuca uncinata, assoc. with Acacia sp.,	Warriedar Coppermine Road, 8.3 km NNE of landing ground N of Mount Mulgine at drainage line	-29.13166	116.997222	17 07 1994
	PERTH 04106644	Grevillea scabrida		3 S slope moist brown loam over quartz & banded ironstone.	Mulga shrubland to 4 m.	Warriedar Copper Mine Road at 39.6 km by road NE from Lake Monger Crossing, near Mount Mulgine	-29.20179	116.945603	17 07 1994
	PERTH 07341784	Grevillea scabrida		3 Red loam.	Thicket. Zygophyllum aurantiacum, Austrostipa ? nitida, Ceph	Gindalbie Metals Ltd. Mungada Survey Area, near Blue Hills Range, ca 60 km S of Yalgoo	-29.18992	116.952538	14 11 2005
	PERTH 07341792	Grevillea scabrida		3 Flat. Red clay.	Thicket. Melaleuca hamata, Acacia sabina, Acacia acuminata,	Gindalbie Metals Ltd. Mungada Survey Area, near Blue Hills Range, ca 60 km S of Yalgoo	-29.18741	116.875833	15 11 2005
	PERTH 07343671	Grevillea scabrida		3 On red loamy soils with gravel.	Open Low woodland of mixed Eucalyptus spp., over Thicket t	Gindalbie Metals Ltd. Minjar project area, near Blue Hills Range, ca 60 km S of Yalgoo	-29.15316	116.966716	02 09 2003
	PERTH 06962734	Grevillea subtiliflora		3 Red loamy clay soil with some rock on drainageline.	Hydrocotyle sp. Warriedar, Rhodanthe collina,Grevillea globu	Mid-West Region. Geraldton District. Shire of Yalgoo. Warriedar Station. Highland Chief mining project area	-29.16995	116.960469	27 09 2004
	PERTH 07343760	Grevillea subtiliflora		3 Valley floor. Red-brown soils on rocky ground.	Low Woodland to Scrub dominated by Allocasuarina acutivalv	Gindalbie Metals Ltd, Minjar project area, near Blue Hills Range, ca 60 km S of Yalgoo, Geraldton District	-29.17001	116.960623	02 09 2003
	PERTH 07797885	Grevillea subtiliflora		3 Slope. Red-brown loam, boulders.	Thicket. Allocasuarina dielsiana, Acacia burkitii.	Low hill N of Mt Mulgine, on Warriedar Station, 80 km E of Perenjori	-29.19419	116.966694	24 04 2007
	PERTH 06962858	Grevillea subtiliflora		3	Growing with Micromyrtus sp. Warriedar.	Mid-West Region. Geraldton District. Yalgoo Shire. Warriedar Station. Keronima - Black Dog mining project area	-29.14188	116.969002	28 09 2004
	PERTH 07341709	Gunniopsis divisa		3 Red loam.	Open woodland. Acacia acuminata, Austrostipa ? nitida, Euca	Gindalbie Metals Ltd. Mungada Survey Area, near Blue Hills Range, c 60 km S of Yalgoo	-29.13794	116.877669	27 10 2005
	PERTH 07349610	Gunniopsis divisa		3 North north-east facing moderately inclined cliff footslope of	Sparse shrubland of Eremophila oppositifolia subsp. angustifo	Blue Hills Range, Mount Karara, survey site KARA21. On Karara Station c. 4 km ENE of Blue Well Bore and 3 km WNW of Euro Bore. c. 87 km W of Paynes Find	-29.16352	116.786807	27 09 2005
	PERTH 07349467	Gunniopsis rubra		3 East north-east facing very gently inclined lower hillslope to p	Mallee woodland of Eucalyptus ewartiana and Eucalyptus koc	Blue Hills Range, Red Hill, survey site REDH02. On Karara Station c. 5.5 km NW of Mungada Well and 2.5 km NW of Red Hill (SH 373). c. 80 km W of Paynes Find	-29.07325	116.839323	21 09 2005
	PERTH 07349629	Gunniopsis rubra		3 North north-east facing moderately inclined cliff footslope of	Sparse shrubland of Eremophila oppositifolia subsp. angustifo	Blue Hills Range, Mount Karara, survey site KARA21. On Karara Station c. 4 km ENE of Blue Well Bore and 3 km WNW of Euro Bore. c. 87 km W of Paynes Find	-29.16352	116.786807	27 09 2005

OID_	SHEET_NO	TAXON	CONS_CODE	SITE	VEGETATION	LOCALITY	LAT	LONG_	COLL_DATE
	PERTH 06962769	Hydrocotyle sp. Warriedar (P.G. Wilson 12267)	1	Creekline, along 100m stretch, mainly on northern bank and (	Acacia acanthoclada, Grevillea scabrida, Rhodanthe collina, M	Mid-West Region, Geraldton District, Yalgoo Shire. Near intersection of haul and Shire Roads, Highland Cheif project area	-29.16095	116.959516	29 09 2004
	PERTH 06962750	Hydrocotyle sp. Warriedar (P.G. Wilson 12267)	1	Red loamy clay soil, some rock in drainageline, species found	Rhodanthe collina, Grevillea subtiliflora, persoonia pentastich	Mid-West Region. Geraldton District. Yalgoo Shire. Highland Chief mining project area	-29.16995	116.960469	27 09 2004
	PERTH 03401464	Hydrocotyle sp. Warriedar (P.G. Wilson 12267)	1	Red loam.	Mixed scrub.	26 km W of Warriedar Homestead	-29.15	116.983333	26 09 1986
	PERTH 07343817	Hydrocotyle sp. Warriedar (P.G. Wilson 12267)	1	Valley floor. Red clay. Red-brown soils on rocky ground.	Low Woodland to Scrub dominated by Allocasaruarina acutiv	Gindalbie Metals Ltd. Minjar project area, near Blue Hills Range, ca 60 km S of Yalgoo	-29.17001	116.960623	02 09 2003
	PERTH 08048444	Hydrocotyle sp. Warriedar (P.G. Wilson 12267)	1	Along creek embankment.	Under shrubs.	N side of Warriedar Copper Mine Road along embankment of a dry creek	-29.12666	117.011388	04 10 2007
	PERTH 07351046	Lepidosperma sp. Blue Hills (A. Markey & S. Dillon 3468)	1	South facing moderately inclined footslope of magnetite and	Open shrubland of Allocasuarina acutivalvis over shrubland o	Blue Hills Range, Mount Karara, survey site KARA04. On Karara Station c. 3.5 km ESE of Blue Well Bore and 3.5 km WSW of Euro Bore. c. 87 km W of Paynes Find	-29.18844	116.778232	23 09 2005
	PERTH 07350880	Lepidosperma sp. Blue Hills (A. Markey & S. Dillon 3468)	1	East south-east facing moderately inclined upper hillslope of	Emergent Eucalyptus kochii subsp. amaryssia in sparse shrubl	Blue Hills Range, Mount Karara, survey site KARA14. On Karara Station c. 4 km ENE of Blue Well Bore and 3 km WNW of Euro Bore. c. 87 km W of Paynes Find	-29.17394	116.782971	26 09 2005
	PERTH 07350872	Lepidosperma sp. Blue Hills (A. Markey & S. Dillon 3468)	1	North-west facing steep upper hillslope of banded ironstone.	Emergent Eucalyptus leptopoda subsp. elevata in shrubland c	Blue Hills Range, Mount Karara, survey site KARA01. On Karara Station c. 3.5 km ESE of Blue Well Bore and 3.5 km WSW of Euro Bore. c. 87 km W of Paynes Find	-29.19015	116.773156	23 09 2005
	PERTH 07349793	Micromyrtus acuta	3	South-east facing moderately inclined midslope of banded irc	Open shrubland of Acacia aneura and Acacia sp. Murchison o	Blue Hills Range, Windaning Hill, survey site WIND12. On Karara Station c. 6.5 km NNE of Mulga Bore and 77 km W of Paynes Find	-29.12984	116.905732	17 09 2005
	PERTH 07349785	Micromyrtus acuta	3	South facing gently inclined uppe hillslope of jaspilite-rich bar	Sparse shrubland of Acacia aneura, Acacia ramulosa var. ram	Blue Hills Range, Jasper Hill, survey site JASP02. On Karara Station c. 5.5 km NE of Mungada Well and 3 km NE of Jasper Hill (SH 454). c. 77 km W of Paynes Find	-29.07018	116.923121	20 09 2005
	PERTH 07349777	Micromyrtus acuta	3	North facing gently inclined midslope of banded ironstone, q	Open shrubland of Acacia sp. Murchison, Melaleuca nematop	Blue Hills Range, Jasper Hill, survey site JASP06. On Karara Station c. 3.5 km NE of Mungada Well and 1 km NE of Jasper Hill (SH 454). c. 77 km W of Paynes Find	-29.08335	116.91002	22 09 2005
	PERTH 07349807	Micromyrtus acuta	3	East south-east facing steep hillcrest of banded ironstone. Ro	Sparse shrubland of Calycopeplus paucifolius, Acacia aulacop	Blue Hills Range, Jasper Hill, survey site JASP05. On Karara Station c. 3.5 km NE of Mungada Well and 1 km NE of Jasper Hill (SH 454). c. 77 km W of Paynes Find	-29.08503	116.909521	22 09 2005
	PERTH 07797893	Micromyrtus acuta	3	SLope. Brown - red loam, boulders.	Open thicket, Acacia aulacophylla, Acacia ramulosa, Philothec	Low hill N of Mt Mulgine on Warriedar Station, 80 km E of Perenjori	-29.18091	116.961944	24 04 2007
	PERTH 07797958	Micromyrtus acuta	3	Slope. Red-brown loam - clay.	Open thicket. Acacia aulacophylla, Micromyrtus trudgenii, Pe	Damperwah Hills area on Karara Station, 80 km E of Perenjori	-29.26947	116.835333	17 05 2007
	PERTH 07889453	Micromyrtus acuta	3	Rocky rise. Red-brown clay loam over decaying granite.	With Acacia aulacophylla, Eremophila latrobei, Acacia ramulo	Just S of Mount Mulgine, ca 70 km W of Paynes Find	-29.23072	116.986722	29 07 2008
	PERTH 07343809	Micromyrtus trudgenii	3	Red loamy soils with gravel. Brown sand.	Open Low Woodland of mixed Eucalyptus spp. over Thicket t	Gindalbie Metals Ltd. Minjar project area, near Blue Hills Range, ca 60 km S of Yalgoo	-28.97894	116.956815	04 09 2003
	PERTH 06962831	Micromyrtus trudgenii	3		Growing with Grevillea subtiliflora.	Mid-West Region. Geraldton District. Yalgoo Shire. Warriedar Station. Keronima - Black Dog mining project area	-29.14188	116.969002	28 09 2004
	PERTH 07559038	Micromyrtus trudgenii	3	Large rocky hill.		Arsenic Hill	-28.9125	116.963117	20 09 2006
	PERTH 07559070	Micromyrtus trudgenii	3	Slope of laterite ridge.		Bentley	-29.07002	116.999965	21 09 2006
	PERTH 07559062	Micromyrtus trudgenii	3	Rocky ridge.		St Patricks	-29.07819	117.01923	21 09 2006
	PERTH 07343825	Micromyrtus trudgenii	3			Gindalbie Metals Ltd. Minjar project area, near Blue Hills Range, ca 60 km S of Yalgoo	-29.10866	116.970626	19 01 2004
	PERTH 07341857	Micromyrtus trudgenii	3	Lower slope. Red clay.	Thicket. Acacia ramulosa var. ramulosa, Acacia sabina, Philott	Gindalbie Metals Ltd. Mungada Survey Area, near Blue Hills Range, ca 60 km S of Yalgoo	-29.24806	116.875655	16 11 2005
	PERTH 07343604	Micromyrtus trudgenii	3	On red loamy soils with some gravel, or on stoney plains.	Thicket to Dense Thicket of Acacia ramulosa var. ramulosa ov	Gindalbie Metals Ltd, Mt Karara project area, near Blue Hills Range, ca 60 km S of Yalgoo	-29.16182	116.820715	23 06 2004
	PERTH 07349718	Micromyrtus trudgenii	3	East south-east facing steep hillcrest of banded ironstone. Ro	Sparse shrubland of Calycopeplus paucifolius, Acacia aulacop	Blue Hills Range, Jasper Hill, survey site JASP05. On Karara Station c. 3.5 km NE of Mungada Well and 1 km NE of Jasper Hill (SH 454). c. 77 km W of Paynes Find	-29.08503	116.909521	22 09 2005
	PERTH 07349556	Micromyrtus trudgenii	3	East north-east facing gently inclined hillcrest of haematite-ri	Open shrubland of Acacia aneura, Acacia sibina, Calycopeplus	Blue Hills Range, survey site CHUL02. On Badja Station c. 5 km SE of Chullar Well and 21 km S of Golden Grove Mine. Golden Grove Mine is c. 92 km NW of Paynes Find and 55 km SSE of Yalgoo	-28.96026	116.940854	21 10 2005
	PERTH 07349661	Micromyrtus trudgenii	3	North-east facing moderately inclined hillcrest of laterised ha	Isolated shrubs of Acacia aneura and Acacia aulacophylla ove	Blue Hills Range, survey site MNJR24. On Badja Station c. 3.5 km NE of Chullar Well and 15.5 km SSW of Golden Grove Mine. Golden Grove Mine is c. 92 km NW of Paynes Find and 55 km SSE of Yalgoo	-28.90536	116.931883	20 10 2005
	PERTH 07319037	Micromyrtus trudgenii	3			Gindalbie Gold [Lease], NW of Paynes Find	-29.18333	116.933333	16 03 2004

OID_	SHEET_NO	TAXON	CONS_CODE	SITE	VEGETATION	LOCALITY	LAT	LONG_	COLL_DATE
	PERTH 06234666	Micromyrtus trudgenii	3	Rocky, brown skeletal soil over ? sedimentary rock (high in irc	With Rhamnaceae. Characteristic species: Ptilotus obovatus,	20 km S of Golden Grove Mine site	-28.93051	116.970092	31 08 2000
	PERTH 07349653	Micromyrtus trudgenii	3	West south-west facing moderately inclined upper hillslope o	Shrubland of Acacia tetragonophylla, Acacia burkittii, Acacia a	Blue Hills Range, Windaning Hill, survey site WIND09. On Karara Station c. 5 km NE of Mulga Bore and 77 km W of Paynes Find	-29.15339	116.910516	16 09 2005
	PERTH 05746809	Micromyrtus trudgenii	3	Ridge. Dry, orange-brown loam-clay.	Sparse tall shrubland, Acacia aneura, Ptilotus obovatus, new g	15 km S of Gossan Hill, Golden Grove Mine site, SE of Yalgoo,	-28.91854	116.972071	22 06 2000
	PERTH 07341520	Micromyrtus trudgenii	3	Slope. Red soil.		Gindalbie Metals Ltd. Mungada Hematite project, Mungada Ridge, ca 60 km S of Yalgoo, Midwest region, Geraldton District	-29.13922	116.908686	22 04 2006
	PERTH 07797915	Micromyrtus trudgenii	3	Slope. Red-brown loam, boulder, ironstone.	Thicket. Allocasuarina dielsiana, Melaleuca hamata, Acacia ra	Low hill N of Mt Mulgine, on Warriedar Station, 80 km E of Perenjori	-29.16852	117.016	25 04 2007
	PERTH 07797931	Micromyrtus trudgenii	3	Slope. Red-brown loam - clay.	Open thicket. Acacia umbraculiformis, Allocasuarina dielsiana	Damperwah Hills area on Karara Station, 80 km E of Perenjori	-29.14469	116.958277	18 05 2007
	PERTH 02503166	Micromyrtus trudgenii	3	Granite hill.		ca 50 km W of Paynes Find	-29.16666	116.983333	17 10 1975
	PERTH 07437773	Micromyrtus trudgenii	3	Rocky moderate hillslope with outcrops. Soil: Brown/red loan	Acacia neurophylla subsp. erugata open low woodland over A	Near Mungada, old Blue Hills iron ore pit	-29.14128	116.883564	26 07 2006
	PERTH 07349920	Millotia dimorpha	1	North-west facing moderately inclined upper hillslope of ban	Sparse shrubland of Allocasuarina acutivalvis subsp. prinsepia	Blue Hills Range, Mount Karara, survey site KARA10. On Karara Station c. 2.5 km E of Blue Well Bore and 3 km W of Euro Bore. c. 87 km W of Paynes Find	-29.17987	116.774933	25 09 2005
	PERTH 07349939	Millotia dimorpha	1	North north-west facing moderately inclined hillcrest of band	Open shrubland of Allocasuarina acutivalvis subsp. prinsepiar	Blue Hills Range, Mount Karara, survey site KARA05. On Karara Station c. 2 km ESE of Blue Well Bore and 4 km WSW of Euro Bore. c. 87 km W of Paynes Find	-29.18731	116.772528	23 09 2005
	PERTH 07349955	Millotia dimorpha	1	South facing moderately inclined footslope of magnetite and	Open shrubland of Allocasuarina acutivalvis over shrubland o	Blue Hills Range, Mount Karara, survey site KARA04. On Karara Station c. 3.5 km ESE of Blue Well Bore and 3.5 km WSW of Euro Bore. c. 87 km W of Paynes Find	-29.18844	116.778232	23 09 2005
	PERTH 07349947	Millotia dimorpha	1	South-east facing moderately inclined lower hillslope of lateri	Sparse shrubland of Allocasuarina acutivalvis subsp. prinsepia	Blue Hills Range, Mount Karara, survey site KARA19. On Karara Station c. 4 km ENE of Blue Well Bore and 3 km WNW of Euro Bore. c. 87 km W of Paynes Find	-29.17373	116.785311	27 09 2005
	PERTH 06962807	Persoonia pentasticha	3	Red loamy clay soil with some rock, on drainageline.	Growing with Hydrocotyle sp. Warriedar, Rhodanthe collina, (	Mid-West Region. Geraldton District. Yalgoo Shire. Warriedar Station. Highland Chief mining project area	-29.16995	116.960469	27 09 2004
	PERTH 07341512	Persoonia pentasticha	3	Outcrop. Red soil.	Acacia ramulosa var. ramulosa, Acacia quadrimarginea, Micrc	Gindalbie Metals Ltd. Mungada Hematite project, Mungada Ridge, ca 60 km S of Yalgoo, Midwest region, Geraldton District	-29.16191	116.90873	25 04 2006
	PERTH 07341776	Persoonia pentasticha	3	Drainage line. Red sand-clay.	Thicket. Aira caryophyllea, Schoenus ?variicellae, Melaleuca h	Gindalbie Metals Ltd. Mungada Survey Area, near Blue Hills Range, ca 60 km S of Yalgoo	-29.18895	116.942563	14 11 2005
	PERTH 07343752	Persoonia pentasticha	3	Flat. Red loamy clay.	Thicket to scrub dominated by Acacia acuminata over Dwarf S	Gindalbie Metals Ltd, Minjar project area, near Blue Hills Range, ca 60 km S of Yalgoo, Geraldton District	-29.03002	116.968245	03 09 2003
	PERTH 07343795	Persoonia pentasticha	3	Mid slope. Red-brown clay soil on rocky ground.	Low Woodland to Scrub dominated by Allocasuarina acutivalv	Gindalbie Metals Ltd, Minjar project area, near Blue Hills Range, ca 60 km S of Yalgoo, Geraldton District	-28.97702	116.958571	04 09 2003
	PERTH 07349416	Persoonia pentasticha	3	East facing moderately inclined midslope of heavily laterised	Shrubland of Allocasuarina acutivalvis, Acacia aneura and Aca	Blue Hills Range, survey site CHUL03. On Badja Station c. 5 km SE of Chullar Well and 21 km S of Golden Grove Mine. Golden Grove Mine is c. 92 km NW of Paynes Find and 55 km SSE of Yalgoo	-28.96057	116.943112	21 10 2005
	PERTH 07349408	Persoonia pentasticha	3	East facing moderately inclined midslope of heavily laterised	Shrubland of Allocasuarina acutivalvis, Acacia aneura and Aca	Blue Hills Range, survey site CHUL03. On Badja Station c. 5 km SE of Chullar Well and 21 km S of Golden Grove Mine. Golden Grove Mine is c. 92 km NW of Paynes Find and 55 km SSE of Yalgoo	-28.96057	116.943112	21 10 2005
	PERTH 07410387	Persoonia pentasticha	3	Slope. Red clay.	Melaleuca nematophylla, Allocasuarina acutivalvis ssp. prinse	Gindalbie Metals Ltd, Mungada Haematite project, Mungada Ridge, c. 60 km S of Yalgoo, Midwest Region, Geraldton district, Shire of Perenjori CALM managed land	-29.14044	116.889573	02 05 2006
	PERTH 07797982	Persoonia pentasticha	3	Slope. Brown-red clay - loam.	Thicket. Acacia ramulosa var. ramulosa, A. tetragonophylla, S	Damperwah Hills area, on Karara Station, 80 km E of Perenjori	-29.2768	116.827527	17 05 2007
	PERTH 07472315	Petrophile pauciflora	3	Nature Reserve. Outcrop of granite boulder. Dry red / brown	Muir's with associated vegetation: Calytrix glutinosa, Acacia s	Karara Station, ca 10 km N of Mount Karara	-29.10597	116.781555	07 02 2007
	PERTH 06962742	Polianthion collinum	3	Hilltop and extending west along saddle.	Micromyrtus sp. Warriedar.	Mid-West Region. Geraldton District. Perenjori Shire. In the Mt. Karara project area. Karara Station	-29.12256	116.861407	29 09 2004
	PERTH 05894638	Polianthion collinum	3	Brown rocky soil over sedimentary geology (suspected).	Open Shrubland with Ptilotus obovatus and Acacia aneura.	20 km S of Golden Grove Mine,	-28.93051	116.970092	31 05 2000
	PERTH 06808808	Polianthion collinum	3			Gindelbie Gold, S of Yalgoo	-28.91933	116.97086	05 02 2004
	PERTH 06874576	Polianthion collinum	3	Slope. Boulder. B/F. Dry brown loam.	Allocasuarina acutivalvis over low shrubs. With Acacia jibberc	Bluehills Karara Station	-29.13909	116.899279	21 10 2003
	PERTH 07341539	Polianthion collinum	3	Red soil.	Acacia aneura, A. quadrimarginea, Mirbelia bursarioides, Alut	Gindalbie Metals Ltd. Mungada Hematite project, Mungada Ridge, ca 60 km S of Yalgoo, Midwest region, Geraldton District	-29.12973	116.902186	25 04 2006

OID_	SHEET_NO	TAXON	CONS_CODE	SITE	VEGETATION	LOCALITY	LAT	LONG_	COLL_DATE
	PERTH 07341644	Polianthion collinum	3	Slope. Red soil.	Micromyrtus sp. Warriedar.	Gindalbie Metals Ltd. Mungada Hematite project, Mungada Ridge, ca 60 km S of Yalgoo, Midwest region, Geraldton District	-29.13311	116.905894	26 05 2006
	PERTH 07343612	Polianthion collinum	3	On red loamy soils with some gravel, or on stoney plains.	Thicket to Dense Thicket of Acacia ramulosa var. ramulosa ov	Gindalbie Metals Ltd. Mt Karara project area, near Blue Hills Range, ca 60 km S of Yalgoo, Geraldton District	-29.16113	116.912296	24 06 2004
	PERTH 07349505	Polianthion collinum	3	West south-west facing moderately inclined upper hillslope o	Shrubland of Acacia tetragonophylla, Acacia burkittii, Acacia a	Blue Hills Range, Windaning Hill, survey site WIND09. On Karara Station c. 5 km NE of Mulga Bore and 77 km W of Paynes Find	-29.15339	116.910516	16 09 2005
	PERTH 07350422	Polianthion collinum	3	North-east facing very steep midslope to cliff of banded irons	Sparse shrubland of Calycopeplus paucifolius and Acacia aula	Blue Hills Range, Windaning Hill, survey site WIND14. On Karara Station c. 5 km NE of Mulga Bore and 77 km W of Paynes Find	-29.15166	116.914011	18 09 2005
	PERTH 07350414	Polianthion collinum	3	South-east facing moderately inclined midslope of banded irc	Open shrubland of Acacia aneura and Acacia sp. Murchison o	Blue Hills Range, Windaning Hill, survey site WIND12. On Karara Station c. 6.5 km of Mulga Bore and 77 km W of Paynes Find	-29.12984	116.905732	17 09 2005
	PERTH 07349513	Polianthion collinum	3	West south-west facing moderately inclined lower footslope	Emergent islolated trees of Melaleuca leiocarpa in sparse shr	Blue Hills Range, Windaning Hill, survey site WIND06. On Karara Station c. 5.5 km NNE of Mulga Bore and 77 km W of Paynes Find	-29.13856	116.903787	15 09 2005
	PERTH 05643627	Polianthion collinum	3	Ridge. Dry, orange sedimentary rock (high iron).	Very sparse shrubland. Associated species: Euryomyrtus sp., I	ca 18 km SW Gossen [Gossan] Hill, Golden Grove Mine, SE of Yalgoo	-28.93085	116.970382	22 06 2000
	PERTH 07559046	Polianthion collinum	3	Large rocky hill.		Arsenic Hill	-28.92068	116.971917	20 09 2006
	PERTH 07903006	Polianthion collinum	3	Red silty loam over ironstone outcropping. Midslope of tall hi	With Acacia aneura, Aluta aspera subsp. hesperia.	North of Warriedar Hill, Warriedar Station	-28.95333	116.9675	12 12 2007
	PERTH 05643643	Polianthion collinum	3	Ridge. Brown-orange clay-loam over rock.	Sparse tall shrubland. Associated species: Acacia aneura, Hak	15 km S of Gossen [Gossan] Hill, Golden Grove Mine, SE of Yalgoo	-28.91723	116.970432	22 06 2000
	PERTH 08023204	Prostanthera sp. Karara (D. Coultas & K. Greenacre Opp 8)	1	Lower slope of low rise. Red silty clay loam.	Thicket of Acacia latior and Acacia sibina with occasional eme	Karara Station, ca 10 km NNW of Mungada Ridge, ca 80 km W of Paynes Find	-29.05491	116.876166	27 01 2009
	PERTH 08023212	Prostanthera sp. Karara (D. Coultas & K. Greenacre Opp 8)	1	Lower slope of low rise. Red silty clay loam.	Thicket of Acacia latior and Acacia sibina with occasional eme	Karara Station, ca 10 km NNW of Mungada Ridge, ca 80 km W of Paynes Find	-29.05491	116.876166	27 01 2009
	PERTH 07987633	Prostanthera sp. Karara (D. Coultas & K. Greenacre Opp 8)	1	Low rise. Red-brown silty clay loam.	Dense tall shrubland of Acacia latior and Melaleuca nematopl	Karara Station, ca 5 km E of Euro Bore, 80 km W of Paynes Find	-29.18036	116.865472	10 09 2008
	PERTH 07987641	Prostanthera sp. Karara (D. Coultas & K. Greenacre Opp 8)	1	Mid-upper slope of low rise. Red silty clay loam.	Very open woodland of Eucalyptus leptopoda subsp. arctata (	Karara Station, ca 5 km E of Mulga Bore, 80 km W of Paynes Find	-29.18922	116.933222	10 09 2008
	PERTH 07987625	Prostanthera sp. Karara (D. Coultas & K. Greenacre Opp 8)	1	Mid-lower slope of low rise. Red silty loam.	Very open woodland of Eucalyptus kochii subsp. plenissima o	Karara Station, ca 6 km E of Mulga Bore, 80 km W of Paynes Find	-29.1878	116.939611	12 09 2006
	PERTH 08124744	Prostanthera sp. Karara (D. Coultas & K. Greenacre Opp 8)	1	Lower slope of low rise with red silty clay loam.	Thicket of Acacia latior and A. sibina, with occasional Grevillea	Karara Station, ca. 5 km NNE of Jasper Hill, in very NE corner of Karara Station, near boundary fence with Warriedar Station, approximately 80 km W of Paynes Find	-29.07388	116.939666	10 09 2009
	PERTH 07350171	Psammomoya implexa	3	South facing gently inclined footslope to pediment of banded	Open mallee woodland of Eucalyptus leptopoda subsp. eleva	Blue Hills Range, Jasper Hill, survey site JASP07. On Karara Station c. 3.5 km NE of Mungada Well and 1 km NE of Jasper Hill (SH 454). c. 77 km W of Paynes Find	-29.08064	116.907105	22 09 2005
	PERTH 06962785	Rhodanthe collina	1	Just upslope of drainage area.	Growing with Acacia acanthoclada.	Mid-West Region. Geraldton District. Yalgoo Shire. Warriedar Station. Highland Chief mining project area	-29.17714	116.972231	28 09 2004
	PERTH 06962793	Rhodanthe collina	1	Flat, loamy/clay/sand.	Eucalyptus kochii, Eucalyptus loxophleba ssp. supralaevis, Aca	Mid-West Region. Geraldton District. Shire of Perenjori. Karara Station. South of Mt. Karara mining project area	-29.1816	116.814706	29 09 2004
	PERTH 06962777	Rhodanthe collina	1	On banks of creekline in loamy, clay sand with occasional roc	Growing with Acacia acuminata, Allocasuarina acutivalvis, Me	Mid-West Region. Geraldton District. Perenjori Shire. W of Yalgoo Road, E of Highland Chief mining project area	-29.15204	117.020307	01 10 2004
	PERTH 07341806	Rhodanthe collina	1	Red soil.	Thicket. Drummondita microphylla, Acacia ramulosa var. ram	Gindalbie Metals Ltd. Mungada Survey Area, near Blue Hills Range, ca 60 km S of Yalgoo	-29.14065	116.883444	27 10 2005
	PERTH 07343647	Rhodanthe collina	1	Drainage line. Outcrop. Red loam-clay.	Hydrocotyle sp. Warriedar, Grevillea subtiliflora.	Near Site 17 (Sep.03), Highland Chief poject, area, Warriedar Station, Geraldton District	-29.16966	116.957846	27 09 2004
	PERTH 07343655	Rhodanthe collina	1	Slope, outcrop.	Eucalyptus loxophleba subsp. supralaevis, Acacia ramulosa, A	S of Mt Karara project area, Karara Station	-29.18127	116.825783	28 09 2004
	PERTH 07343701	Rhodanthe collina	1	Valley floor. Red clay.	Open Low Woodland of Eucalyptus species over Thicket domi	Gindalbie Metals Ltd, Minjar project area, near Blue Hills Range, ca 60 km S of Yalgoo, Geraldton District	-29.16147	116.958621	02 09 2003
	PERTH 07350015	Rhodanthe collina	1	South facing gently inclined uppe hillslope of jaspilite-rich bar	Sparse shrubland of Acacia aneura, Acacia ramulosa var. ram	Blue Hills Range, Jasper Hill, survey site JASP02. On Karara Station c. 5.5 km NE of Mungada Well and 3 km NE of Jasper Hill (SH 454). c. 77 km W of Paynes Find	-29.07018	116.923121	20 09 2005
	PERTH 07350023	Rhodanthe collina	1	West south-west facing gently inclined upper midslope ridge	Open shrubland of Allocasuarina acutivalvis subsp. prinsepiar	Blue Hills Range, Jasper Hill, survey site JASP03. On Karara Station c. 5.5 km NE of Mungada Well and 3 km NE of Jasper Hill (SH 454). c. 77 km W of Paynes Find	-29.07172	116.921329	20 09 2005

OID_	SHEET_NO	TAXON	CONS_CODE	SITE	VEGETATION	LOCALITY	LAT	LONG_	COLL_DATE
	PERTH 07350058	Rhodanthe collina	1	North-west facing steep upper hillslope of banded ironstone.	Emergent Eucalyptus leptopoda subsp. elevata in shrubland c	Blue Hills Range, Mount Karara, survey site KARA01. On Karara Station c. 3.5 km ESE of Blue Well Bore and 3.5 km WSW of Euro Bore. c. 87 km W of Paynes Find	-29.19015	116.773156	23 09 2005
	PERTH 07350155	Rhodanthe collina	1	South-east facing moderately inclined midslope of banded irc	Open shrubland of Acacia aneura and Acacia sp. Murchison o	Blue Hills Range, Windaning Hill, survey site WIND12. On Karara Station c. 6.5 km NNE of Mulga Bore and 77 km W of Paynes Find	-29.12984	116.905732	17 09 2005
	PERTH 07350007	Rhodanthe collina	1	South south-west facing gently inclined lower hillslope of ban	Open shrubland of Melaleuca nematophylla, Acacia sibina an	Blue Hills Range, Jasper Hill, survey site JASP01. On Karara Station c. 5.5 km NE of Mungada Well and 3 km NE of Jasper Hill (SH 454). c. 77 km W of Paynes Find	-29.07455	116.918296	19 09 2005
	PERTH 07350066	Rhodanthe collina	1	South-east facing moderately inclined lower hillslope of band	Shrubland of Allocasuarina acutivalvis, Acacia ramulosa var. r	Blue Hills Range, survey site CHUL01. On Badja Station c. 16.5 km SSE of Golden Grove Mine which is c. 92 km NW of Paynes Find and 55 km SSE of Yalgoo	-28.90947	117.018388	05 08 2005
	PERTH 07349998	Rhodanthe collina	1	West facing steep mid to upper hillslope of banded ironstone	Shrubland of Dodonaea viscosa subsp. mucronata, Acacia mir	Blue Hills Range, Windaning Hill, survey site WIND02. On Karara Station c. 4.5 km N of Mulga Bore and 77 km W of Paynes Find	-29.14046	116.883775	14 09 2005
	PERTH 03024407	Spartothamnella sp. Helena & Aurora Range (P.G. Armstrong 155-109)	3	Red brown clay, banded ironstone hill (mine site).	Open scrub.	Blue Hill Range,	-29.13333	116.866666	22 11 1992
	PERTH 07341768	Stenanthemum poicilum	3	Red gravel.	Allocasuarina acutivalvis subsp. prinsepiana, Melaleuca hama	Gindalbie Metals Ltd. Mungada Survey Area, near Blue Hills Range, ca 60 km S of Yalgoo	-29.19858	116.876094	16 11 2005
	PERTH 03048551	Stenanthemum poicilum	3	Red brown clay, drainage foccii, iron stone.	Open scrub.	12 km E of Jasper Hill, Vacant Crown Land	-29.13333	117.016666	22 11 1992
	PERTH 07797923	Stenanthemum poicilum	3	Slope. Red-brown loam, boulders, basalt.	Thicket, Allocasuarina dielsiana, Acacia burkittii.	Low hill N of Mt Mulgine, on Warriedar Station, 80 km E of Perenjori	-29.19272	117.007222	25 04 2007
	PERTH 07889445	Stenanthemum poicilum	3	Creekline. Red clay loam.	With Lepidosperma sp. Blue Hill, Eremophila serrulata, Eremc	Just NW of Mount Mulgine on edge of Perenjori - WArriedar Road, ca 70 km W of Paynes Find	-29.12616	117.009638	31 08 2008
	PERTH 07887965	Stylidium scintillans	T	Crest of low rise. Brown clay loam over shaley ? ironstone out	OPen shrubland with Micromyrtus acuta and Grevillea extorr	A few kilometres NW of Mungada Ridge, adjacent to N-S running fence line Karara Station, ca 80 km WSW of Paynes Find	-29.11983	116.939916	10 09 2008
	PERTH 07887973	Stylidium scintillans	T	Midslope of low hill. Brown clay loam over shaley ? ironstone	Open shrubland with Micromyrtus acuta, Aluta aspera subsp.	Very NW end of Mungada Ridge, Terapod prospect, Karara Station, ca 80 km W of Paynes Find	-29.1293	116.884555	12 09 2008
	PERTH 07887981	Stylidium scintillans	T	Crest of low rise. Brown clay loam over shaley ? ironstone ou	Open shrubland with Acacia aulacophylla, Micromyrtus trudg	A few kilometres WNW of Badja-Warriedar Stations boundary gate on Minjar haul road, Badja Station, ca 90 km WNW of Paynes Find	-28.95419	116.952416	11 09 2008
	PERTH 07888007	Stylidium scintillans	T	Low rocky hill. Exposed shaly ironstone with skeletal red clay	Open Acacia shrubland.	Karara Station, just N of Mt Mungada, Yalgoo region	-29.1285	116.914166	05 09 2007
	PERTH 07888015	Stylidium scintillans	T	Crest of low rise. Brown clay loam over shaley ? ironstone out	Open shrubland with Micromyrtus acuta.	A few kilometres NE of Mungada Ridge, on edge of Minjar Haul Road, Warriedar Station, ca 70 km W of Paynes Find	-29.10836	116.97	12 09 2008
	PERTH 07887957	Stylidium scintillans	T	Crest of low rise. Brown clay loam over shaley ? ironstone out	Open shrubland of Micromyrtus acuta, Acacia assimilis subsp	Just N of the western end of Mungada Ridge, Karara Station, ca 80 km WSW of Paynes Find	-29.13002	116.902638	08 09 2008
	PERTH 08244871	Stylidium scintillans	T	Upper hill slope and crest; a rocky habitat with highly weathe	Micromyrtus acuta dominated shrubland over low herbs incl	Terapod prospect, N of Mungada E-W Ridge, Karara	-29.12963	116.884889	07 09 2009
	PERTH 08244898	Stylidium scintillans	T	Flat hill top and adjacent upper slopes; a rocky habitat with h	Micromyrtus acuta dominated shrubland over low herbs incl	Low rise to N of Mungada E-W Ridge, just S of Syncline Haul Track, 3.4 km E of Mungada Pit to Terapod track, Karara Station	-29.12869	116.91425	08 09 2009
	PERTH 08244901	Stylidium scintillans	T	Flat hill crest; a rocky habitat with highly weathered granitic-t	Micromyrtus acuta and Acacia dominated shrubland over Bor	Low rise to N of Mungada E-W Ridge, accessed via tracks running S of Syncline Haul Track, Karara	-29.13025	116.902361	09 09 2009
	PERTH 08244928	Stylidium scintillans	T	Flat hill crest; a rocky habitat with highly weathered granitic-t	Micromyrtus acuta dominated shrubland with scattered Acac	Low rise to N of Mungada E-W Ridge, accessed via tracks running S of Syncline Haul Track, Karara	-29.12841	116.914167	09 09 2009
	PERTH 08124795	Stylidium scintillans	T	Vacant crown land. Granite outcrop.		Karara Station, Yalgoo Geraldton	-29.09489	116.905971	10 09 2009
	PERTH 08124809	Stylidium scintillans	T	Vacant crown land. Granite outcrop.		W of Warriedar Coppermine Road, Perenjori Geraldton	-29.11176	116.990513	10 09 2009
	PERTH 08124825	Stylidium scintillans	T	Vacant crown land. Granite outcrop.		Karara Station, Perenjori Geraldton	-29.14994	116.938771	11 09 2009
	PERTH 08124833	Stylidium scintillans	T	Vacant crown land. Granite outcrop.		Warriedar Station, Yalgoo Geraldton	-28.99803	116.954898	08 09 2009
	PERTH 04914406	Xanthoparmelia dayiana	3	Growing on rock fragment. Red clayey sand.	Open woodland.	7 km E of Widdin Widdin Hill, Karara Station	-29.18333	116.933333	22 11 1992

Taxon	Status	Rank	IUCNCriteria	EPBC	DECRegion	DECDistrict	Distribution	FloweringPeriod	RecoveryPlan
Acacia diallaga		2			MWST	GERALDTON	Karara, Warriedar	September	
Acacia formidabilis		3			GOLD,MWST,WHTB	KALGOORLIE,GERALDTON,CENTRAL WHEATBELT	Wanarra, Perenjori, Paynes Find, Southern Cross, Warralackin, Bungalbin Hill		
Acacia karina		2			MWST	GERALDTON	Blue Hill Range, Karara, Mt Gibson Stn	-	
Acacia sulcaticaulis		1			MWST	GERALDTON	Warriedar Stn	Sept	
Acacia woodmaniorum	T		VU	D2	MWST	GERALDTON	Blue Hill Range, Karara	-	
Angianthus micropodioides		3			MWST,SWAN,WHTB	SWAN COASTAL,GERALDTON,CENTRAL WHEATBELT	Perth, Meckering, Mongers Lake, Bunjil, Warriedar, Mollerin		
Calandrinia kalanniensis		2			WHTB	CENTRAL WHEATBELT	Kalannie, Petrudor Rock, Xantippe Rock, Karara Station, Bonnie Rock, Yanneymooning NR, Hughden Rock	Dec-Jan	
Calandrinia sp. Warriedar (F. Obbens 04/09)		2			MWST	GERALDTON	Warriedar Stn, Karara Stn., Morawa	Sep	
Chamelaucium sp. Warriedar (A.P. Brown & S. Patrick APB 1100)		1			MWST	GERALDTON	Warriedar Stn, Karara Stn, Paynes Find	Sept	
Drummondita fulva		3			MWST	GERALDTON	Lochada, Karara	Sep-Oct	
Eremophila sp. Rothsay (D. Coultas & J. Kelt s.n. PERTH 08200440)		1			MWST	GERALDTON	Karara Stn.		
Eucalyptus jutsonii subsp. kobela		1			MWST	GERALDTON	Karara		
Gnephosis cassiniana		3			MWST	GERALDTON	Binnu, Mongers Lake, Warriedar, Mullewa,		
Grevillea globosa		3			MWST	GERALDTON	Pindar, Mt Harry, Edamurta Range, Gossan Hill, Tallering Stn, Badja Stn	Jan	
Gunniopsis divisa		3			MWST	GERALDTON	Mt Narryer, Meeberrie, Karara Stn., Wooleen Stn., Murgoo Stn., Mileura Stn., Woolgorong Stn.	Aug	
Haegiela tatei		4			GOLD,MWST,SCST,WHTB	ESPERANCE,KALGOORLIE,GERALDTON,GREAT SOUTHERN	Grass Patch, Lake Lockhart, Lake King, Badja Station, Peak Charles N.P., Lake Grace, Lake Magenta N.R., Lake Lockhart, Lake Cronin, Jaurdi Stn.	-	
Hydrocotyle sp. Warriedar (P.G. Wilson 12267)		1			MWST	GERALDTON	Warriedar Stn		
Korthalsella leucothrix		3			GOLD,MWST	KALGOORLIE,GERALDTON	Lake Monger, Wanarra Rock, Kent Bore, Gibson Desert	-	
Lepidosperma sp. Blue Hills (A. Markey & S. Dillon 3468)		1			MWST	GERALDTON	Karara, Blue Hills Range		
Micromyrtus acuta		3			MWST	GERALDTON	Paynes Find, Warriedar, Lake Monger, White Wells, Blue Hill Range	Jun,Sep	
Micromyrtus trudgenii		3			MWST	GERALDTON	Warriedar Hill, Gossan Hill, Yalgoo, Golden Grove, Karara, Mungada	Jul	
Persoonia kararae		2			MWST	GERALDTON	Karara Station, Toolonga NR	-	
Petrophile pauciflora		3			MWST,WHTB	GERALDTON,CENTRAL WHEATBELT	Bimbiji, Mt Magnet, Mileura, Woolgorong, Paynes Find, Kalli, Karara, Madoonga	Aug	
Prostanthera sp. Karara (D. Coultas & K. Greenacre Opp 8)		1			MWST	GERALDTON	Karara Stn., Lochada Stn.	Sep	
Stenanthemum poicilum		3			MWST,SCST	ESPERANCE,GERALDTON,MOORA	Wilroy, Canna, Bremer Range, Warriedar Station, Yilgarn, Geraldton	May-Jun,Oct	
Stylidium sp. Yalgoo (D. Coultas et al. Opp 01)	T		VU	D2	MWST	GERALDTON	Warriedar Stn, Karara Stn, Badja Stn		
Wurmbea murchisoniana		4			GOLD,MWST,SCST	ESPERANCE,KALGOORLIE,GERALDTON	Murchison R., Jingemarra, Wanarra Rk, 71 Mile Rk, Coonmine Well, Balladonia	Jul-Sep	
Xanthoparmelia dayiana		3			GOLD,MWST	KALGOORLIE,GERALDTON	Kalgoorlie, Northern Territory, Karara		

Appendix F: Vegetation Classification and Condition Scales

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LANDFORM – slope class, morphological type, landform element and aspect.

Example Landform Descriptions:

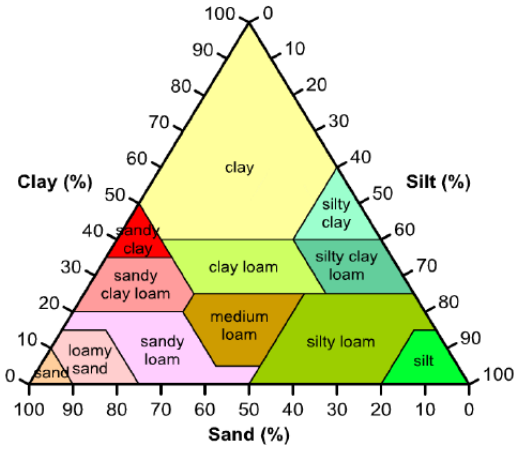
- Gentle crest: summit surface
- Very gentle open depression: drainage depression
- Moderate hillock: tor
- Level ridge: levee
- Very gentle flat: valley flat

Slope Class	Degrees range
Level	>0.35° (0.2°)
Very gently	0.35°- 1.45° (1°)
Gently inclined	1°- 5.45° (3°)
Moderately	5.45°- 18° (10°)
Steep	18°- 30° (23°)
Very Steep	30°- 45° (37°)
Precipitous	45°- 72° (60°)
Cliffed	72°- 90° (80°)

Note: *slope to be estimated over at least 20m.*

Morphological Type	Description	Landform Element Type		
Crest	Landform element that stands above all points in adjacent terrain.	Hillcrest	Risecrest	Dunecrest
		Summit surface		
Hillock	Compound landform element comprising a narrow crest and short adjoining slopes, the crest length being less that the width of the landform element.	Tor	Residual rise	Tumulus
		Hummocky	Dune	Barchan
		Parabolic dune	Mound	Cone
		Dune	Linear or longitudinal	
Ridge	Compound landform element comprising a narrow crest and short adjoining slopes, the crest length being greater than the width of the landform element.	Levee	Bar (stream)	Dune
		Scroll	Prior Stream	Lunette
		Beach ridge	Foredune	Embankment
		Dam		
Slope (unspecified)	Planar landform element that is neither a crest nor a depression and has an inclination > about 1%.	Cliff	Scarp	Landslide
		Hillslope	Cutface	Embankment
Simple slope	Slope element adjacent below a crest or flat and adjacent above a flat or depression.	Bank (stream)	Beach	Riseslope
		Duneslope		
Mid-slope	Slope element not adjacent below a crest or flat and not adjacent above a flat or depression.	Breakaway	Cliff-footslope	Berm
		Scarp-footslope	Bench	
Lower slope	Slope element not adjacent below a crest or flat but adjacent above a flat or depression.	Cliff footslope	Scarp	Cliff-
		Pediment	Footslope	Talus
Flat	Planar landform element that is neither crest nor a depression and is level or very gently inclined.	Plain	Rock flat	Terrace plain
		Rockplatform	Cut-over	Intertidal flat
		Scald	Pediment	Fill-top
		Fan	Valley flat	Reef flat
		Terrace flat	Channel bench	Supratidal
		Back plain	Scroll plain	Berm
		Flood-out	Tidal flat	Tidal creek
Open depression	Landform element below almost all points in adjacent terrain. Extends at the same elevation or lower beyond the locality where it is observed.	Alcove	Gully	Swamp
		Cirque	Drainage	Trench
		Stream channel	Stream bed	Swale
		Estuary		
Closed depression	Landform element below all points in adjacent terrain.	Lake	Playa	Blow-out
		Deflation basin	Solution	Maar
		Collapse doline	Ox-bow	Pit
		Lagoon	Swamp	Cirque
		Crater		

SOIL – colour and texture



Particle size (mm)	Descriptor
>200	Boulder
60 - 200	Cobble
20 - 60	Pebble
6 - 20	Gravel
2 - 6	Fine gravel
0.6 – 2	Coarse sand
0.2 - 0.6	Medium sand
0.06 - 0.2	Fine sand
0.02 - 0.06	Coarse silt
0.006 - 0.02	Medium silt
0.002 - 0.006	Fine silt

Testing Soil Texture

Texture refers to the feel of the soil. It is based on the varying amounts of sand, silt and clay in the soil. To estimate the texture of the soil:

- Take a handful of soil and moisten it with water, a little at a time,
- Knead the soil and continue to moisten it until you have a ball of soil which is moist all the way through,
- Now use the following key to estimate the texture of the soil.

1. The soil will not roll into a ribbon – go to 2.
The soil will roll out into a ribbon about 8 cm long and 0.5 cm thick, but cannot be turned into a ring without cracking – go to 4.
The soil rolls easily into a ribbon and can be turned into a ring. No sand can be felt – go to 7.

2. The soil feels gritty – go to 3.
The soil feels silky – it is ***SILTY LOAM***.
The soil feels neither gritty nor silky – it is ***LOAM***.

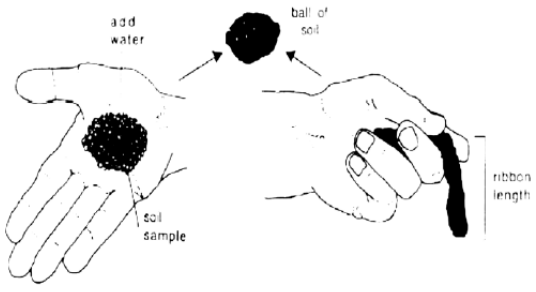
3. The soil will make a firm ball – it is ***SANDY LOAM***.
The soil does not make a firm ball, but colours your fingers – it is ***LOAMY SAND***.
The soil neither makes a firm ball nor colours your fingers – it is ***SAND***.

4. The soil feels gritty – go to 5.
The soil feels silky – go to 6.
Then soil feels neither gritty nor silky – it is ***CLAY LOAM***.

5. The feels like gritty plasticine to mould – it is ***SANDY CLAY***.
The soil feels earthy – it is ***SANDY CLAY LOAM***.

6. The soil feels like plasticine to mould – it is ***SILTY CLAY***.
The soil feels silky, but earthier – it is ***SILTY CLAY LOAM***.

7. The soil is easy to mould – it is ***LIGHT CLAY***.
The soil is fairly stiff to mould – it is ***MEDIUM CLAY***.
The soil is very stiff to mould – it is ***HEAVY CLAY***.



BROAD FLORISTIC FORMATIONS

Broad Floristic Formation Classes[2]							
Foliage Cover (%)	100 - 70	70 - 30	30 - 10	10 - 0.2	< 0.2	< 0.2	< 3[1]
Cover Name	Closed or dense	Mid-dense	Sparse or open	Very sparse	Isolated plants	Isolated clumps	Emergents
Growth form of dominant stratum (Height Range (m))							
Tree (2 - 50)	Closed X trees	Mid-dense X trees	Sparse X trees	Very Sparse X trees	Isolated X trees	Isolated clumps of X trees	X trees
Woody plant (indeterminate tree or shrub) (0.1 - 10)	Closed X woody plants	Mid-dense X woody plants	Sparse X woody plants	Very Sparse X woody plants	Isolated X woody plants	Isolated clumps X woody plants	X woody plants
Mallee (tree or shrub) (0.1 - 30)	Closed X mallee	Mid-dense X mallee	Sparse X mallee	Very Sparse X mallee	Isolated X mallee	Isolated clumps X mallee	X mallee
Shrub (< 20)	Closed X shrub	Mid-dense X shrubs	Sparse X shrubs	Very sparse X shrubs	Isolated X shrubs	Isolated clumps of X shrubs	X shrubs
Heath or kwongan or wallum shrub (< 8)	Closed X heath shrubs	Mid-dense X heath shrubs	Sparse X heath shrubs	Very sparse X heath shrubs	Isolated X shrubs	Isolated clumps of X shrubs	X heath shrubs
Chenopod shrub (< 3)	Closed X chenopod shrub	Mid-dense X chenopod shrub	Sparse X chenopod shrub	Very sparse X chenopod shrub	Isolated X chenopod shrub	Isolated clumps of X chenopod shrubs	X chenopod shrubs
Samphire shrub (< 3)	Closed X samphire shrub	Mid-dense X samphire shrub	Sparse X samphire shrub	Very sparse X samphire shrub	Isolated X samphire shrub	Isolated clumps of X samphire shrub	X samphire shrub
Tussock / hummock grass (0.1 - 5)	Closed X tussock / hummock grasses	Mid-dense X tussock / hummock grasses	Sparse X tussock / hummock grasses	Very sparse X tussock / hummock grasses	Isolated X tussock / hummock grasses	Isolated clumps of X tussock / hummock grasses	X tussock / hummock grasses
Sedge / rush (< 3)	Closed X sedges / rushes	Mid-dense X sedges / rushes	Sparse X sedges / rushes	Very sparse X sedges / rushes	Isolated X sedges / rushes	Isolated clumps of X sedges / rushes	X sedges / rushes
Herb (< 2)	Closed X herbs	Mid-dense X herbs	Sparse X herbs	Very sparse X herbs	Isolated X herbs	Isolated clumps of X herbs	X herbs

[1] For emergents, '<3' means 'up to 3 % of total foliage cover' and '<5' means 'up to 5 % of total crown cover'.

[2] In each class name, replace 'X' with the taxonomic name from either the dominant genus or genus group making up the dominant stratum. Not all classes require a separate taxonomic name (e.g. mid-dense mallee). In other cases, the 'X' name is optional, e.g. sparse chenopod shrubs vs sparse *Atriplex* chenopod shrubs or sparse *Atriplex* shrubs.

Reference: CSIRO Australian Soil and Land Survey Field Handbook 2009

COARSE FRAGMENTS – abundance

Code	Description	Cover
0	No coarse fragments	0
1	Very slightly or very few, i.e. very few small pebbles	<2 %
2	Slightly or few, for example slightly stony, few stones	2-10 %
3	No qualifier or common, i.e. gravelly, stony, common medium	10-20 %
4	Moderately or many	20-50 %
5	Very or abundant	50-90 %
6	Extremely or very abundant	>90 %

ROCK OUTCROP - abundance

Code	Description	Cover
0	No rock outcrop	0
1	Very slightly rocky	<2 %
2	Slightly rocky	2-10 %
3	Rocky	10-20 %
4	Very Rocky	20-50 %
5	Rockland	>50 %

Keighery (1994) Vegetation Condition Scale

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
Very Good	Vegetation structure altered obvious signs of disturbance. Disturbance to vegetation structure covers repeated fire, aggressive weeds, dieback, logging, grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure covers frequent fires, aggressive weeds at high density, partial clearing, dieback and grazing.
Degraded	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 includes frequent fires, presence of very aggressive weeds, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas often described as “parkland cleared” with the flora comprising weed or crop species with isolated native trees or shrubs.

Modified from Trudgen, 1991, by Keighery for the Swan Coastal Plain Survey. Found in Bushland Plant Survey: a Guide to Plant Community Survey for the Community.

Appendix G: Map of Priority Flora Targeted Gridlines and Tracklog

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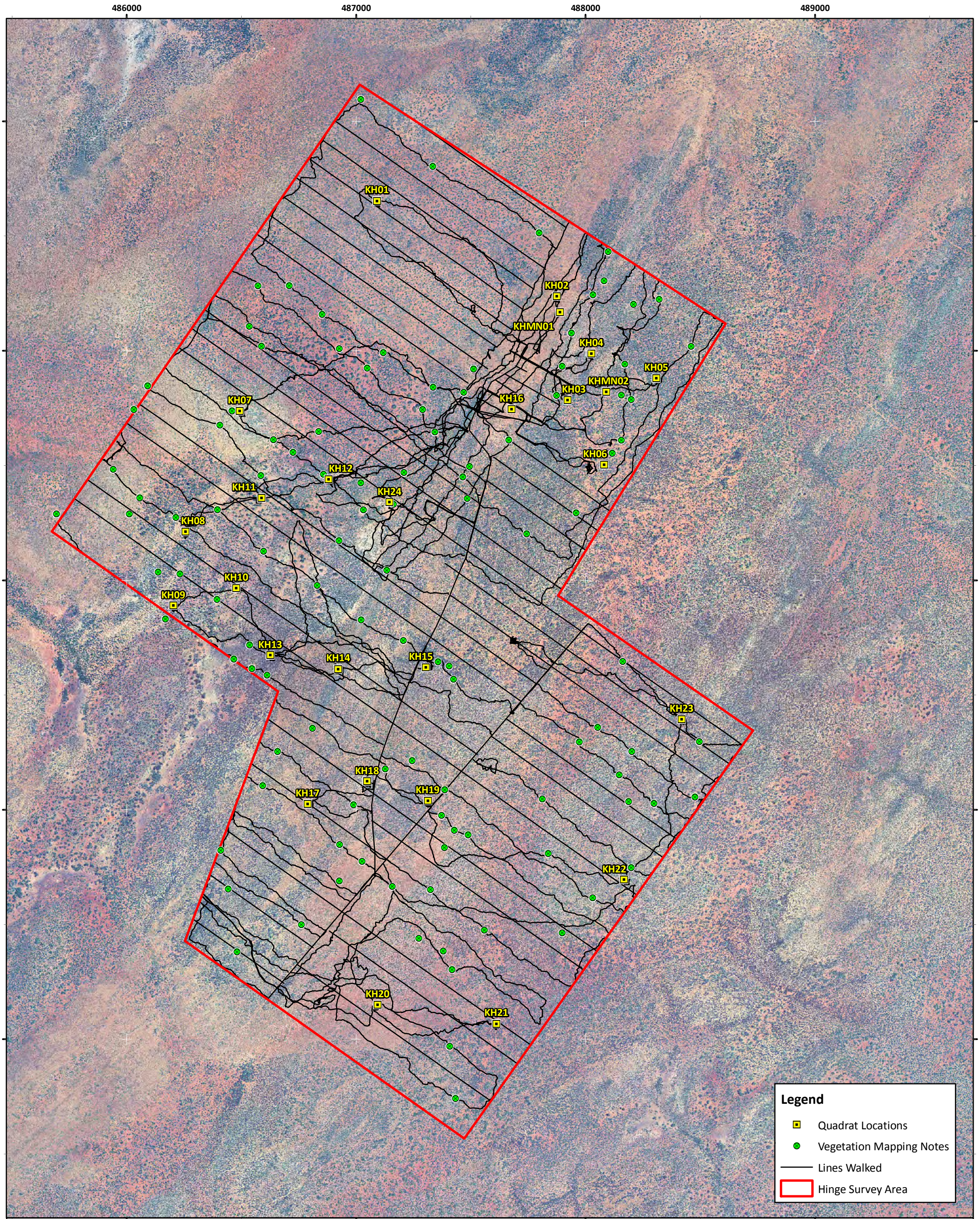

Karara Mining Ltd.
Hinge Vegetation and Flora Survey

Appendix G: Areas Covered by Survey

Author: M. Gardener	Date: 12-12-2012	Datum: GDA 1994 - Projection: MGA Zone 50 - Scale: 1:15,000 (A3)
Drawn: C. Dyde	Figure Ref: 16002-12FMV1RevA_20121212_AppendixG_Tracks	Metres 0 200 400 600 800 1,000

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Appendix H: Summary of Priority Flora within 50 km of Survey Area

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Table H.1: Summary of Priority Flora within 50 km of the survey area.

Species	Priority	Life form	Flowering time	Habitat	Likely occurrence in survey area
Acacia woodmaniorum	Threatened	Shrub	July or September	Red-brown clay, skeletal red silt, banded ironstone, laterite on slopes, crests of ridges, rocky hills and disturbed overburden of mine sites.	Unlikely
Eremophila viscida	Threatened	Shrub	September to November	Granitic soils and sandy loams in stony gullies and on sandplains.	Unlikely
Eucalyptus synandra	Threatened	Mallee	August or December or January to March	Sandy and lateritic soils.	Unlikely
Stylidium scintillans	Threatened	Annual herb	September	Brown clay loam over ironstone outcropping on crests of low rises.	Unlikely
Hybanthus cymulosus	Threatened	Perennial herb	May to July	Clays and rocky red/brown loam clays along dry creeklines.	Unlikely
Acacia sulcaticaulis	Priority 1	Shrub	September	Brown clay loam over granite and quartz and red silty loam over granite/greenstone on low hills, slopes, ridges and creeklines between low hills.	Unlikely
Chamelaucium sp. Warriedar (A.P. Brown & S. Patrick APB 1100)	Priority 1	Shrub	September	Red-brown loam over granite/greenstone or dolerite boulders on low hills and rocky slopes.	Unlikely

Species	Priority	Life form	Flowering time	Habitat	Likely occurrence in survey area
Chamelaucium sp. Yalgoo (Y. Chadwick 1816)	Priority 1	Shrub	August to September	Red loamy clay on granite outcrops and upper slopes.	Potential
Eremophila sp. Rothsay (D. Coultas & J. Kelt s.n. PERTH 08200440)	Priority 1	Shrub	October to November	Red-brown silty clay loam on low rises.	Potential
Eucalyptus jutsonii subsp. *kobela*	Priority 1	Mallee	Details not available	Deep red-yellow sand on rises.	Unlikely
Hydrocotyle sp. Warriedar (P.G. Wilson 12267)	Priority 1	Annual herb	September	Red loam on creek embankments, valley floors.	Unlikely
Lepidosperma sp. Blue Hills (A. Markey & S. Dillon 3468)	Priority 1	Rhizomatous perennial sedge	September	Brown and red brown soils on upper hillslopes of banded ironstones and footslopes.	Unlikely
Millotia dimorpha	Priority 1	Annual herb	September	Red loamy soils on hillslopes of banded ironstone, ironstone outcrops and footslopes.	Potential
Prostanthera sp. Karara (D. Coultas & K. Greenacre Opp 8)	Priority 1	Shrub	September	Red silty clay loam on low rises and slopes.	Previously recorded
Rhodanthe collina	Priority 1	Annual herb	August to October	Loam on rocky hill slopes, drainage lines and outcrops.	Potential

Species	Priority	Life form	Flowering time	Habitat	Likely occurrence in survey area
Acacia diallaga	Priority 2	Shrub	September	Red silty loam or brown clay loam over basalt on low hills and gentle to moderate slopes.	Unlikely
Acacia karina	Priority 2	Woody shrub	June	Brown-red silty clay loam with pebbles, banded ironstone, basalt and gravel on crests, ridges and rocky slopes.	Unlikely
Calandrinia kalanniensis	Priority 2	Perennial herb	November to December or January	Red sandy clay and shallow brown clay derived from granite on rocky outcrops, herbfields and slopes near drainage lines.	Unlikely
Calandrinia sp. Warriedar (F. Obbens 04/09)	Priority 2	Annual herb (succulent)	September	Red brown clay loam with some ironstone gravel/stone, on lower slopes and on the crest of low rises of granite rock.	Potential
Persoonia kararae	Priority 2	Shrub	September to November	Sandplains.	Potential
Acacia formidabilis	Priority 3	Shrub	August to September	Yellow or red/brown sand on undulating plains and hillsides.	Potential
Angianthus micropodioides	Priority 3	Annual herb	November to December or January to February	Saline sandy soils on river edges, saline depressions and claypans.	Unlikely

Species	Priority	Life form	Flowering time	Habitat	Likely occurrence in survey area
Austrostipa blackii	Priority 3	Perennial, grass-like or herb	September to November	Red-brown soil on rocky outcrops and upper hillslopes of banded ironstone.	Potential
Bossiaea sp. Jackson Range (G. Cockerton & S. McNee LCS 13614)	Priority 3	Shrub	March to September	Red-brown silty clay loam on low breakaways.	Potential
Calotis sp. Perrinvale Station (R.J. Cranfield 7096)	Priority 3	Annual herb	August to September	Red-yellow brown soils, banded ironstone and laterite on gentle to moderate slopes, banded ironstone outcrops.	Unlikely
Cyanicula fragrans	Priority 3	Perennial herb	August to September	Red loam on flat granite outcrops.	Potential
Dicrastylis linearifolia	Priority 3	Shrub	November to December	Red sandy loam on flat sandplains.	Previously recorded
Drummondita fulva	Priority 3	Shrub	September to October	Skeletal, orange-red or red-brown sandy loams and clayey silts, banded ironstone on footslopes, slopes and hillcrests.	Previously recorded
Gnephosis cassiniana	Priority 3	Annual herb	September to October	Sand, clay loam on saline depressions and low wet areas.	Unlikely
Grevillea granulosa	Priority 3	Compact shrub	July to October	Gravelly sand, loam, clay. Sandplains.	Unlikely

Species	Priority	Life form	Flowering time	Habitat	Likely occurrence in survey area
Grevillea globosa	Priority 3	Shrub	January or June or November	Red-brown loam, yellow sand on slopes and stony plains.	Potential
Grevillea scabrida	Priority 3	Shrub	July	Red clay loam, brown loam and stony loam on flats and slopes.	Unlikely
Grevillea subtiliflora	Priority 3	Shrub	Apr or July to September	Red-brown loam on rocky ground, slopes, drainage lines and valley floors.	Unlikely
Gunniopsis divisa	Priority 3	Annual herb	August	Yellow pale-brown loam on roadsides, footslopes and laterite outcrops.	Potential
Korthalsella leucothrix	Priority 3	Parasitic shrub	August	On Acacia acuminata and A. craspedocarpa.	Potential
Melaleuca barlowii	Priority 3	Shrub	April	Occurs in shrubland and roadside reserves in yellow-brown sand or red-brown clay loam.	Provisionally recorded
Micromyrtus acuta	Priority 3	Shrub	June or September	Grey-tan silty sand, laterite, granite and red-brown loam clay on slopes, rock outcrops and hillcrests of banded ironstone.	Potential
Micromyrtus trudgenii	Priority 3	Shrub	July	Yellow-brown or red-brown loamy clay, gravel, banded ironstone, dolerite on crests and slopes.	Previously recorded
Persoonia pentasticha	Priority 3	Shrub	August to November	Red sandy loam on base of granite outcrops, drainage lines and slopes.	Potential

Species	Priority	Life form	Flowering time	Habitat	Likely occurrence in survey area
Petrophile pauciflora	Priority 3	Shrub	August to September	Red-brown loam clay on decaying and dissected granite breakaways and outcrops.	Potential
Polianthion collinum	Priority 3	Shrub	May to July	Red or brown clay loam between blocks of banded ironstone on low hills and slopes.	Potential
Psammomoya implexa	Priority 3	Shrub	August to October	Red-brown soils on stony rises and footslopes of banded ironstone.	Previously recorded
Spartothamnella sp. Helena & Aurora Range (P.G. Armstrong 155-109)	Priority 3	Shrub	March to Apr	Red brown clay on banded ironstone hills.	Potential
Stenanthemum poicilum	Priority 3	Shrub	May to June or September to November	Red clay or sandy clay, loam on slopes and in creeklines.	Potential
Xanthoparmelia dayiana	Priority 3	Lichen	Details not available	Red clayey sand.	Potential
Haegiela tatei	Priority 4	Annual herb	August to November	Clay, sandy loam and gypsum in saline habitats.	Unlikely
Wurmbea murchisoniana	Priority 4	Perennial herb	July to September	Clay, sandy clay, loam on seasonally inundated clay hollows and rock pools.	Unlikely

Appendix I: Vascular Flora List

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Table I.1: Vascular Flora List.

Family	Species	Conservation Priority	Weed (*)
AIZOACEAE	*Gunniopsis rubra*		
	*? Mesembryanthemum nodiflorum^*		*
AMARANTHACEAE	*Ptilotus ?aervoides^*		
	Ptilotus gaudichaudii var. *gaudichaudii*		
	Ptilotus obovatus		
	Ptilotus sp. Northampton (R. Davis 10952)		
APOCYNACEAE	*Alyxia buxifolia*		
	Rhyncharrhena linearis		
ARALIACEAE	*Trachymene ornata*		
	Trachymene sp.^		
ASPARAGACEAE	*Thysanotus manglesianus*		
	*Thysanotus ?manglesianus^*		
	Thysanotus sp.^		
ASTERACEAE	*Asteraceae* sp.^		
	*?Blennospora drummondii^*		
	Calocephalus multiflorus		
	Cephalipterum drummondii		
	Chthonocephalus pseudevax		
	*?Erymophyllum tenellum^*		
	Erymophyllum ramosum subsp. *ramosum*		
	Gilberta tenuifolia		
	Gnephosis sp.		
	*?Hyalosperma glutinosum^*		
	Lawrencella rosea		
	Minuria cunninghamii		
	*?Minuria cunninghamii^*		
	Minuria sp.^		
	Myriocephalus guerinae		
	Olearia pimeleoides		
	*Podolepis ?canescens^*		
	Podolepis canescens		
	Podolepis lessonii		
	Pogonolepis muelleriana		
	*Rhodanthe ?manglesii^*		
	*?Rhodanthe manglesii^*		
	Schoenia cassiniana		
	Waitzia acuminata		
BORYACEAE	*Borya sphaerocephala*		
BRASSICACEAE	*Brassica tournefortii*		*
BRASSICACEAE	*Stenopetalum anfractum*		
CAMPANULACEAE	*Wahlenbergia capensis*		*

Family	Species	Conservation Priority	Weed (*)
CASUARINACEAE	*Allocasuarina acutivalvis*		
	*Allocasuarina ?acutivalvis^*		
	Allocasuarina campestris		
CELASTRACEAE	*Psammomoya implexa*	P3	
CHENOPODIACEAE	*Atriplex* sp.^		
	*?Maireana carnosa^*		
	*Maireana ?planifolia^*		
	Maireana planifolia		
	Maireana sp.^		
	?Maireana sp.^		
	Rhagodia sp.^		
CONVOLVULACEAE	*Cuscuta epithymum*		*
	Cuscuta sp.^		
CRASSULACEAE	*Crassula colorata* var. *colorata*		
	Crassula ?colorata var. *colorata^*		
CUPRESSACEAE	*Callitris columellaris*		
DILLENIACEAE	*Hibbertia arcuata*		
	Hibbertia stenophylla		
DROSERACEAE	*Drosera macrantha* subsp. *macrantha*		
	Drosera sp.^		
ECDEIOCOLEACEAE	*Ecdeiocolea monostachya*		
ERICACEAE	*Astroloma serratifolium*		
FABACEAE	*Acacia acuminata*		
	Acacia anthochaera		
	Acacia assimilis		
	Acacia assimilis subsp. *assimilis*		
	Acacia aulacophylla		
	Acacia caesaneura		
	Acacia colletioides		
	Acacia erinacea		
	Acacia exocarpoides		
	Acacia grasbyi		
	Acacia latior		
	Acacia longispinea		
	Acacia murrayana		
	Acacia obtecta		
	*Acacia ?obtecta^*		
	Acacia prainii		
	Acacia ramulosa		
	Acacia ramulosa var. *ramulosa*		
	Acacia sibina		
	Acacia tetragonophylla		
	*Daviesia ?benthamii^*		

Family	Species	Conservation Priority	Weed (*)
FABACEAE	*Mirbelia bursarioides*		
	Senna artemisioides subsp. *filifolia*		
	Senna charlesiana		
GERANIACEAE	**Erodium aureum*		*
	Erodium cygnorum		
GOODENIACEAE	*Scaevola spinescens*		
HALORAGACEAE	*Glischrocaryon flavescens*		
HEMEROCALLIDACEAE	*Dianella revoluta*		
LAMIACEAE	*Dicrastylis ?linearifolia^*		
	*?Hemigenia botryphylla^*		
	*?Hemigenia macphersonii^*		
	?Hemigenia sp.^		
	Prostanthera althoferi		
	Prostanthera patens		
	*?Prostanthera patens^*		
	*Prostanthera ?*sp. Karara^		
	Prostanthera sp.^		
LOBELIACEAE	*Lobelia winfridae*		
LORANTHACEAE	*Lysiana casuarinae*		
MALVACEAE	*Brachychiton gregorii*		
	Sida sp. dark green fruits (S. van Leeuwen 2260)		
MYRTACEAE	*Aluta aspera*		
	Aluta aspera subsp. *hesperia*		
	Eucalyptus brachycorys		
	Eucalyptus ?celastroides subsp. *virella^*		
	Eucalyptus kochii subsp. *plenissima*		
	Eucalyptus ?kochii subsp. *plenissima^*		
	Eucalyptus leptopoda subsp. *arctata*		
	Eucalyptus loxophleba subsp. *supralaevis*		
	Euryomyrtus patrickiae		
	*Melaleuca ?barlowii^*		
	Melaleuca hamata		
	Melaleuca leiocarpa		
	Melaleuca nematophylla		
	Micromyrtus trudgenii	P3	
MYRTACEAE	*Thryptomene costata*		
	Thryptomene sp.^		
POACEAE	*Amphipogon caricinus* var. *caricinus*		
	Austrostipa elegantissima		
	*Austrostipa ?scabra^*		
	Austrostipa sp.^		
	*Austrostipa ?trichophylla^*		
	Monachather paradoxus		

Family	Species	Conservation Priority	Weed (*)
POLYGALACEAE	*Comesperma integerrimum*		
PORTULACACEAE	*Calandrinia ?*sp. Blackberry (D. M. Porter 171)^		
PROTEACEAE	*Grevillea ?obliquistigma^*		
	Grevillea eriobotrya		
	*Grevillea ?eriobotrya^*		
	Grevillea extorris		
	*Grevillea ?extorris^*		
	Grevillea globosa	P1	
	Grevillea juncifolia subsp. *temulenta*		
	Grevillea nematophylla subsp. *supraplana*		
	Grevillea obliquistigma subsp. *obliquistigma*		
	Grevillea paradoxa		
	Grevillea pityophylla		
	Hakea minyma		
	Hakea recurva		
	Hakea recurva subsp. *recurva*		
	Persoonia pentasticha	P2	
PTERIDACEAE	*Cheilanthes adiantoides*		
	Cheilanthes sieberi		
	Cheilanthes sieberi subsp. *sieberi*		
	Cheilanthes sp.^		
RUTACEAE	*Drummondita fulva*	P3	
	Philotheca brucei subsp. *brucei*		
	Philotheca sericea		
	*Philotheca ?sericea^*		
	Philotheca tomentella		
SANTALACEAE	*Exocarpos aphyllus*		
	*Santalum ?acuminatum^*		
	*Santalum ?spicatum^*		
SAPINDACEAE	*Dodonaea inaequifolia*		
SCROPHULARIACEAE	*Eremophila clarkei*		
	Eremophila forrestii subsp. *forrestii*		
	Eremophila georgei		
SCROPHULARIACEAE	*Eremophila ?granitica^*		
SCROPHULARIACEAE	*Eremophila latrobei* subsp. *latrobei*		
	Eremophila oldfieldii subsp.*?angustifolia / karara^*		
	Eremophila oppositifolia subsp. *angustifolia* *Eremophila serrulata*		
SOLANACEAE	*Duboisia hopwoodii*		
	Solanum lasiophyllum		
THYMELAEACEAE	*?Pimelea* sp.^		
	Pimelea forrestiana		

Family	Species	Conservation Priority	Weed (*)
THYMELAEACEAE	*Pimelea* sp.^		
ZYGOPHYLLACEAE	*Zygophyllum lobulatum*		
	Zygophyllum ovatum		

^ Specimens could not be indentified further due to inadequate material.

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Appendix J: Floristic Community Type x Species Matrix

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Table J.1: Floristic Community Type x Species Matrix.

Species	Conservation Priority	Weed	FCT 2	FCT 9	FCT 13	FCT 19a	FCT ?
Acacia acuminata			*		*	*	*
Acacia anthochaera				*			
Acacia assimilis			*	*		*	
Acacia assimilis subsp. *assimilis*			*	*			
Acacia aulacophylla			*				
Acacia caesaneura			*		*	*	
Acacia colletioides				*			
Acacia erinacea						*	
Acacia exocarpoides			*		*	*	
Acacia latior			*	*			
Acacia longispinea				*			
Acacia murrayana				*			
Acacia obtecta					*		
Acacia prainii				*			
Acacia ramulosa			*	*	*	*	
Acacia ramulosa var. *ramulosa*			*	*	*	*	*
Acacia sibina			*	*	*	*	
Acacia tetragonophylla			*		*	*	*
Allocasuarina ?acutivalvis			*	*			
Allocasuarina acutivalvis					*	*	
Allocasuarina campestris			*				*
Aluta aspera			*				
Aluta aspera subsp. *hesperia*			*		*	*	
Alyxia buxifolia			*			*	

Species	Conservation Priority	Weed	FCT 2	FCT 9	FCT 13	FCT 19a	FCT ?
Amphipogon caricinus var. *caricinus*			*	*		*	
Asteraceae sp.			*				*
Astroloma serratifolium			*				
Atriplex sp.			*			*	
Austrostipa elegantissima			*		*		*
Austrostipa ?scabra			*			*	
Austrostipa sp.			*			*	
Austrostipa ?trichophylla			*			*	*
?Blennospora drummondii			*			*	
Borya sphaerocephala							*
*Calandrinia ?*sp. Blackberry (D. M. Porter 171)			*				
Calocephalus multiflorus			*				
Cephalipterum drummondii			*			*	*
Cheilanthes adiantoides			*				*
Cheilanthes sieberi							*
Cheilanthes sieberi subsp. *sieberi*					*		
Cheilanthes sp.			*		*	*	
Chthonocephalus pseudevax			*				*
Comesperma integerrimum			*		*		*
Crassula ?colorata var. *colorata*			*				
Crassula colorata var. *colorata*					*		
Cuscuta epithymum		^	*			*	*
Cuscuta sp.			*			*	
Dianella revoluta			*		*		*
Dodonaea inaequifolia			*				

Species	Conservation Priority	Weed	FCT 2	FCT 9	FCT 13	FCT 19a	FCT ?
Drosera macrantha subsp. *macrantha*			*				*
Drosera sp.			*				
Drummondita fulva	P3		*		*	*	
Eremophila clarkei			*		*	*	
Eremophila forrestii subsp. *forrestii*				*			
Eremophila georgei			*			*	
Eremophila ?granitica			*			*	
Eremophila latrobei subsp. *latrobei*			*		*	*	*
Eremophila oldfieldii subsp. *?angustifolia / karara*			*			*	
Eremophila oppositifolia subsp. *angustifolia*			*				
Eremophila serrulata			*		*	*	
Erodium cygnorum			*				
?Erymophyllum tenellum			*		*		*
Eucalyptus brachycorys					*	*	
Eucalyptus ?celastroides subsp. *virella*				*			
Eucalyptus ?kochii subsp. *plenissima*				*		*	
Eucalyptus kochii subsp. *plenissima*						*	
Eucalyptus leptopoda subsp. *arctata*					*		
Eucalyptus loxophleba subsp. *supralaevis*						*	
Euryomyrtus patrickiae				*			
Exocarpos aphyllus			*			*	
Gilberta tenuifolia			*		*	*	
Gnephosis sp.							*
Grevillea ?extorris							*
Grevillea extorris							*

Species	Conservation Priority	Weed	FCT 2	FCT 9	FCT 13	FCT 19a	FCT ?
Grevillea globosa	P3			*			
Grevillea juncifolia subsp. *temulenta*				*			
Grevillea nematophylla subsp. *supraplana*			*			*	
Grevillea ?obliquistigma				*			
Grevillea pityophylla			*				
Gunniopsis rubra			*				
Hakea minyma			*	*			
Hakea recurva			*		*	*	
Hakea recurva subsp. *recurva*					*		
?Hemigenia botryphylla			*		*	*	
?Hemigenia macphersonii			*				*
?Hemigenia sp.				*			
Hibbertia arcuata			*		*	*	
Hibbertia stenophylla				*			
?Hyalosperma glutinosum			*				
Lawrencella rosea			*		*	*	*
Lobelia winfridae			*				*
Lysiana casuarinae					*		
?Maireana carnosa				*			
Maireana ?planifolia			*	*		*	
Maireana planifolia						*	
Maireana sp.			*	*	*	*	
?Maireana sp.						*	
Melaleuca hamata							*
Melaleuca leiocarpa			*	*	*	*	

Species	Conservation Priority	Weed	FCT 2	FCT 9	FCT 13	FCT 19a	FCT ?
Melaleuca nematophylla			*				
?Mesembryanthemum nodiflorum			*				
Micromyrtus trudgenii	P3		*				
?Minuria cunninghamii			*				
Minuria cunninghamii			*		*	*	
Minuria sp.			*				
Mirbelia bursarioides			*			*	
Monachather paradoxus			*		*	*	
Myriocephalus guerinae					*		
Olearia pimeleoides					*		
Philotheca brucei subsp. *brucei*			*		*	*	
Philotheca ?sericea			*				
Philotheca sericea			*	*		*	
Philotheca tomentella				*			
Pimelea forrestiana							*
?Pimelea sp.			*				
Pimelea sp.						*	
Podolepis ?canescens							*
Podolepis canescens			*				*
Podolepis lessonii			*				
Pogonolepis muelleriana							*
Prostanthera althoferi			*				*
?Prostanthera patens			*		*		
Prostanthera patens			*				*
Prostanthera sp.			*				

Species	Conservation Priority	Weed	FCT 2	FCT 9	FCT 13	FCT 19a	FCT ?
Psammomoya implexa	P3			*			
Ptilotus ?aervoides						*	
Ptilotus gaudichaudii var. *gaudichaudii*							*
Ptilotus obovatus			*		*	*	*
Ptilotus sp. Northampton (R. Davis 10952)			*				
Rhagodia sp.					*	*	
?Rhodanthe manglesii							*
Rhodanthe ?manglesii			*				*
Rhyncharrhena linearis			*				
Santalum ?acuminatum			*				
Santalum ?spicatum			*		*		
Scaevola spinescens			*		*	*	
Schoenia cassiniana			*				
Senna artemisioides subsp. *filifolia*						*	
Senna charlesiana			*		*	*	
Sida sp. dark green fruits (S. van Leeuwen 2260)			*				*
Solanum lasiophyllum							*
Stenopetalum anfractum			*				*
Thryptomene costata			*				*
Thryptomene sp.				*			
Thysanotus ?manglesianus			*				
Thysanotus manglesianus			*	*			
Thysanotus sp.			*			*	
Trachymene ornata			*				*
Trachymene sp.			*				

Species	Conservation Priority	Weed	FCT 2	FCT 9	FCT 13	FCT 19a	FCT ?
Waitzia acuminata			*		*	*	*
Zygophyllum lobulatum			*			*	*

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Appendix K: Quadrat Data and Photos

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Site: KH01

Location: North west of survey area. **Type:** Quadrat (20 metres x 20 metres)

Date: 26/09/2012 **Described by:** LK/NK **Seasonal Conditions:** Excellent

MGA Zone: 50 **Easting:** 487091 mE **Northing:** 6789654 mN

Habitat: Very gentle flat: plain.

Soil: Orange-brown (Pindan) loamy sand.

Rock Type: No coarse fragments.

Vegetation: Very sparse *Grevillea juncifolia* subsp. *temulenta* and *Acacia latior* shrubs over very sparse A*. ramulosa* var. *ramulosa, A. prainii, Acacia sibina* and *Hakea minyma* shrubs.

Veg Condition: Very Good

Fire Age: 2-5 years

Notes: Signs of disturbance: grazing by rabbits.

Floristic Community Type Code: 9

Floristic Community Type Description: Low open woodland of *Eucalyptus kochii* subsp. *plenissima* over a tall closed shrubland to tall open shrubland of mixed species including *Acacia latior* and *A. sibina, Allocasuarina acutivalvis* subsp. *prinsepiana* and *Melaleuca leiocarpa* on red or red-brown sandy loam or clay loam on flats to upperslopes.

Species List

Name	Cover (%)	Height (m)
Acacia assimilis	+	1.90
Acacia colletioides	+	0.30
Acacia latior	1.00	3.00
Acacia murrayana	+	2.00
Acacia prainii	3.00	1.70
Acacia ramulosa var*. ramulosa*	3.00	1.10
Acacia sibina	1.50	1.70
Allocasuarina ?acutivalvis	+	1.90
Eucalyptus ?celastroides subsp. *virella*	+	2.20
Grevillea juncifolia subsp. *temulenta*	2.00	2.90
Grevillea ?obliquistigma	+	0.60
Hakea minyma	1.00	1.60
Melaleuca leiocarpa	+	0.30
Psammomoya implexa	1.00	0.50

Site: KH02

Location: End of drill pads, north-west of the survey area. **Type:** Quadrat (20 metres x 20 metres)

Date: 26/09/2012 **Described by:** LK/NK **Seasonal Conditions:** Excellent

MGA Zone: 50 **Easting:** 487875 mE **Northing:** 6789238 mN

Habitat: Gently inclined lower slope: footslope, north facing.

Soil: Orange-brown loamy sand.

Rock Type: Ironstone, 2-10 % abundance; coarse fragments 2-50 %.

Vegetation: Sparse *Acacia ramulosa* shrubs.

Veg Condition: Very Good

Fire Age: 2-5 years

Notes: Signs of disturbance: tracks.

Floristic Community Type Code: 2

Floristic Community Type Description: Tall shrubland to tall open shrubland of mixed *Acacia* species, including *Acacia ramulosa* var. *ramulosa, A. exocarpoides, A. aneura* and *A. tetragonophylla* over mid open shrubland to mid sparse shrubland of mixed species including *Eremophila clarkei, E. latrobei* subsp. *latrobei, Hibbertia arcuata, Philotheca brucei* subsp. *brucei* and *Philotheca sericea* on red-brown silty loams or clay loams on flats to upperslopes with ironstone (BIF).

Species List

Name	Cover (%)	Height (m)
Acacia assimilis	+	1.00
Acacia exocarpoides	+	0.40
Acacia latior	+	1.30
Acacia ramulosa	12.00	0.70
Acacia sibina	+	0.70
Allocasuarina ?acutivalvis	+	1.00
Aluta aspera subsp. *hesperia*	+	0.30
Grevillea pityophylla	+	1.10
Melaleuca nematophylla	+	0.50
Philotheca sericea	+	0.35
Scaevola spinescens	+	0.75

Site: KH03

Location: Drill pads, north of survey area. **Type:** Quadrat (20 metres x 20 metres)

Date: 26/09/2012 **Described by:** LK/NK **Seasonal Conditions:** Excellent

MGA Zone: 50 **Easting:** 487922 mE **Northing:** 6788785 mN

Habitat: Gently inclined lower slope: footslope, west facing.

Soil: Orange-brown silty loam.

Rock Type: Ironstone 20-50 % abundance; coarse fragments 10-20 %.

Vegetation: Very sparse *Acacia sibina* and *A. caesaneura* shrubs over sparse *Philotheca sericea, Aluta aspera* subsp. *hesperia, A. ramulosa* and *A. assimilis* shrubs.

Veg Condition: Excellent

Fire Age: 5-10 years

Notes: No signs of obvious disturbance.
Outside quadrat: *Acacia exocarpoides* (near *Eucalyptus brachycorys*) and emergent *Eucalyptus brachycorys* in vegetation type.

Floristic Community Type Code: 19a

Floristic Community Type Description: Low woodland to low open woodland of *Eucalyptus loxophleba* subsp. *supralaevis* over tall open shrubland of mixed species including *Acacia tetragonophylla* over mid sparse shrubland of mixed species including *Senna artemisioides* subsp. *filifolia* and *Rhagodia drummondii* over low sparse chenopod shrubland of mixed species including *Enchylaena tomentosa* var. *tomentosa, Sclerolaena diacantha, S. fusiformis* and *Maireana carnosa* over low isolated clumps of grasses of *Austrostipa elegantissima* on red to red-brown clay loam or silty clay with ironstone gravel on drainage lines, flats to midslopes.

Species List

Name	Cover (%)	Height (m)
Acacia assimilis	1.00	1.90
Acacia caesaneura	1.00	3.00
Acacia ramulosa	4.00	2.00
Acacia sibina	1.00	3.00
Aluta aspera subsp. *hesperia*	4.00	1.50
Amphipogon caricinus var. *caricinus*	+	0.30
Drummondita fulva	+	0.80
Eremophila clarkei	+	1.10
Eremophila ?granitica	+	1.10

Eremophila latrobei subsp. *latrobei*	+	1.90
Hibbertia arcuata	+	0.70
Lawrencella rosea	+	0.03
Mirbelia bursarioides	+	0.90
Philotheca brucei subsp. *brucei*	+	0.60
Philotheca sericea	5.00	1.50

Site: KH04

Location: North-west of survey area. **Type:** Quadrat (20 metres x 20 metres)

Date: 26/09/2012 **Described by:** LK/NK **Seasonal Conditions:** Excellent

MGA Zone: 50 **Easting:** 488025 mE **Northing:** 6788988 mN

Habitat: Gently inclined slope: hillslope, south-east facing.

Soil: Orange-brown clay loam.

Rock Type: Ironstone 10-20 %; coarse fragments 10-20 %.

Vegetation: Very sparse *Acacia acuminata* and *A. assimilis* shrubs over very sparse *Philotheca sericea, P. brucei* subsp. *brucei* and *Melaleuca nematophylla* shrubs.

Veg Condition: Excellent

Fire Age: 5-10 years

Notes: No signs of obvious disturbance.

Floristic Community Type Code: 2

Floristic Community Type Description: Tall shrubland to tall open shrubland of mixed *Acacia* species, including *Acacia ramulosa* var. *ramulosa, A. exocarpoides, A. aneura* and *A. tetragonophylla* over mid open shrubland to mid sparse shrubland of mixed species including *Eremophila clarkei, E. latrobei* subsp. *latrobei, Hibbertia arcuata, Philotheca brucei* subsp. *brucei* and *Philotheca sericea* on red-brown silty loams or clay loams on flats to upperslopes with ironstone (BIF).

Species List

Name	Cover (%)	Height (m)
Acacia acuminata	4.00	2.20
Acacia assimilis	1.00	2.00
Acacia aulacophylla	+	2.00
Acacia exocarpoides	+	2.00
Acacia tetragonophylla	+	1.50
Aluta aspera subsp. *hesperia*	+	1.10
Amphipogon caricinus var. *caricinus*	+	0.20
Astroloma serratifolium	+	0.25
Dodonaea inaequifolia	+	0.50
Drummondita fulva	+	0.45
Eremophila clarkei	+	1.80
Eremophila georgei	+	1.80
Eremophila latrobei subsp. *latrobei*	+	1.60

Eremophila serrulata	+	0.35
Hakea recurva	+	1.30
Hibbertia arcuata	1.00	0.40
Lawrencella rosea	+	0.05
Lobelia winfridae	+	0.04
Melaleuca nematophylla	1.00	1.80
Micromyrtus trudgenii	+	1.70
Minuria cunninghamii	+	0.25
Mirbelia bursarioides	+	1.40
Philotheca brucei subsp. *brucei*	3.00	1.50
?Prostanthera patens	+	0.30
Thryptomene costata	+	1.70
Waitzia acuminata	+	0.04

Site: KH05

Location:	North-west survey area		**Type:** Quadrat (20 metres x 20 metres)
Date:	27/09/2012	**Described by:** LK/NK	**Seasonal Conditions:** Excellent
MGA Zone:	50	**Easting:** 488309 mE	**Northing:** 6788880 mN

Habitat: Very gentle flat: plain.

Soil: Orange-brown loamy clay.

Rock Type: Ironstone, quartz and granite 10-20 % abundance; coarse fragments 10-20 %.

Vegetation: Sparse *Acacia ramulosa* and *A. caesaneura* tall shrubs and very sparse *A. acuminata* and *Philotheca brucei* subsp. *brucei* shrubs.

Veg Condition: Excellent

Fire Age: 5-10 years

Notes: No signs of obvious disturbance.

Floristic Community Type Code: 13

Floristic Community Type Description: Tall shrubland of mixed species including *Acacia sibina, A. latior, A. ramulosa* var. *ramulosa* and *Melaleuca leiocarpa* with low isolated clumps of trees of mixed *Eucalyptus* spp. over low isolated clumps of grasses of *Monachather paradoxus* on red or red-brown silty clay loam or clay loam on flats to midslopes.

Species List

Name	Cover (%)	Height (m)
Acacia acuminata	4.00	1.60
Acacia caesaneura	1.00	4.50
Acacia ramulosa	15.00	3.50
Acacia tetragonophylla	+	1.50
Austrostipa elegantissima	+	0.05
Cheilanthes sieberi subsp. *sieberi*	+	0.02
Crassula colorata var. *colorata*	+	0.04
Eremophila serrulata	+	1.10
?Erymophyllum tenellum	+	0.03
Eucalyptus brachycorys	+	6.00
Lawrencella rosea	+	0.10
Maireana sp.1	+	0.30
Maireana sp.2	+	0.15
Maireana sp.3	+	0.70

Minuria cunninghamii	+	0.20
Philotheca brucei subsp. *brucei*	2.00	1.50
?Prostanthera patens	+	0.30
Ptilotus obovatus	+	0.30
Senna charlesiana	+	1.60
Waitzia acuminata	+	0.03

Site: KH06

Location: North-west of survey area, drill lines. **Type:** Quadrat (20 metres x 20 metres)

Date: 27/09/2012 **Described by:** LK/NK **Seasonal Conditions:** Excellent

MGA Zone: 50 **Easting:** 488081 mE **Northing:** 6788503 mN

Habitat: Very gentle flat: plain.

Soil: Orange-brown clay loam.

Rock Type: Ironstone 2-10 % abundance; coarse fragments 2-10 %.

Vegetation: Very sparse *Eucalyptus kochii* subsp. *plenissima* trees over very sparse *Acacia ramulosa* and *A. tetragonophylla* shrubs.

Veg Condition: Very Good

Fire Age: 5-10 years

Notes: Signs of disturbance: grazing by rabbits.

Floristic Community Type Code: 19a

Floristic Community Type Description: Low woodland to low open woodland of *Eucalyptus loxophleba* subsp. *supralaevis* over tall open shrubland of mixed species including *Acacia tetragonophylla* over mid sparse shrubland of mixed species including *Senna artemisioides* subsp. *filifolia* and *Rhagodia drummondii* over low sparse chenopod shrubland of mixed species including *Enchylaena tomentosa* var. *tomentosa, Sclerolaena diacantha, S. fusiformis* and *Maireana carnosa* over low isolated clumps of grasses of *Austrostipa elegantissima* on red to red-brown clay loam or silty clay with ironstone gravel on drainage lines, flats to midslopes.

Species List

Name	Cover (%)	Height (m)
Acacia exocarpoides	+	1.10
Acacia ramulosa	3.00	2.50
Acacia tetragonophylla	1.00	2.10
Austrostipa sp.	+	0.30
Eremophila georgei	+	1.80
Eremophila latrobei subsp. *latrobei*	+	0.30
Eremophila serrulata	+	0.20
Eucalyptus kochii subsp. *plenissima*	4.00	6.50
Hakea recurva	+	0.10
Maireana planifolia	+	0.15
Maireana sp.1	+	0.05

Maireana sp.2	+	0.40
Maireana sp.3	+	0.10
Maireana sp.4	+	0.10
Minuria cunninghamii	+	0.10
Philotheca brucei subsp. *brucei*	1.00	0.50
Pimelea sp.	+	0.15
Ptilotus obovatus	+	0.20
Scaevola spinescens	+	0.10
Senna artemisioides subsp. *filifolia*	+	0.80
Waitzia acuminata	+	1.20

Site: KH07

Location: A kilometre west from the Hinge site access road. **Type:** Quadrat (20 metres x 20 metres)

Date: 26/09/2012 **Described by:** LK/NK **Seasonal Conditions:** Excellent

MGA Zone: 50 **Easting:** 486493 mE **Northing:** 6788738 mN

Habitat: Level flat: plain.

Soil: Brown loamy sand.

Rock Type: Coarse fragments <2 % abundance.

Vegetation: Very sparse *Eucalyptus ?kochii* subsp. *plenissima* mallee over mid-dense *Acacia ramulosa* var. *ramulosa* juvenile shrubs over very sparse *Eremophila forrestii* subsp. *forrestii* and *Philotheca sericea* shrubs.

Veg Condition: Excellent

Fire Age: 2-5 years

Notes: Signs of disturbance: past disturbance (grazing).
Burnt 3-5 years ago. Mostly *Acacia ramulosa* var. *ramulosa* and *Eucalyptus?kochii* subsp. *plenissima* resprouting from seed.

Floristic Community Type Code: 9

Floristic Community Type Description: Low open woodland of *Eucalyptus kochii* subsp. *plenissima* over a tall closed shrubland to tall open shrubland of mixed species including *Acacia latior* and *A. sibina, Allocasuarina acutivalvis* subsp. *prinsepiana* and *Melaleuca leiocarpa* on red or red-brown sandy loam or clay loam on flats to upperslopes.

Species List

Name	Cover (%)	Height (m)
Acacia longispinea	+	1.00
Acacia ramulosa var. *ramulosa*	50.00	1.00
Eremophila forrestii subsp. *forrestii*	4.00	0.80
Eucalyptus?kochii subsp. *plenissima*	2.00	2.00
Euryomyrtus patrickiae	+	0.30
Grevillea globosa	+	1.00
Hakea minyma	+	1.20
Hibbertia stenophylla	+	0.30
Philotheca sericea	+	0.50
Thryptomene sp.	+	0.50
Thysanotus manglesianus	+	0.50

Site: KH08

Location: West side (corner) of the survey area. **Type:** Quadrat (20 metres x 20 metres)

Date: 26/09/2012 **Described by:** MG/JS **Seasonal Conditions:** Excellent

MGA Zone: 50 **Easting:** 486256 mE **Northing:** 6788212 mN

Habitat: Very gentle flat: pediment (low rise).

Soil: Orange sandy clay loam.

Rock Type: Small ironstone with quartz floaters; coarse fragments 20-50 % abundance.

Vegetation: Very sparse *Acacia tetragonophylla*, *A. acuminata* and *A. ramulosa* var. *ramulosa* shrubs over very sparse *Thryptomene costata* shrubs.

Veg Condition: Excellent

Fire Age: >10 years

Notes: Signs of disturbance: grazing by rabbits.

Floristic Community Type Code: ?

Floristic Community Type Description: No Woodman floristic community type matches this vegetation type.

Species List

Name	Cover (%)	Height (m)
Acacia acuminata	2.00	2.00
Acacia ramulosa var. *ramulosa*	2.00	2.00
Acacia tetragonophylla	2.00	1.50
Asteraceae sp.	+	0.10
Austrostipa ?trichophylla	+	0.10
Cephalipterum drummondii	+	0.10
Cheilanthes adiantoides	+	0.10
Chthonocephalus pseudevax	+	0.10
Comesperma integerrimum	+	Climber
Cuscuta epithymum	+	0.10
Dianella revoluta	+	0.40
Drosera macrantha subsp. *macrantha*	+	Climber
Eremophila latrobei subsp. *latrobei*	+	0.50
?Erymophyllum tenellum	+	0.10
Gnephosis sp.	+	0.10
Grevillea ?extorris	+	2.00

?Hemigenia macphersonii	+	0.10
Lobelia winfridae	+	0.10
Pimelea forrestiana	+	0.30
Podolepis canescens	+	0.10
Pogonolepis muelleriana	+	0.10
Prostanthera althoferi	+	0.50
Prostanthera patens	+	0.70
Ptilotus obovatus	+	0.50
Sida sp. dark green fruits (S. van Leeuwen 2260)	+	0.10
Solanum lasiophyllum	+	0.30
Thryptomene costata	5.00	1.50
Trachymene ornata	+	0.10
Waitzia acuminata	+	0.10

Site: KH09

Location: West of the centre of the survey area. **Type:** Quadrat (20 metres x 20 metres)

Date: 27/09/2012 **Described by:** MG/JS **Seasonal Conditions:** Excellent

MGA Zone: 50 **Easting:** 486203 mE **Northing:** 6787890 mN

Habitat: Level flat: plain.

Soil: Brown clay loam.

Rock Type: Ironstone and quartzite with lichenised crust; coarse fragments 10-20 % abundance.

Vegetation: Very sparse *Allocasuarina campestris* trees over very sparse *Acacia acuminata, A. ramulosa* var. *ramulosa* and *Melaleuca hamata* shrubs.

Veg Condition: Excellent

Fire Age: >10 years

Notes: Signs of disturbance: grazing by rabbits. Herbs and annual species are dying off.

Floristic Community Type Code: ?

Floristic Community Type Description: No Woodman floristic community type matches this vegetation type.

Species List

Name	Cover (%)	Height (m)
Acacia acuminata	3.00	1.00
Acacia ramulosa var. *ramulosa*	2.00	1.30
Acacia tetragonophylla	+	2.00
Allocasuarina campestris	+	4.00
Austrostipa ?trichophylla	+	0.15
Cephalipterum drummondii	+	0.01
Cheilanthes adiantoides	+	0.10
Chthonocephalus pseudevax	+	0.20
Comesperma integerrimum	+	Climber
?Erymophyllum tenellum	+	0.10
Lawrencella rosea	+	0.10
Melaleuca hamata	+	4.00
Podolepis ?canescens	+	0.05
Podolepis canescens	+	0.01
Prostanthera althoferi	+	1.20
Prostanthera patens	+	0.01
Ptilotus gaudichaudii var. *gaudichaudii*	+	0.10

?Rhodanthe manglesii	+	0.10
Sida sp. dark green fruits (S. van Leeuwen 2260)	+	0.50
Stenopetalum anfractum	+	0.10
Waitzia acuminata	+	0.10
Zygophyllum lobulatum	+	0.10

Site: KH10

Location: West of road. **Type:** Quadrat (20 metres x 20 metres)

Date: 27/09/2012 **Described by:** MG/JS **Seasonal Conditions:** Excellent

MGA Zone: 50 **Easting:** 486477 mE **Northing:** 6787966 mN

Habitat: Level flat: plain.

Soil: Brown sandy clay loam.

Rock Type: Ironstone and quartz with lichenised crust (decomposing, sedimentary) <2 % abundance; no coarse fragments.

Vegetation: Very sparse *Allocasuarina campestris* trees over very sparse *Acacia acuminata, A. ramulosa* and *A. tetragonophylla* shrubs over very sparse *Borya sphaerocephala* herbs.

Veg Condition: Excellent

Fire Age: No fire evident, > 10 years.

Notes: Signs of disturbance: grazing by rabbits. Site is similar to KH08.

Floristic Community Type Code: ?

Floristic Community Type Description: No Woodman floristic community type matches this vegetation type.

Species List

Name	Cover (%)	Height (m)
Acacia acuminata	2.00	2.50
Acacia ramulosa var. *ramulosa*	+	2.00
Acacia tetragonophylla	+	2.50
Allocasuarina campestris	+	6.00
Asteraceae sp.	+	0.10
Austrostipa ?trichophylla	+	0.50
Austrostipa elegantissima	+	0.50
Borya sphaerocephala	+	0.20
Cephalipterum drummondii	+	0.10
Cheilanthes adiantoides	+	0.10
Cheilanthes sieberi	+	0.10
Cuscuta epithymum	+	0.10
Grevillea extorris	+	0.20
?Hemigenia macphersonii	+	0.60
Lawrencella rosea	+	0.10
Podolepis canescens	+	0.10

Prostanthera althoferi	+	1.00
Rhodanthe ?manglesii	+	0.10
Trachymene ornata	+	0.10
Waitzia acuminata	+	0.10

Site: KH11

Location: North-west (centre) of the survey area. **Type:** Quadrat (20 metres x 20 metres)

Date: 26/09/2012 **Described by:** MG/JS **Seasonal Conditions:** Excellent

MGA Zone: 50 **Easting:** 486588 mE **Northing:** 6788358 mN

Habitat: Level flat: plain.

Soil: Brown sandy clay loam.

Rock Type: Ironstone and quartz <2 % abundance; coarse fragments 2-10 % abundance.

Vegetation: Very sparse *Eucalyptus loxophleba* subsp. *supralaevis* trees over very sparse *Eremophila oldfieldii* subsp. *?angustifolia / karara* and *A. tetragonophylla* shrubs over very sparse mixed chenopods and very sparse *Ptilotus obovatus* shrubs.

Veg Condition: Excellent

Fire Age: >10 years

Notes: Signs of disturbance: grazing by rabbits.

Floristic Community Type Code: 19a

Floristic Community Type Description: Low woodland to low open woodland of *Eucalyptus loxophleba* subsp. *supralaevis* over tall open shrubland of mixed species including *Acacia tetragonophylla* over mid sparse shrubland of mixed species including *Senna artemisioides* subsp. *filifolia* and *Rhagodia drummondii* over low sparse chenopod shrubland of mixed species including *Enchylaena tomentosa* var. *tomentosa, Sclerolaena diacantha, S. fusiformis* and *Maireana carnosa* over low isolated clumps of grasses of *Austrostipa elegantissima* on red to red-brown clay loam or silty clay with ironstone gravel on drainage lines, flats to midslopes.

Species List

Name	Cover (%)	Height (m)
Acacia acuminata	+	0.50
Acacia erinacea	+	0.50
Acacia tetragonophylla	2.00	1.00
Alyxia buxifolia	+	0.10
Atriplex sp.	+	0.50
Austrostipa ?scabra	+	0.10
Austrostipa ?trichophylla	+	0.30
Austrostipa sp.	+	0.30
?Blennospora drummondii	+	0.10
Cephalipterum drummondii	+	0.10
Cuscuta epithymum	+	0.10

Eremophila oldfieldii subsp. *?angustifolia / karara*	2.00	3.00
Eucalyptus loxophleba subsp. *supralaevis*	15.00	10.00
Exocarpos aphyllus	+	1.50
Maireana ?planifolia	+	0.50
Maireana sp.1	+	0.30
Maireana sp.2	+	0.50
Maireana sp.3	+	0.50
?Maireana sp.	+	0.20
Ptilotus ?aervoides	+	0.10
Rhagodia sp.	+	0.50
Scaevola spinescens	+	1.00
Senna charlesiana	+	1.00
Zygophyllum lobulatum	+	0.10
Zygophyllum ovatum	+	0.10

Site: KH12

Location: West side of access track. **Type:** Quadrat (20 metres x 20 metres)

Date: 27/09/2012 **Described by:** MG/JS **Seasonal Conditions:** Excellent

MGA Zone: 50 **Easting:** 486880 mE **Northing:** 6788441 mN

Habitat: Gently inclined lower slope: footslope, north-west facing.

Soil: Brown clay loam.

Rock Type: Ironstone, heavily lichenised <2 % abundance; coarse fragments 20-50 %.

Vegetation: Very sparse *Acacia acuminata* shrubs over very sparse *Eremophila oldfieldii* subsp. *?angustifolia / karara* and *E. oppositifolia* subsp. *angustifolia* shrubs and very sparse *Ptilotus obovatus* herbs.

Veg Condition: Excellent

Fire Age: >10 years

Notes: Signs of disturbance: grazing by rabbits.

Floristic Community Type Code: 2

Floristic Community Type Description: Tall shrubland to tall open shrubland of mixed *Acacia* species, including *Acacia ramulosa* var. *ramulosa, A. exocarpoides, A. aneura* and *A. tetragonophylla* over mid open shrubland to mid sparse shrubland of mixed species including *Eremophila clarkei, E. latrobei* subsp. *latrobei, Hibbertia arcuata, Philotheca brucei* subsp. *brucei* and *Philotheca sericea* on red-brown silty loams or clay loams on flats to upperslopes with ironstone (BIF).

Species List

Name	Cover (%)	Height (m)
Acacia acuminata	2.00	4.00
Acacia exocarpoides	+	1.50
Acacia tetragonophylla	+	2.00
Aluta aspera subsp. *hesperia*	+	1.20
Alyxia buxifolia	+	1.50
Atriplex sp.	+	0.30
Austrostipa ?scabra	+	0.10
Austrostipa ?trichophylla	+	0.50
Austrostipa sp.	+	0.30
?Blennospora drummondii	+	0.10
Cephalipterum drummondii	+	0.10
Comesperma integerrimum	+	Climber
Crassula ?colorata var. *colorata*	+	0.10
Cuscuta epithymum	+	0.10

Dodonaea inaequifolia	+	1.50
Eremophila oldfieldii subsp. *?angustifolia / karara*	2.00	3.00
Eremophila oppositifolia subsp. *angustifolia*	2.00	2.50
Exocarpos aphyllus	+	2.00
Gunniopsis rubra	+	0.10
Hakea recurva	+	1.50
?Hemigenia macphersonii	+	0.10
Hibbertia arcuata	+	0.50
Lobelia winfridae	+	0.10
Maireana ?planifolia	+	0.10
Maireana sp.	+	0.20
? Mesembryanthemum nodiflorum	+	0.10
?Minuria cunninghamii	+	0.10
Philotheca brucei subsp. *brucei*	+	1.00
Podolepis canescens	+	0.10
Scaevola spinescens	+	1.00
Senna charlesiana	+	1.50
Sida sp. dark green fruits (S. van Leeuwen 2260)	+	0.10
Stenopetalum anfractum	+	0.10
Waitzia acuminata	+	0.10
Zygophyllum lobulatum	+	0.20

Site: KH13

Location: West (centre) of the survey area. **Type:** Quadrat (20 metres x 20 metres)

Date: 28/09/2012 **Described by:** LK/JS **Seasonal Conditions:** Excellent

MGA Zone: 50 **Easting:** 486626 mE **Northing:** 6787673 mN

Habitat: Gently inclined flat: plain, west facing.

Soil: Red-brown loamy sand.

Rock Type: Ironstone 2-10 % abundance; coarse fragments 10-20 % abundance.

Vegetation: Very sparse *Acacia ramulosa* var. *ramulosa* shrubs over very sparse *A. acuminata, Philotheca brucei* subsp. *brucei* and *A. tetragonophylla* shrubs.

Veg Condition: Excellent

Fire Age: 5-10 years

Notes: No signs of obvious disturbance.

Floristic Community Type Code: 2

Floristic Community Type Description: Tall shrubland to tall open shrubland of mixed *Acacia* species, including *Acacia ramulosa* var. *ramulosa, A. exocarpoides, A. aneura* and *A. tetragonophylla* over mid open shrubland to mid sparse shrubland of mixed species including *Eremophila clarkei, E. latrobei* subsp. *latrobei, Hibbertia arcuata, Philotheca brucei* subsp. *brucei* and *Philotheca sericea* on red-brown silty loams or clay loams on flats to upperslopes with ironstone (BIF).

Species List

Name	Cover (%)	Height (m)
Acacia acuminata	5.00	1.10
Acacia exocarpoides	+	2.50
Acacia ramulosa var. *ramulosa*	5.00	4.00
Acacia tetragonophylla	1.00	2.50
Aluta aspera	+	1.20
Austrostipa ?trichophylla	+	0.15
Cheilanthes adiantoides	+	0.10
Lawrencella rosea	+	0.07
Minuria sp.	+	0.05
?Minuria cunninghamii	+	0.15
Philotheca brucei subsp. *brucei*	3.00	1.00
Ptilotus obovatus	+	0.15
Rhodanthe ?manglesii	+	0.05
Scaevola spinescens	+	1.10

Stenopetalum anfractum	+	0.15
Thysanotus manglesianus	+	0.10
Waitzia acuminata	+	0.05

Site: KH14

Location: Lower - midof the survey area. **Type:** Quadrat (20 metres x 20 metres)

Date: 28/09/2012 **Described by:** LK/JS **Seasonal Conditions:** Excellent

MGA Zone: 50 **Easting:** 486922 mE **Northing:** 6787614 mN

Habitat: Gently inclined crest: hillcrest, north-west facing.

Soil: Light orange-brown sandy loam.

Rock Type: Ironstone 20-50 % abundance; coarse fragments 20-50 % abundance.

Vegetation: Very sparse *Acacia sibina* shrubs over sparse *A. assimilis* subsp. *assimilis, Philotheca ?sericea* and *A. ramulosa* var. *ramulosa* shrubs over very sparse *Aluta aspera* shrubs.

Veg Condition: Excellent

Fire Age: 5-10 years

Notes: No signs of obvious disturbance.

Floristic Community Type Code: 2

Floristic Community Type Description: Tall shrubland to tall open shrubland of mixed *Acacia* species, including *Acacia ramulosa* var. *ramulosa, A. exocarpoides, A. aneura* and *A. tetragonophylla* over mid open shrubland to mid sparse shrubland of mixed species including *Eremophila clarkei, E. latrobei* subsp. *latrobei, Hibbertia arcuata, Philotheca brucei* subsp. *brucei* and *Philotheca sericea* on red-brown silty loams or clay loams on flats to upperslopes with ironstone (BIF).

Species List

Name	Cover (%)	Height (m)
Acacia assimilis subsp. *assimilis*	5.00	1.50
Acacia caesaneura	1.00	2.50
Acacia exocarpoides	+	1.00
Acacia ramulosa var. *ramulosa*	1.00	1.50
Acacia sibina	3.00	3.50
Allocasuarina campestris	2.00	2.00
Aluta aspera	3.00	0.90
Cheilanthes adiantoides	+	0.02
Drosera macrantha subsp. *macrantha*	+	0.10
Eremophila clarkei	+	1.30
Eremophila latrobei subsp. *latrobei*	+	1.10
Gilberta tenuifolia	+	0.02
Lawrencella rosea	+	0.05
?Minuria cunninghamii	+	0.50

Philotheca ?sericea	5.00	1.10
Prostanthera sp.	+	0.05
Stenopetalum anfractum	+	0.03
Waitzia acuminata	+	0.05

Site: KH15

Location: Centre of the survey area. **Type:** Quadrat (20 metres x 20 metres)

Date: 27/09/2012 **Described by:** LK/NK **Seasonal Conditions:** Excellent

MGA Zone: 50 **Easting:** 487304 mE **Northing:** 6787620 mN

Habitat: Gently inclined flat: plain, east facing.

Soil: Pink-brown clay sand.

Rock Type: Ironstone and quartz 2-10 % abundance; coarse fragments 2-10 % abundance.

Vegetation: Very sparse *Acacia ramulosa* shrubs over very sparse *A. acuminata* shrubs over very sparse *Aluta aspera* subsp. *hesperia, Hibbertia arcuata, Drummondita fulva* and *Acacia sibina* shrubs.

Veg Condition: Excellent

Fire Age: 5-10 years

Notes: No signs of obvious disturbance.

Floristic Community Type Code: 13

Floristic Community Type Description: Tall shrubland of mixed species including *Acacia sibina, A. latior, A. ramulosa* var. *ramulosa* and *Melaleuca leiocarpa* with low isolated clumps of trees of mixed *Eucalyptus* spp. over low isolated clumps of grasses of *Monachather paradoxus* on red or red-brown silty clay loam or clay loam on flats to midslopes.

Species List

Name	Cover (%)	Height (m)
Acacia acuminata	2.00	2.40
Acacia exocarpoides	+	1.70
Acacia ramulosa	6.00	4.50
Acacia sibina	1.00	1.30
Allocasuarina acutivalvis	+	2.00
Aluta aspera subsp. *hesperia*	2.00	1.70
Cheilanthes sp.	+	0.03
Dianella revoluta	+	0.05
Drummondita fulva	1.00	1.10
Eremophila clarkei	+	1.20
Eremophila latrobei subsp. *latrobei*	+	2.00
Gilberta tenuifolia	+	0.02
Hakea recurva subsp. *recurva*	+	0.20
Hibbertia arcuata	1.00	1.00

Lawrencella rosea	+	0.08
Melaleuca leiocarpa	+	1.20
Minuria cunninghamii	+	0.30
Myriocephalus guerinae	+	0.08
Olearia pimeleoides	+	0.40
Ptilotus obovatus	+	0.20
Scaevola spinescens	+	0.40
Waitzia acuminata	+	0.03

Site: KH16

Location: Between two access tracks. **Type:** Quadrat (20 metres x 20 metres)

Date: 28/09/2012 **Described by:** MG/NK **Seasonal Conditions:** Excellent
MGA Zone: 50 **Easting:** 487677 mE **Northing:** 6788746 mN
Habitat: Gently inclined flat: plain.
Soil: Orange-brown silty loam.
Rock Type: Ironstone; coarse fragments 2-10 % abundance.
Vegetation: Very sparse *Acacia ramulosa* and *A. acuminata* shrubs over very sparse *Philotheca brucei* subsp. *brucei* shrubs.
Veg Condition: Very Good
Fire Age: >10 years
Notes: Signs of disturbance: grazing by rabbits.

Floristic Community Type Code: 13

Floristic Community Type Description: Tall shrubland of mixed species including *Acacia sibina, A. latior, A. ramulosa* var. *ramulosa* and *Melaleuca leiocarpa* with low isolated clumps of trees of mixed *Eucalyptus* spp. over low isolated clumps of grasses of *Monachather paradoxus* on red or red-brown silty clay loam or clay loam on flats to midslopes.

Species List

Name	Cover (%)	Height (m)
Acacia acuminata	2.00	3.00
Acacia exocarpoides	+	1.10
Acacia obtecta	+	2.50
Acacia ramulosa var. *ramulosa*	2.00	2.00
Acacia sibina	+	2.00
Acacia tetragonophylla	+	1.10
Aluta aspera subsp. *hesperia*	+	1.50
Austrostipa elegantissima	+	0.30
Comesperma integerrimum	+	Climber
Drummondita fulva	+	0.80
Eremophila clarkei	+	0.20
Eremophila serrulata	+	1.00
Eucalyptus leptopoda subsp. *arctata*	+	3.50
Hakea recurva	+	2.50
?Hemigenia botryphylla	+	1.10

Hibbertia arcuata	+	0.50
Lysiana casuarinae	+	Climber
Minuria cunninghamii	+	0.40
Monachather paradoxus	+	0.15
Myriocephalus guerinae	+	0.02
Philotheca brucei subsp. *brucei*	1.00	2.00
Rhagodia sp.	+	0.40
Santalum ?spicatum	+	2.00
Senna charlesiana	+	0.50
Waitzia acuminata	+	0.02

Site: KH17

Location: Centre of the survey area. **Type:** Quadrat (20 metres x 20 metres)

Date: 28/09/2012 **Described by:** LK/JS **Seasonal Conditions:** Excellent

MGA Zone: 50 **Easting:** 486788 mE **Northing:** 6787025 mN

Habitat: Gently inclined flat: plain.

Soil: Pink-brown sandy loam.

Rock Type: Ironstone 2-10 % abundance; coarse fragments 2-10 % abundance.

Vegetation: Very sparse *Acacia ramulosa* var. *ramulosa* and *Melaleuca leiocarpa* shrubs over very sparse *Aluta aspera* subsp. *hesperia, A. sibina* and *Hibbertia arcuata* shrubs over very sparse *Philotheca brucei* subsp. *brucei* shrubs.

Veg Condition: Very Good

Fire Age: 0-2 years

Notes: Signs of disturbance: grazing by rabbits. Most herbs and annual species dying off.

Floristic Community Type Code: 2

Floristic Community Type Description: Tall shrubland to tall open shrubland of mixed *Acacia* species, including *Acacia ramulosa* var. *ramulosa, A. exocarpoides, A. aneura* and *A. tetragonophylla* over mid open shrubland to mid sparse shrubland of mixed species including *Eremophila clarkei, E. latrobei* subsp. *latrobei, Hibbertia arcuata, Philotheca brucei* subsp. *brucei* and *Philotheca sericea* on red-brown silty loams or clay loams on flats to upperslopes with ironstone (BIF).

Species List

Name	Cover (%)	Height (m)
Acacia caesaneura	1.00	1.00
Acacia exocarpoides	+	1.00
Acacia ramulosa var. *ramulosa*	5.00	3.00
Acacia sibina	2.00	1.00
Aluta aspera subsp. *hesperia*	2.00	2.00
Cheilanthes adiantoides	+	0.05
Comesperma integerrimum	+	Climber
Dianella revoluta	+	0.30
Hibbertia arcuata	1.00	1.00
Lawrencella rosea	+	0.10
Melaleuca leiocarpa	1.00	4.00
Melaleuca nematophylla	+	1.10
Monachather paradoxus	+	0.10

Philotheca brucei subsp. *brucei*	1.50	0.90
Trachymene ornata	+	0.10
Waitzia acuminata	+	0.10

Site: KH18

Location: East of main access track. **Type:** Quadrat (20 metres x 20 metres)

Date: 25/09/2012 **Described by:** LK/NK **Seasonal Conditions:** Excellent

MGA Zone: 50 **Easting:** 487048 mE **Northing:** 6787124 mN

Habitat: Gently inclined lower slope: footslope, east facing.

Soil: Pale orange-brown silty loam.

Rock Type: Banded ironstone formation (BIF), quartz and granite <2 % abundance; coarse fragments 2-10 % abundance.

Vegetation: Sparse *Acacia ramulosa, A. acuminata, A. tetragonophylla* and *Melaleuca nematophylla* shrubs over sparse *Philotheca brucei* subsp. *brucei, P. ?sericea, Mirbelia bursarioides* and *Eremophila clarkei* shrubs.

Veg Condition: Excellent

Fire Age: 5-10 years

Notes: No signs of obvious disturbance.

Floristic Community Type Code: 2

Floristic Community Type Description: Tall shrubland to tall open shrubland of mixed *Acacia* species, including *Acacia ramulosa* var. *ramulosa, A. exocarpoides, A. aneura* and *A. tetragonophylla* over mid open shrubland to mid sparse shrubland of mixed species including *Eremophila clarkei, E. latrobei* subsp. *latrobei, Hibbertia arcuata, Philotheca brucei* subsp. *brucei* and *Philotheca sericea* on red-brown silty loams or clay loams on flats to upperslopes with ironstone (BIF).

Species List

Name	Cover (%)	Height (m)
Acacia acuminata	5.00	3.00
Acacia exocarpoides	+	1.40
Acacia ramulosa	4.00	2.10
Acacia tetragonophylla	+	3.50
Astroloma serratifolium	+	0.10
Austrostipa ?scabra	+	0.10
Austrostipa elegantissima	+	0.40
Cheilanthes sp.	+	0.40
Dodonaea inaequifolia	+	1.40
Eremophila ?granitica	+	1.70
Eremophila clarkei	1.00	1.10
Eremophila latrobei subsp. *latrobei*	+	1.30

?Erymophyllum tenellum	+	0.04
Hibbertia arcuata	+	0.40
Lawrencella rosea	+	0.04
Lobelia winfridae	+	0.02
Melaleuca nematophylla	1.50	2.20
Minuria cunninghamii	+	0.50
Mirbelia bursarioides	4.00	1.70
Philotheca ?sericea	6.00	1.50
Philotheca brucei subsp. *brucei*	8.00	1.70
?Prostanthera patens	+	0.70
Ptilotus obovatus	+	0.25
Santalum ?acuminatum	+	3.70
Scaevola spinescens	+	1.80
Schoenia cassiniana	+	0.04
Senna charlesiana	+	1.50
Stenopetalum anfractum	+	0.05
Waitzia acuminata	+	0.03

Site: KH19

Location: Approximately 150 m east of north/south hinge site access road. **Type:** Quadrat (20 metres x 20 metres)

Date: 25/09/2012 **Described by:** MG/JS **Seasonal Conditions:** Excellent
MGA Zone: 50 **Easting:** 487313 mE **Northing:** 6787040 mN
Habitat: Gently inclined flat: (rock) plain.
Soil: Orange sandy clay.
Rock Type: BIF; coarse fragments 50-90 % abundance.
Vegetation: Very sparse *Acacia ramulosa* var. *ramuolsa, A. assimilis* subsp. *assimilis, A. acuminata* and *Grevillea nematophylla* subsp. *supralana* shrubs over very sparse *Philotheca brucei* subsp. *brucei* shrubs over isolated clumps of mixed Asteraceae ssp.
Veg Condition: Excellent
Fire Age: >10 years
Notes: Signs of disturbance: grazing by goats.

Floristic Community Type Code: 2

Floristic Community Type Description: Tall shrubland to tall open shrubland of mixed *Acacia* species, including *Acacia ramulosa* var. *ramulosa, A. exocarpoides, A. aneura* and *A. tetragonophylla* over mid open shrubland to mid sparse shrubland of mixed species including *Eremophila clarkei, E. latrobei* subsp. *latrobei, Hibbertia arcuata, Philotheca brucei* subsp. *brucei* and *Philotheca sericea* on red-brown silty loams or clay loams on flats to upperslopes with ironstone (BIF).

Species List

Name	Cover (%)	Height (m)
Acacia acuminata	2.00	1.50
Acacia assimilis subsp. *assimilis*	2.00	3.00
Acacia exocarpoides	+	0.80
Acacia ramulosa var. *ramulosa*	3.00	3.00
Acacia sibina	+	1.20
Amphipogon caricinus var. *caricinus*	+	0.30
Asteraceae sp.	+	0.10
Austrostipa elegantissima	+	0.30
Austrostipa ?scabra	+	0.30
Cheilanthes adiantoides	+	0.10
Comesperma integerrimum	+	Climber
Eremophila clarkei	+	1.00

Eremophila latrobei subsp. *latrobei*	+	1.00
Erodium cygnorum	+	0.10
Grevillea nematophylla subsp. *supraplana*	2.00	1.50
Hibbertia arcuata	+	0.80
Lawrencella rosea	+	0.20
Lawrencella rosea	+	0.10
Melaleuca nematophylla	+	2.00
Mirbelia bursarioides	+	0.80
Philotheca brucei subsp. *brucei*	+	1.20
Philotheca ?sericea	5.00	1.00
?Pimelea sp.	+	0.80
Prostanthera patens	+	0.30
Rhyncharrhena linearis	+	Climber
Santalum ?spicatum	+	4.00
Scaevola spinescens	+	0.60
Sida sp. dark green fruits (S. van Leeuwen 2260)	+	0.10
Stenopetalum anfractum	+	0.10
Thysanotus ?manglesianus	+	Climber
Trachymene ornata	+	0.10
Waitzia acuminata	+	0.10

Site: KH20

Location: East of road, north-west of the study area. **Type:** Quadrat (20 metres x 20 metres)

Date: 27/09/2012 **Described by:** LK/NK **Seasonal Conditions:** Excellent

MGA Zone: 50 **Easting:** 487093 mE **Northing:** 6786150 mN

Habitat: Gently inclined flat: plain.

Soil: Pink-brown clay sand.

Rock Type: Ironstone, bedrock 2-10 % abundance; coarse fragments 10-20 %.

Vegetation: Very sparse *Eucalyptu ?kochii* subsp. *plenissima, Acacia latior* and *A. anthochaera* shrubs over very sparse *A. ramulosa* shrubs over very sparse *?Hemigenia sp.* and *Philotheca tomentella* shrubs.

Veg Condition: Very Good

Fire Age: 2-5 years

Notes: Signs of disturbance: grazing by rabbits.

Floristic Community Type Code: 9

Floristic Community Type Description: Low open woodland of *Eucalyptus kochii* subsp. *plenissima* over a tall closed shrubland to tall open shrubland of mixed species including *Acacia latior* and *A. sibina, Allocasuarina acutivalvis* subsp. *prinsepiana* and *Melaleuca leiocarpa* on red or red-brown sandy loam or clay loam on flats to upperslopes.

Species List

Name	Cover (%)	Height (m)
Acacia anthochaera	1.00	3.00
Acacia assimilis subsp. *assimilis*	+	1.10
Acacia latior	1.00	3.00
Acacia longispinea	+	1.05
Acacia murrayana	+	1.80
Acacia ramulosa	5.00	1.50
Acacia sibina	+	0.40
Amphipogon caricinus var. *caricinus*	+	0.15
Eucalyptus ?kochii subsp. *plenissima*	2.00	3.80
?Hemigenia sp.	1.00	0.15
?Maireana carnosa	+	0.02
Maireana ?planifolia	+	0.10
Maireana sp.	+	0.10
Melaleuca leiocarpa	+	0.80
Philotheca tomentella	1.00	0.30

Site: KH21

Location: East of access track, main access track through the survey area. **Type:** Quadrat (20 metres x 20 metres)

Date: 27/09/2012 **Described by:** LK/NK **Seasonal Conditions:** Excellent
MGA Zone: 50 **Easting:** 487612 mE **Northing:** 6786068 mN
Habitat: Gently inclined flat: plain.
Soil: Pink-brown loamy clay.
Rock Type: Ironstone 2-10 % abundance; coarse fragments 2-10 % abundance.
Vegetation: Very sparse *Eucalyptus brachycorys* trees over very sparse *Acacia ramulosa* and *Melaleuca leiocarpa* shrubs.
Veg Condition: Very Good
Fire Age: 5-10 years
Notes: Signs of disturbance: grazing by rabbits.
No understorey present. Other species within this vegetation type: *Acacia caesaneura,* more *Acacia sibina* (approx. 2-3%), *Acacia tetragonophylla* and *Ptilotus obovatus*.

Floristic Community Type Code: 19a

Floristic Community Type Description: Low woodland to low open woodland of *Eucalyptus loxophleba* subsp. *supralaevis* over tall open shrubland of mixed species including *Acacia tetragonophylla* over mid sparse shrubland of mixed species including *Senna artemisioides* subsp. *filifolia* and *Rhagodia drummondii* over low sparse chenopod shrubland of mixed species including *Enchylaena tomentosa* var. *tomentosa, Sclerolaena diacantha, S. fusiformis* and *Maireana carnosa* over low isolated clumps of grasses of *Austrostipa elegantissima* on red to red-brown clay loam or silty clay with ironstone gravel on drainage lines, flats to midslopes.

Species List

Name	Cover (%)	Height (m)
Acacia ramulosa	20.00	2.00
Acacia sibina	+	1.20
Eucalyptus brachycorys	3.00	6.00
Eucalyptus ?kochii subsp. *plenissima*	+	3.00
Melaleuca leiocarpa	1.00	2.40

Site: KH22

Location: South-east of the survey area. **Type:** Quadrat (20 metres x 20 metres)

Date: 28/09/2012 **Described by:** MG/NK **Seasonal Conditions:** Excellent

MGA Zone: 50 **Easting:** 488168 mE **Northing:** 6786695 mN

Habitat: Gently inclined flat: pediment.

Soil: Red-brown silty loam.

Rock Type: Ironstone; coarse fragments 20-50 % abundance.

Vegetation: Isolated plants of *Eucalyptus loxophleba* (outside quadrat) trees over very sparse *Acacia ramulosa* and *A. sibina* shrubs over very sparse *Aluta aspera* subsp. *hesperia* shrubs.

Veg Condition: Excellent

Fire Age: >10 years

Notes: Signs of disturbance: some erosion evident and grazing by rabbits.

Floristic Community Type Code: 2

Floristic Community Type Description: Tall shrubland to tall open shrubland of mixed *Acacia* species, including *Acacia ramulosa* var. *ramulosa, A. exocarpoides, A. aneura* and *A. tetragonophylla* over mid open shrubland to mid sparse shrubland of mixed species including *Eremophila clarkei, E. latrobei* subsp. *latrobei, Hibbertia arcuata, Philotheca brucei* subsp. *brucei* and *Philotheca sericea* on red-brown silty loams or clay loams on flats to upperslopes with ironstone (BIF).

Species List

Name	Cover (%)	Height (m)
Acacia ramulosa	10.00	2.00
Acacia sibina	2.00	2.00
Acacia tetragonophylla	+	1.20
Aluta aspera subsp. *hesperia*	5.00	1.50
Amphipogon caricinus var. *caricinus*	+	0.30
Cheilanthes sp.	+	0.10
Chthonocephalus pseudevax	+	0.10
Dianella revoluta	+	0.50
Drosera sp.	+	0.10
Eremophila clarkei	+	1.50
Eremophila latrobei subsp. *latrobei*	+	1.10
Gilberta tenuifolia	+	0.10
Hakea minyma	+	1.80
?Hemigenia botryphylla	+	0.80

Hibbertia arcuata	+	0.80
Lawrencella rosea	+	0.10
Mirbelia bursarioides	+	0.80
Philotheca sericea	+	1.20
Podolepis lessonii	+	0.10
?Prostanthera patens	+	0.50
Thysanotus sp.	+	Climber
Waitzia acuminata	+	0.10

Site: KH23

Location: East of the survey area. **Type:** Quadrat (20 metres x 20 metres)

Date: 28/09/2012 **Described by:** MG/NK **Seasonal Conditions:** Excellent
MGA Zone: 50 **Easting:** 488419 mE **Northing:** 6787394 mN
Habitat: Level flat: plain.
Soil: Orange-brown silty loam.
Rock Type: Ironstone; coarse fragments 2-10 % abundance.
Vegetation: Very sparse *Eucalyptus loxophleba* (outside quadrat) trees over sparse *Acacia ramulosa* shrubs over very sparse *Aluta aspera* subsp. *hesperia* shrubs.
Veg Condition: Excellent.
Fire Age: >10 years
Notes: Signs of disturbance: grazing by rabbits.

Floristic Community Type Code: 19a

Floristic Community Type Description: Low woodland to low open woodland of *Eucalyptus loxophleba* subsp. *supralaevis* over tall open shrubland of mixed species including *Acacia tetragonophylla* over mid sparse shrubland of mixed species including *Senna artemisioides* subsp. *filifolia* and *Rhagodia drummondii* over low sparse chenopod shrubland of mixed species including *Enchylaena tomentosa* var. *tomentosa, Sclerolaena diacantha, S. fusiformis* and *Maireana carnosa* over low isolated clumps of grasses of *Austrostipa elegantissima* on red to red-brown clay loam or silty clay with ironstone gravel on drainage lines, flats to midslopes.

Species List

Name	Cover (%)	Height (m)
Acacia acuminata	+	1.00
Acacia caesaneura	+	3.00
Acacia ramulosa var. *ramulosa*	20.00	3.00
Acacia sibina	+	1.50
Allocasuarina acutivalvis	+	1.80
Aluta aspera subsp. *hesperia*	3.00	1.50
Cheilanthes sp.	+	0.10
Cuscuta sp.	+	0.10
Drummondita fulva	+	1.00
Gilberta tenuifolia	+	0.10
Grevillea nematophylla subsp. *supraplana*	+	1.60
?Hemigenia botryphylla	+	0.20

Hibbertia arcuata	+	0.40
Monachather paradoxus	+	0.20
Philotheca brucei subsp. *brucei*	+	1.00
Thysanotus sp.	+	Climber
Waitzia acuminata	+	0.10

Site: KH24

Location: South of drill lines, centre of the survey area. **Type:** Quadrat (20 metres x 20 metres)

Date: 2/10/2012 **Described by:** LK/JS **Seasonal Conditions:** Excellent

MGA Zone: 50 **Easting:** 487145 mE **Northing:** 6788340 mN

Habitat: Gently inclined slope: scarp, west facing.

Soil: Orange-brown sandy clay.

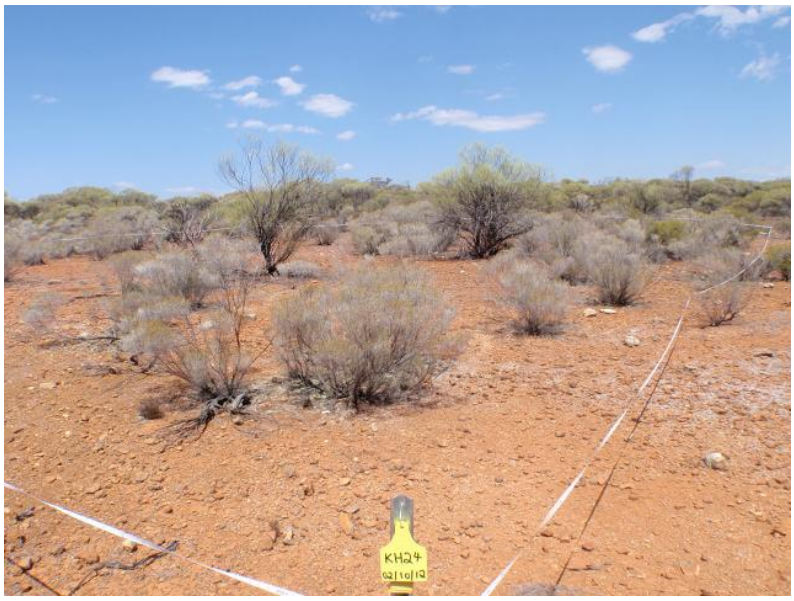
Rock Type: Ironstone with quartz 2-10 % abundance; coarse fragments 20-50 % abundance.

Vegetation: Very sparse *Acacia sibina* shrubs over very sparse *Aluta aspera* subsp. *hesperia* shrubs.

Veg Condition: Very Good

Fire Age: >10 years

Notes: Signs of disturbance: grazing by rabbits. Annual species have died off.



Floristic Community Type Code: 2

Floristic Community Type Description: Tall shrubland to tall open shrubland of mixed *Acacia* species, including *Acacia ramulosa* var. *ramulosa, A. exocarpoides, A. aneura* and *A. tetragonophylla* over mid open shrubland to mid sparse shrubland of mixed species including *Eremophila clarkei, E. latrobei* subsp. *latrobei, Hibbertia arcuata, Philotheca brucei* subsp. *brucei* and *Philotheca sericea* on red-brown silty loams or clay loams on flats to upperslopes with ironstone (BIF).

Species List

Name	Cover (%)	Height (m)
Acacia sibina	1.00	2.50
Aluta aspera subsp. *hesperia*	3.00	1.70
Austrostipa elegantissima	+	0.40
Calandrinia ?sp. Blackberry (D. M. Porter 171)	+	0.02
Calocephalus multiflorus	+	0.01
Cheilanthes adiantoides	+	0.02
Cuscuta sp.	+	Climber
Eremophila clarkei	+	1.10
?Hyalosperma glutinosum	+	0.04
Lobelia winfridae	+	0.04
Mirbelia bursarioides	+	0.40
Philotheca ?sericea	+	1.50
Prostanthera althoferi	+	0.50
?Prostanthera patens	+	0.50
Ptilotus sp. Northampton (R. Davis 10952)	+	0.15
Trachymene sp.	+	0.02

Site: KHMN01

Location: Northern top of survey area. **Type:** Mapping Note

Date: 26/09/2012 **Described by:** LK/NK **Seasonal Conditions:** Excellent

MGA Zone: 50 **Easting:** 487888 mE **Northing:** 6789168 mN

Habitat: Gently inclined mid-slope: scarp-footslope, west facing.

Vegetation: Very sparse *Allocasuarina acutivalvis* and *Acacia assimilis* shrubs over very sparse *Acacia sibina* and *Melaleuca nematophylla* shrubs.

Veg Condition: Excellent

Fire Age: 2-5 years

Notes: No signs of obvious disturbance.

Floristic Community Type Code: 2

Floristic Community Type Description: Tall shrubland to tall open shrubland of mixed *Acacia* species, including *Acacia ramulosa* var. *ramulosa, A. exocarpoides, A. aneura* and *A. tetragonophylla* over mid open shrubland to mid sparse shrubland of mixed species including *Eremophila clarkei, E. latrobei* subsp. *latrobei, Hibbertia arcuata, Philotheca brucei* subsp. *brucei* and *Philotheca sericea* on red-brown silty loams or clay loams on flats to upperslopes with ironstone (BIF).

Species List

Name	Cover (%)	Height (m)
Acacia assimilis		
Acacia caesaneura		
Acacia latior		
Acacia sibina		
Allocasuarina acutivalvis		
Aluta aspera		
Melaleuca nematophylla		
Philotheca sericea		

Site: KHMN02

Location: **Type:** Mapping Note

Date: 27/09/2012 **Described by:** LK/NK **Seasonal Conditions:** Excellent

MGA Zone: 50 **Easting:** 488091 mE **Northing:** 6788821 mN

Habitat: Gently inclined lower slope: footslope, east facing.

Vegetation: Sparse *Acacia ramulosa, Melaleuca leiocarpa* and *A. caesaneura* shrubs over sparse *A. assimilis* and *Philotheca brucei* subsp. *brucei* shrubs over very sparse *Drummondita fulva* and *Eremophila serrulata* low shrubs.

Veg Condition: Excellent

Fire Age: >10 years

Notes: No signs of obvious disturbance.

Floristic Community Type Code: 13

Floristic Community Type Description: Tall shrubland of mixed species including *Acacia sibina, A. latior, A. ramulosa* var. *ramulosa* and *Melaleuca leiocarpa* with low isolated clumps of trees of mixed *Eucalyptus* spp. over low isolated clumps of grasses of *Monachather paradoxus* on red or red-brown silty clay loam or clay loam on flats to midslopes.

Species List

Name	Cover (%)	Height (m)
Acacia acuminata		
Acacia assimilis		
Acacia caesaneura		
Acacia ramulosa		
Acacia tetragonophylla		
Allocasuarina acutivalvis		
Drummondita fulva		
Eremophila serrulata		
Melaleuca leiocarpa		
Philotheca brucei subsp. *brucei*		

Site: OPP

Type: Opportunistic Collections

Species List

Name	Cover (%)	Height (m)
Acacia ?obtecta		
Acacia erinacea		
Acacia grasbyi		
Acacia latior		
Allocasuarina acutivalvis		
Allocasuarina campestris		
Aluta aspera subsp. *hesperia*		
Astroloma serratifolium		
Austrostipa elegantissima		
Brachychiton gregorii		
Brassica tournefortii		
Callitris columellaris		
Daviesia ?benthamii		
Dicrastylis ?linearifolia		
Duboisia hopwoodii		
Ecdeiocolea monostachya		
Erymophyllum ramosum subsp. *ramosum*		
Eucalyptus brachycorys		
Eucalyptus leptopoda subsp. *arctata*		
Euryomyrtus patrickiae		
Glischrocaryon flavescens		
Grevillea ?eriobotrya		
Grevillea eriobotrya		
Grevillea juncifolia subsp. *temulenta*		
Grevillea nematophylla subsp. *supraplana*		
Grevillea obliquistigma subsp. *obliquistigma*		
Grevillea paradoxa		
Hakea minyma		
Melaleuca ?barlowii		
Melaleuca leiocarpa		
Melaleuca nematophylla		
? Mesembryanthemum nodiflorum		
Persoonia pentasticha		
Philotheca tomentella		
Prostanthera ?sp. Karara		
Psammomoya implexa		
Senna charlesiana		
Thryptomene costata		
Wahlenbergia capensis		
Waitzia acuminata		

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Appendix L: Results of Statistical Analyses

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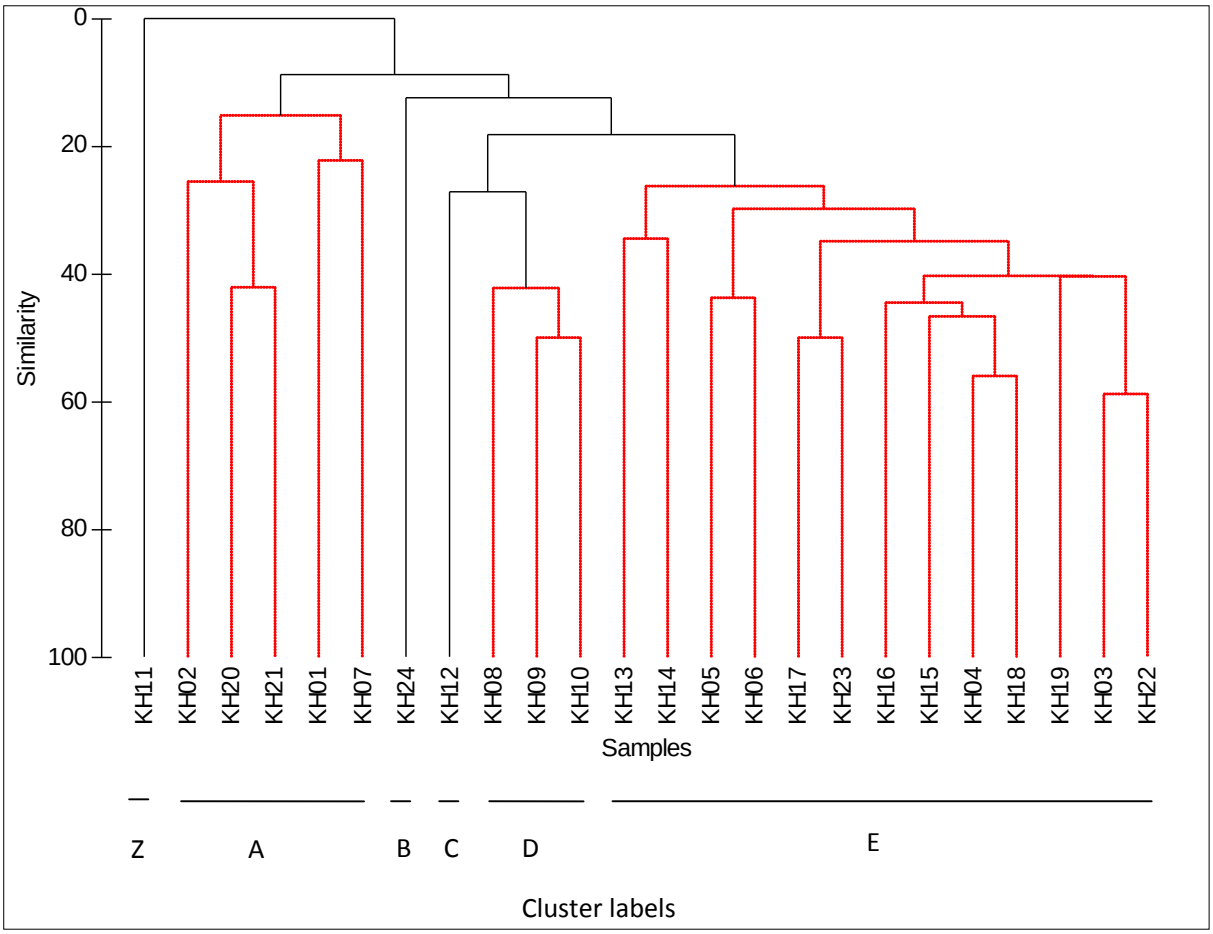
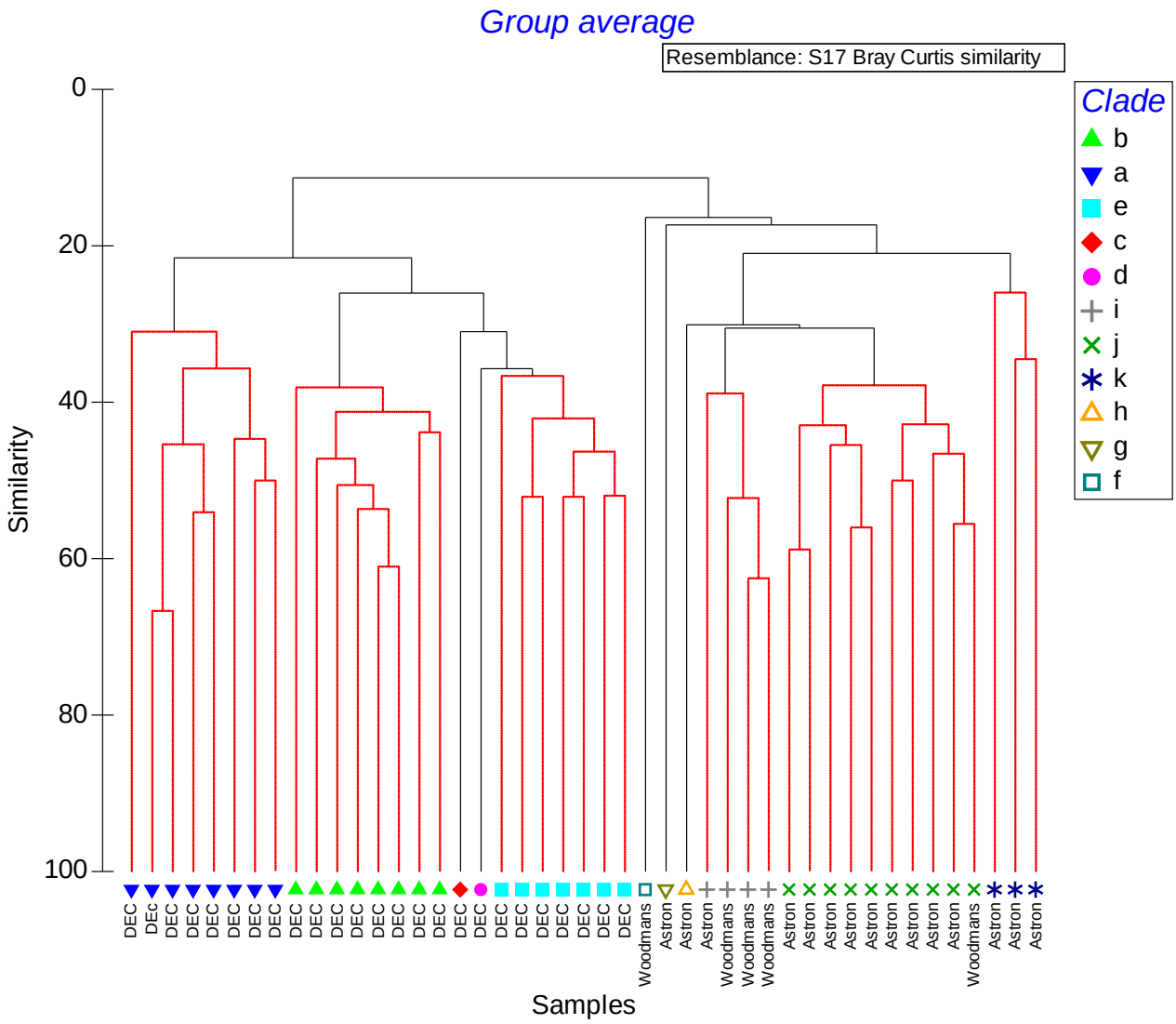


Figure L.1: Classification dendrogram of vegetation quadrats based on Sorensen's index of similarity. Cluster labels are based on statistically significant clusters derived from results of the Simprof test. Black lines represent significantly different clusters.



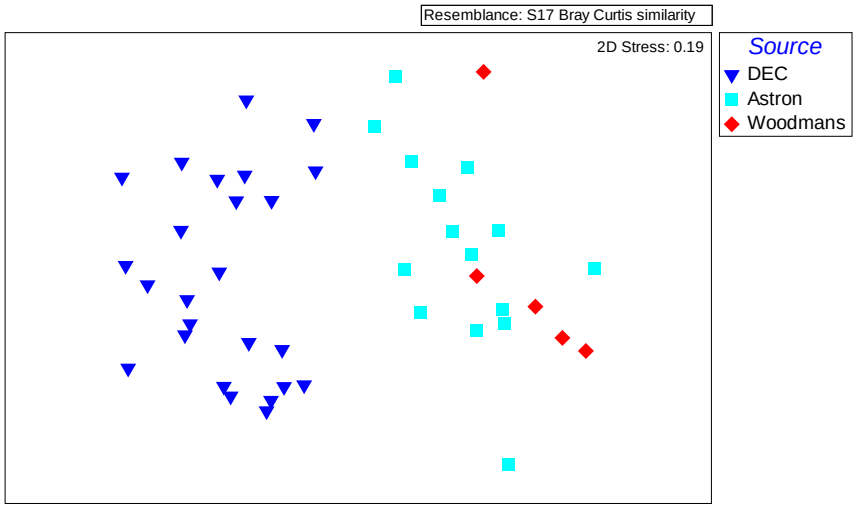


Figure L.2: Classification dendrogram and cluster diagram of vegetation similarity (Sorensen's index) of quadrats from the survey area and the Gnows Nest part of the Minjar/Gnows Nest PEC. Cluster labels are based on statistically significant clusters derived from results of the Simprof test. Black lines and different symbol colour represent significantly different clusters.

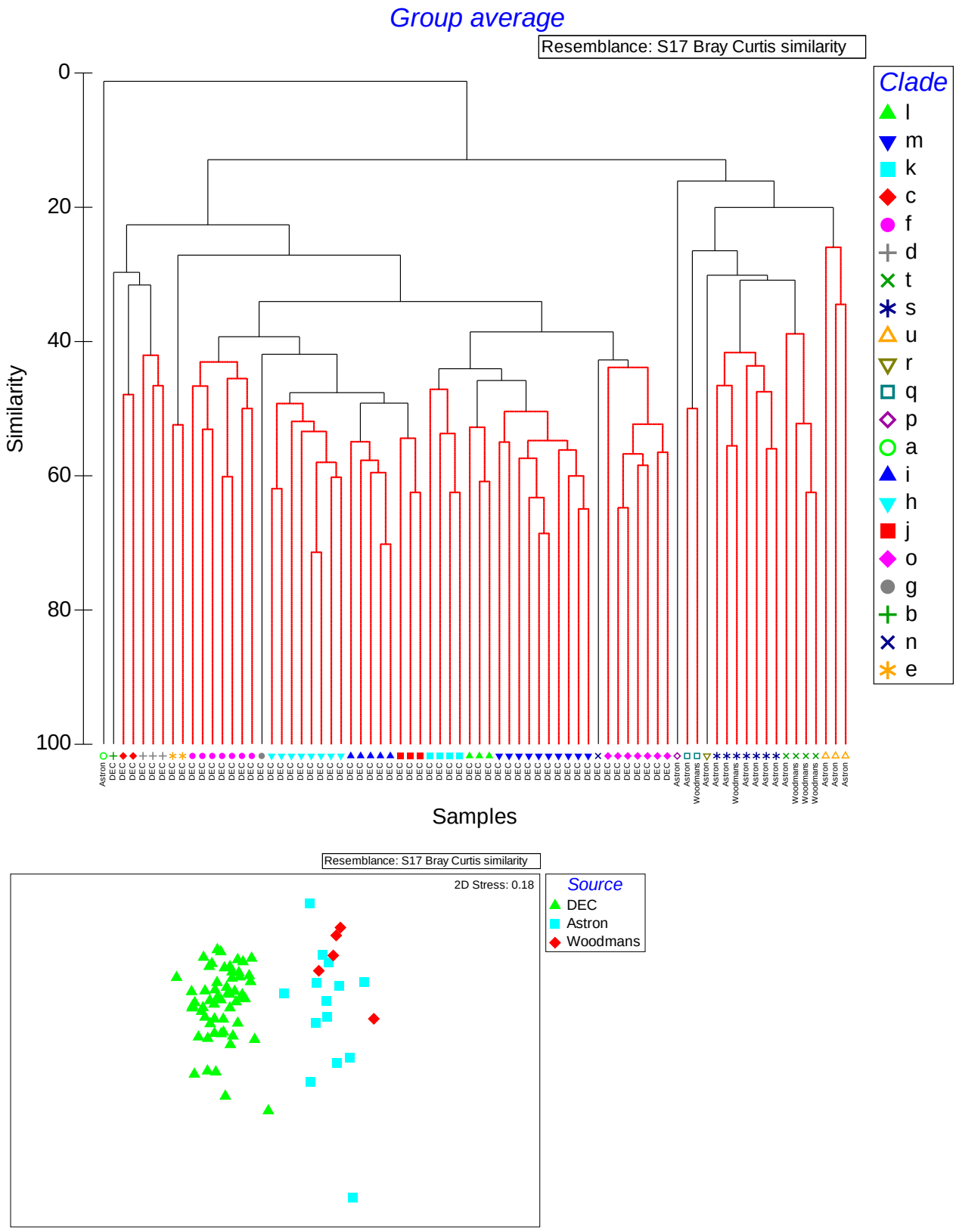


Figure L.3: Classification dendrogram and cluster diagram of vegetation similarity (Sorensen's index) of quadrats from the survey area and the Blue Hills, Warriedar Hills/Pinyalling and the Minjar part of the Minjar/Gnows Nest PEC. Cluster labels are based on statistically significant clusters derived from results of the Simprof test. Black lines and different symbol colour represent significantly different clusters.

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Appendix M: Fire Scar Mapping

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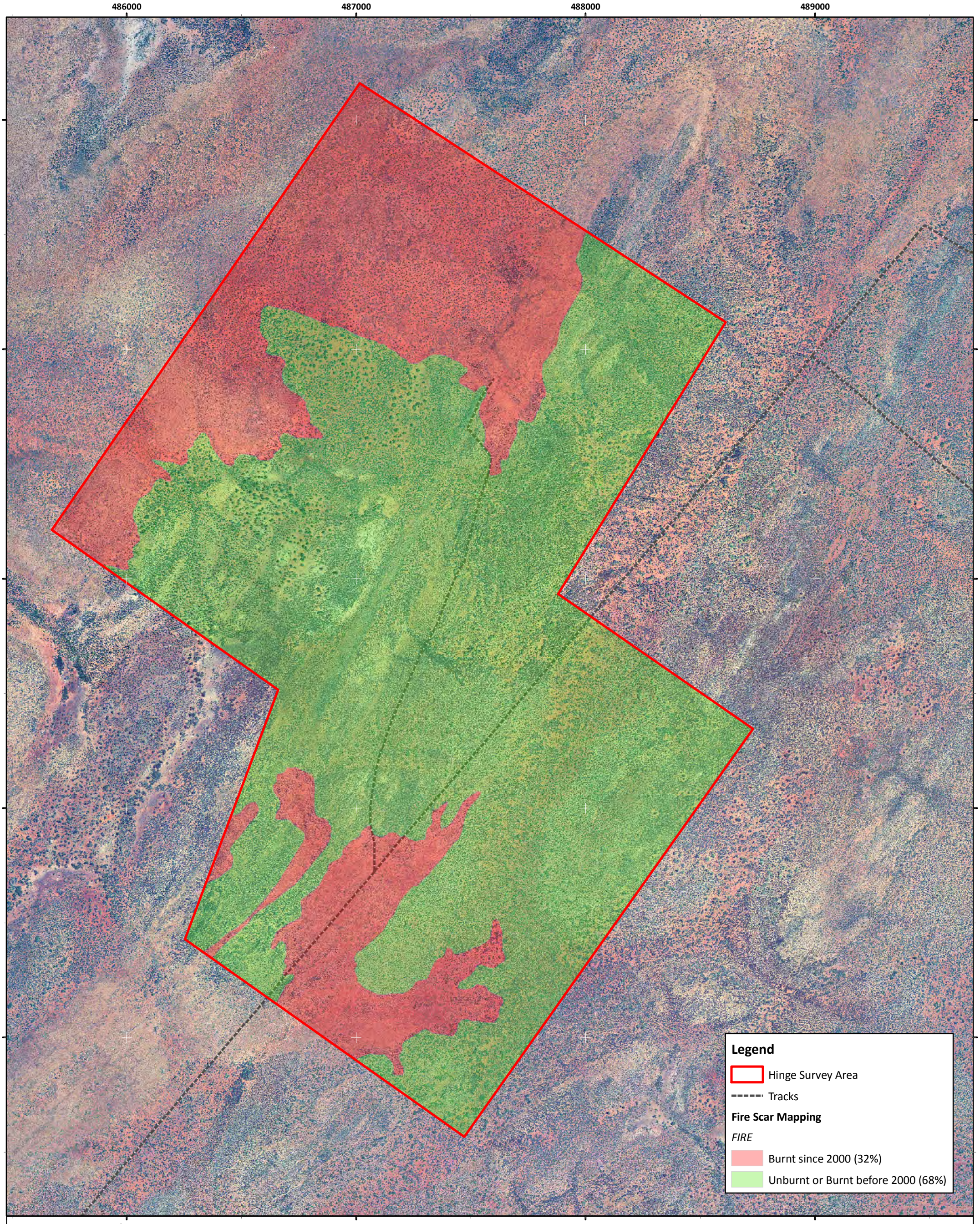

Karara Mining Ltd.
Hinge Vegetation and Flora Survey

Appendix M: Fire Scar Map

Author: M. Gardener	Date: 12-12-2012	Datum: GDA 1994 - Projection: MGA Zone 50 - Scale: 1:15,000 (A3)
Drawn: C. Dyde	Figure Ref: 16002-12FMV1RevA_20121212_AppendixM_FireScar	Metres 0 200 400 600 800 1,000

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Appendix N: Priority Flora Locations and Descriptions

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Table N.1: Locations of Priority Flora recorded in the Survey Area.

Species	Site	Abundance	GPS coordinate (GDA94)	
			Easting	Northing
Dicrastylis ?linearifolia **(sterile) (P3)**	Opportunistic	1	487421	6789247
	Opportunistic	6	487418	6789244
	Opportunistic	2	487420	6789239
	Opportunistic	2	487425	6789241
	Opportunistic	2	487422	6789249
	Opportunistic	5	487426	6789253
	Opportunistic	1	487415	6789253
	Opportunistic	3	487386	6789281
	Opportunistic	5	487381	6789276
	Opportunistic	10	487384	6789287
	Opportunistic	3	487374	6789296
	Opportunistic	10	487353	6789312
	Opportunistic	20	487335	6789349
	Opportunistic	15	487293	6789383
	Opportunistic	10	487277	6789387
	Opportunistic	25	487237	6789388
	Opportunistic	10	487127	6789650
	Opportunistic	20	487165	6789634
	Opportunistic	20	487180	6789636
	Opportunistic	15	487202	6789639
	Opportunistic	100	487214	6789629
	Opportunistic	25	487279	6789594
	Opportunistic	20	487308	6789566
	Opportunistic	25	487324	6789541
	Opportunistic	25	487367	6789551
	Opportunistic	10	487331	6789573
	Opportunistic	15	487307	6789584
	Opportunistic	25	487286	6789606
	Opportunistic	10	487262	6789628
	Opportunistic	50	487235	6789630
	Opportunistic	2	487209	6789665
	Opportunistic	50	487174	6789690
	Opportunistic	50	487156	6789696
	Opportunistic	15	487121	6789709
	Opportunistic	5	487239	6787909
	Opportunistic	5	487445	6789373
	Opportunistic	5	487448	6789382
	Opportunistic	5	487440	6789394
	Opportunistic	10	487262	6789507
	Opportunistic	10	487242	6789513
	Opportunistic	3	487180	6789561

Species	Site	Abundance	GPS coordinate (GDA94)	
			Easting	Northing
Dicrastylis ?linearifolia **(sterile) (P3)**	Opportunistic	3	487194	6789324
	Opportunistic	6	487221	6789302
	Opportunistic	4	487301	6789215
Drummondita fulva **(P3)**	KH03	4	487922	6788785
	KH04	4	488025	6788988
	KH15	10	487304	6787620
	KH16	4	487677	6788746
	KH23	4	488419	6787394
	KHMN02	4	488091	6788821
	Opportunistic	2	487907	6788769
	Opportunistic	5	487891	6788881
	Opportunistic	5	487940	6788913
	Opportunistic	1	487951	6788904
	Opportunistic	1	487974	6788906
	Opportunistic	3	487994	6788919
	Opportunistic	2	488001	6788930
	Opportunistic	2	488011	6788939
	Opportunistic	1	488017	6788951
	Opportunistic	1	488122	6788870
	Opportunistic	2	488126	6788877
	Opportunistic	1	488131	6788882
	Opportunistic	4	488146	6788882
	Opportunistic	4	488172	6788869
	Opportunistic	1	488177	6788870
	Opportunistic	1	488186	6788876
	Opportunistic	4	488208	6788825
	Opportunistic	2	488193	6788830
	Opportunistic	1	488171	6788835
	Opportunistic	4	488128	6788834
	Opportunistic	1	488112	6788830
	Opportunistic	2	488102	6788825
	Opportunistic	2	488092	6788822
	Opportunistic	2	488083	6788812
	Opportunistic	1	488072	6788810
	Opportunistic	3	488054	6788804
	Opportunistic	1	488033	6788808
	Opportunistic	1	487991	6788817
	Opportunistic	1	487977	6788821
	Opportunistic	6	487812	6788596
	Opportunistic	2	487812	6788603
	Opportunistic	2	487800	6788609
	Opportunistic	5	487795	6788613

Species	Site	Abundance	GPS coordinate (GDA94)	
			Easting	Northing
***Drummondita fulva* (P3)**	Opportunistic	4	487784	6788617
	Opportunistic	1	487312	6787660
	Opportunistic	5	487325	6787658
	Opportunistic	4	488390	6787419
	Opportunistic	1	488408	6787342
	Opportunistic	3	487706	6787730
	Opportunistic	2	487578	6788916
	Opportunistic	1	487618	6788954
	Opportunistic	1	487634	6788942
	Opportunistic	6	487595	6788965
	Opportunistic	1	487650	6789000
	Opportunistic	1	487661	6789011
	Opportunistic	1	487678	6789028
	Opportunistic	2	487691	6789053
	Opportunistic	1	487760	6789140
	Opportunistic	4	487771	6789156
	Opportunistic	1	487832	6789247
	Opportunistic	1	487890	6789339
	Opportunistic	1	488028	6789503
	Opportunistic	6	487965	6789306
	Opportunistic	3	487948	6789289
	Opportunistic	1	487675	6788859
	Opportunistic	3	487798	6788750
	Opportunistic	2	488006	6789078
	Opportunistic	1	488004	6789199
	Opportunistic	2	488151	6789295
	Opportunistic	1	488151	6789310
	Opportunistic	1	488159	6789326
	Opportunistic	7	488271	6789344
	Opportunistic	1	488271	6789266
	Opportunistic	8	488264	6789145
	Opportunistic	2	488248	6789119
	Opportunistic	4	488195	6789026
	Opportunistic	1	488188	6789010
	Opportunistic	1	488188	6788993
	Opportunistic	7	488174	6788977
	Opportunistic	3	488156	6788980
	Opportunistic	1	488133	6788944
	Opportunistic	2	488131	6788932
	Opportunistic	3	488137	6788919
	Opportunistic	3	488132	6788884
	Opportunistic	2	488124	6788846

Species	Site	Abundance	GPS coordinate (GDA94)	
			Easting	Northing
***Drummondita fulva* (P3)**	Opportunistic	20	488105	6788744
	Opportunistic	2	488056	6788658
	Opportunistic	3	487946	6788667
	Opportunistic	2	487355	6788503
	Opportunistic	4	487339	6788488
	Opportunistic	4	487236	6788353
	Opportunistic	1	487200	6788292
	Opportunistic	5	487194	6788265
	Opportunistic	1	487192	6788240
	Opportunistic	3	487336	6788226
	Opportunistic	2	487355	6788274
	Opportunistic	2	487379	6788306
	Opportunistic	4	487415	6788340
	Opportunistic	3	487417	6788354
	Opportunistic	2	487430	6788364
	Opportunistic	3	487446	6788387
	Opportunistic	2	487487	6788443
	Opportunistic	2	487504	6788479
	Opportunistic	1	487551	6788542
	Opportunistic	1	487349	6787729
	Opportunistic	3	487366	6787711
	Opportunistic	1	487383	6787706
	Opportunistic	1	487408	6787691
	Opportunistic	1	487720	6789168
	Opportunistic	1	487739	6789209
	Opportunistic	2	487759	6789239
	Opportunistic	3	487686	6789329
	Opportunistic	3	487647	6789350
	Opportunistic	1	487565	6788997
	Opportunistic	2	487578	6788989
	Opportunistic	1	487650	6788987
	Opportunistic	20	487556	6788319
	Opportunistic	5	487590	6788314
	Opportunistic	2	487620	6788310
	Opportunistic	1	487660	6788276
	Opportunistic	1	487692	6788232
	Opportunistic	3	488304	6788749
	Opportunistic	2	488316	6788824
	Opportunistic	1	488350	6788907
	Opportunistic	1	488424	6788976
	Opportunistic	1	488440	6788991
	Opportunistic	6	488465	6789033

Species	Site	Abundance	GPS coordinate (GDA94)	
			Easting	Northing
***Drummondita fulva* (P3)**	Opportunistic	1	488602	6789125
	Opportunistic	2	488494	6788983
	Opportunistic	1	488493	6788958
	Opportunistic	3	488462	6788902
	Opportunistic	10	488455	6788885
	Opportunistic	2	488385	6788788
	Opportunistic	1	488371	6788776
	Opportunistic	1	488349	6788759
	Opportunistic	1	488225	6788586
	Opportunistic	15	487775	6787903
	Opportunistic	5	487756	6787913
	Opportunistic	6	487733	6787926
	Opportunistic	1	487717	6787927
	Opportunistic	1	487624	6787989
	Opportunistic	15	487608	6787989
	Opportunistic	7	487585	6788000
	Opportunistic	5	487571	6788015
	Opportunistic	6	487557	6788035
	Opportunistic	1	487543	6788051
	Opportunistic	3	487550	6788946
	Opportunistic	2	487574	6788993
	Opportunistic	1	487636	6789046
	Opportunistic	1	487812	6789277
	Opportunistic	10	488007	6789276
	Opportunistic	5	487970	6789227
	Opportunistic	2	487772	6788906
	Opportunistic	1	487830	6788695
	Opportunistic	5	487888	6788772
	Opportunistic	3	488263	6789115
	Opportunistic	10	488139	6789107
	Opportunistic	1	488178	6789049
	Opportunistic	10	488149	6788966
	Opportunistic	1	488172	6788929
	Opportunistic	4	488170	6788907
	Opportunistic	5	488175	6788892
	Opportunistic	4	488185	6788876
	Opportunistic	5	488185	6788839
	Opportunistic	2	488199	6788789
	Opportunistic	5	488166	6788732
	Opportunistic	10	488166	6788719
	Opportunistic	3	487425	6788761
	Opportunistic	1	487402	6788741

Species	Site	Abundance	GPS coordinate (GDA94)	
			Easting	Northing
***Drummondita fulva* (P3)**	Opportunistic	4	487344	6788633
	Opportunistic	1	487294	6788507
	Opportunistic	1	487124	6788424
	Opportunistic	10	487111	6788410
	Opportunistic	5	487098	6788396
	Opportunistic	5	487342	6787642
	Opportunistic	10	487365	6787651
	Opportunistic	50	487379	6787625
	Opportunistic	10	487425	6787571
	Opportunistic	3	487449	6787537
	Opportunistic	2	487540	6787476
	Opportunistic	10	487357	6788836
	Opportunistic	5	487588	6788911
	Opportunistic	1	487487	6788652
	Opportunistic	8	487332	6788116
	Opportunistic	4	487354	6788113
	Opportunistic	3	487429	6788105
	Opportunistic	3	487443	6788113
	Opportunistic	1	487490	6788172
	Opportunistic	4	487493	6788180
	Opportunistic	3	487504	6788204
	Opportunistic	1	487508	6788230
	Opportunistic	3	487518	6788249
	Opportunistic	1	487529	6788292
	Opportunistic	2	487530	6788305
	Opportunistic	6	487533	6788321
	Opportunistic	4	487547	6788361
	Opportunistic	1	487551	6788388
	Opportunistic	7	487560	6788406
	Opportunistic	2	487569	6788443
	Opportunistic	3	487588	6788537
	Opportunistic	1	487435	6786743
	Opportunistic	2	487579	6788402
	Opportunistic	4	487614	6788383
	Opportunistic	10	487639	6788374
	Opportunistic	10	487654	6788356
	Opportunistic	5	487659	6788303
	Opportunistic	1	487682	6788314
	Opportunistic	1	487707	6788308
	Opportunistic	1	487748	6788291
	Opportunistic	6	488205	6788587
	Opportunistic	1	488232	6788635

Species	Site	Abundance	GPS coordinate (GDA94)	
			Easting	Northing
***Drummondita fulva* (P3)**	Opportunistic	5	488434	6788995
	Opportunistic	5	488444	6788999
	Opportunistic	5	488534	6789015
	Opportunistic	3	488530	6789000
	Opportunistic	1	488519	6788986
	Opportunistic	10	488510	6788966
	Opportunistic	3	488485	6788909
	Opportunistic	15	488464	6788886
	Opportunistic	15	488458	6788867
	Opportunistic	5	488281	6788616
	Opportunistic	1	487549	6788205
	Opportunistic	4	487523	6788224
	Opportunistic	5	487585	6788970
	Opportunistic	5	487594	6789002
	Opportunistic	6	487695	6789094
	Opportunistic	4	487864	6788781
	Opportunistic	1	488037	6789245
	Opportunistic	1	488074	6789320
	Opportunistic	1	488259	6789151
	Opportunistic	15	488156	6789045
	Opportunistic	5	488157	6789028
	Opportunistic	10	488157	6789015
	Opportunistic	5	488146	6788954
	Opportunistic	5	488148	6788953
	Opportunistic	10	488158	6788892
	Opportunistic	2	488159	6788874
	Opportunistic	1	488147	6788775
	Opportunistic	10	487339	6788545
	Opportunistic	1	487298	6788478
	Opportunistic	2	487232	6788426
	Opportunistic	2	487227	6788418
	Opportunistic	5	487207	6788414
	Opportunistic	4	487201	6788406
	Opportunistic	4	487195	6788392
	Opportunistic	5	487185	6788387
	Opportunistic	5	487176	6788380
	Opportunistic	10	487158	6788365
	Opportunistic	5	487114	6788231
	Opportunistic	3	487262	6788131
	Opportunistic	3	487274	6788142
	Opportunistic	3	487341	6788206
	Opportunistic	5	487342	6788221

Species	Site	Abundance	GPS coordinate (GDA94)	
			Easting	Northing
***Drummondita fulva* (P3)**	Opportunistic	5	487348	6788234
	Opportunistic	2	487417	6788305
	Opportunistic	5	487423	6788315
	Opportunistic	3	487429	6788330
	Opportunistic	1	487467	6788368
	Opportunistic	5	487474	6788372
	Opportunistic	2	487511	6788449
	Opportunistic	1	487565	6788516
	Opportunistic	4	487633	6788607
	Opportunistic	1	487634	6788621
	Opportunistic	1	487459	6787809
	Opportunistic	2	487465	6787812
	Opportunistic	5	487502	6787806
	Opportunistic	1	487534	6787793
	Opportunistic	2	487564	6787768
	Opportunistic	4	487614	6787731
	Opportunistic	5	487625	6787731
	Opportunistic	10	487647	6787719
	Opportunistic	20	487669	6787724
	Opportunistic	5	487712	6787727
	Opportunistic	1	487795	6787847
	Opportunistic	5	487788	6787856
	Opportunistic	5	487763	6787851
	Opportunistic	1	487714	6787859
	Opportunistic	10	487699	6787870
	Opportunistic	15	487680	6787872
	Opportunistic	20	487660	6787894
	Opportunistic	15	487651	6787919
	Opportunistic	20	487625	6787937
	Opportunistic	10	487587	6787966
	Opportunistic	15	487559	6787966
	Opportunistic	5	487537	6787969
	Opportunistic	5	487769	6789383
	Opportunistic	10	487710	6789427
	Opportunistic	7	487687	6789425
	Opportunistic	4	487341	6788953
	Opportunistic	5	487368	6788940
	Opportunistic	20	487385	6788924
	Opportunistic	7	487428	6788928
	Opportunistic	1	487553	6789025
	Opportunistic	2	487586	6789034
	Opportunistic	3	487629	6789035

Species	Site	Abundance	GPS coordinate (GDA94)	
			Easting	Northing
***Drummondita fulva* (P3)**	Opportunistic	5	487065	6787396
	Opportunistic	5	487043	6788005
	Opportunistic	1	487127	6787890
	Opportunistic	1	487188	6787889
	Opportunistic	3	487201	6787899
	Opportunistic	1	487098	6788405
	Opportunistic	5	487112	6788409
	Opportunistic	1	487125	6788423
	Opportunistic	5	487138	6788424
	Opportunistic	5	487210	6788441
	Opportunistic	10	487219	6788424
	Opportunistic	5	488396	6787399
	Opportunistic	5	488400	6787385
	Opportunistic	5	488419	6787367
	Opportunistic	10	488426	6787331
	Opportunistic	2	488541	6787277
	Opportunistic	10	488557	6787261
	Opportunistic	20	488576	6787253
	Opportunistic	10	488594	6787250
	Opportunistic	1	488624	6787238
	Opportunistic	1	488628	6787230
	Opportunistic	25	488690	6787275
	Opportunistic	15	487466	6788625
	Opportunistic	100	487405	6788611
	Opportunistic	50	487314	6788577
	Opportunistic	100	487007	6788336
	Opportunistic	50	487115	6788294
	Opportunistic	5	487078	6788496
	Opportunistic	5	487315	6788438
	Opportunistic	20	487344	6788487
	Opportunistic	4	487686	6788951
	Opportunistic	1	487687	6788964
	Opportunistic	1	487771	6789122
	Opportunistic	1	487775	6789129
	Opportunistic	1	487972	6789409
	Opportunistic	1	488014	6789511
	Opportunistic	2	488006	6789498
	Opportunistic	2	487978	6789411
	Opportunistic	1	487805	6788821
	Opportunistic	1	487844	6788937
	Opportunistic	2	488020	6789086
	Opportunistic	2	488018	6789145

Species	Site	Abundance	GPS coordinate (GDA94)	
			Easting	Northing
***Drummondita fulva* (P3)**	Opportunistic	2	488134	6789255
	Opportunistic	1	488185	6789323
	Opportunistic	1	488259	6789144
	Opportunistic	2	488243	6789141
	Opportunistic	3	488184	6789036
	Opportunistic	2	488169	6789034
	Opportunistic	2	488168	6789012
	Opportunistic	5	488162	6789005
	Opportunistic	5	488146	6788998
	Opportunistic	4	488122	6788984
	Opportunistic	1	488089	6788822
	Opportunistic	2	488082	6788813
	Opportunistic	2	488070	6788774
	Opportunistic	1	488054	6788736
	Opportunistic	1	488048	6788736
	Opportunistic	2	487466	6788634
	Opportunistic	2	487435	6788607
	Opportunistic	2	487341	6788476
	Opportunistic	1	487317	6788453
	Opportunistic	1	487291	6788408
	Opportunistic	2	487290	6788402
	Opportunistic	2	487263	6788345
	Opportunistic	1	487226	6788289
	Opportunistic	1	487350	6788302
	Opportunistic	1	487435	6788422
	Opportunistic	3	487486	6788497
	Opportunistic	2	487502	6788540
	Opportunistic	1	487512	6788543
	Opportunistic	3	487517	6788543
	Opportunistic	1	487563	6788602
	Opportunistic	3	487398	6787521
	Opportunistic	3	487357	6787508
	Opportunistic	3	487336	6787520
	Opportunistic	3	487441	6787934
	Opportunistic	1	487497	6787855
	Opportunistic	1	487504	6787856
	Opportunistic	1	487568	6787846
	Opportunistic	1	487572	6787844
	Opportunistic	1	487601	6787848
	Opportunistic	1	487607	6787840
	Opportunistic	1	487658	6787794
	Opportunistic	5	487659	6787779

Species	Site	Abundance	GPS coordinate (GDA94)	
			Easting	Northing
***Drummondita fulva* (P3)**	Opportunistic	1	487663	6787761
	Opportunistic	1	487677	6787746
	Opportunistic	2	487791	6787902
	Opportunistic	1	487652	6788011
	Opportunistic	2	487637	6788022
	Opportunistic	2	487626	6788024
	Opportunistic	2	487615	6788032
	Opportunistic	2	487563	6788074
	Opportunistic	2	487539	6788114
	Opportunistic	1	487506	6788120
	Opportunistic	1	487704	6789199
	Opportunistic	1	487547	6789065
	Opportunistic	2	487568	6789025
	Opportunistic	1	487570	6789016
	Opportunistic	1	487594	6788997
	Opportunistic	1	487614	6788993
	Opportunistic	3	487617	6788997
	Opportunistic	1	487661	6789013
	Opportunistic	3	487670	6789018
	Opportunistic	1	487678	6789020
	Opportunistic	1	487700	6789038
	Opportunistic	1	487133	6787892
	Opportunistic	4	487196	6787885
	Opportunistic	2	487202	6787889
	Opportunistic	2	487224	6787890
	Opportunistic	5	487230	6787886
	Opportunistic	6	487234	6787877
	Opportunistic	4	487263	6787758
	Opportunistic	4	487263	6787743
	Opportunistic	1	487258	6787693
	Opportunistic	1	487264	6787681
	Opportunistic	5	487381	6788662
	Opportunistic	1	487341	6788662
	Opportunistic	1	487333	6788666
	Opportunistic	2	487305	6788671
	Opportunistic	1	487211	6788447
	Opportunistic	2	487226	6788442
	Opportunistic	2	487235	6788427
	Opportunistic	2	487239	6788423
	Opportunistic	2	487241	6788420
	Opportunistic	1	487296	6788356
	Opportunistic	1	488331	6787251

Species	Site	Abundance	GPS coordinate (GDA94)	
			Easting	Northing
***Drummondita fulva* (P3)**	Opportunistic	3	488344	6787244
	Opportunistic	8	488374	6787225
	Opportunistic	3	488498	6787189
	Opportunistic	2	488512	6787166
	Opportunistic	2	488570	6787145
***Grevillea globosa* (P3)**	KH07	6	486493	6788738
	Opportunistic	1	486493	6788738
	Opportunistic	1	488010	6788464
	Opportunistic	10	487547	6787599
	Opportunistic	8	487555	6787599
	Opportunistic	2	486836	6787738
	Opportunistic	1	486897	6787740
	Opportunistic	1	487155	6787627
	Opportunistic	2	487167	6787604
***Melaleuca ?barlowii* (sterile) (P3)**	Opportunistic	1	486912	6787596
***Micromyrtus trudgenii* (P3)**	KH04	10	488025	6788988
	Opportunistic	5	488006	6788960
	Opportunistic	1	488252	6788861
	Opportunistic	2	487862	6789110
	Opportunistic	2	487857	6788948
	Opportunistic	1	487863	6788960
	Opportunistic	3	487868	6788970
	Opportunistic	3	487878	6789002
	Opportunistic	7	487953	6788985
	Opportunistic	2	487966	6789004
	Opportunistic	20	487972	6789015
	Opportunistic	5	487989	6789033
	Opportunistic	6	488005	6789079
	Opportunistic	8	488002	6789100
	Opportunistic	5	488000	6789119
	Opportunistic	20	487999	6789133
	Opportunistic	6	487992	6789163
	Opportunistic	3	488113	6789254
	Opportunistic	1	488132	6789267
	Opportunistic	3	488169	6789341
	Opportunistic	20	488258	6789351
	Opportunistic	1	488151	6788983
	Opportunistic	1	487900	6789111
	Opportunistic	4	487899	6789046

Species	Site	Abundance	GPS coordinate (GDA94)	
			Easting	Northing
***Micromyrtus trudgenii* (P3)**	Opportunistic	1	487904	6789037
	Opportunistic	1	487871	6789001
	Opportunistic	10	487921	6789000
	Opportunistic	5	487928	6789027
	Opportunistic	5	487935	6789048
	Opportunistic	5	487939	6789079
	Opportunistic	10	487937	6789094
	Opportunistic	10	487946	6789107
	Opportunistic	3	487976	6789182
	Opportunistic	5	487978	6789196
	Opportunistic	3	488048	6789315
	Opportunistic	10	488048	6789331
	Opportunistic	1	488056	6789349
	Opportunistic	5	488061	6789362
	Opportunistic	5	488067	6789373
	Opportunistic	5	488077	6789387
	Opportunistic	5	488086	6789408
	Opportunistic	10	488093	6789427
	Opportunistic	5	488096	6789445
	Opportunistic	5	488109	6789466
	Opportunistic	10	488120	6789482
	Opportunistic	1	488157	6789025
	Opportunistic	10	488145	6789005
	Opportunistic	1	488054	6789455
	Opportunistic	1	487872	6788947
	Opportunistic	1	487879	6788953
	Opportunistic	3	487882	6788966
	Opportunistic	2	487881	6788974
	Opportunistic	2	487928	6788983
	Opportunistic	2	487935	6788983
	Opportunistic	2	487940	6788992
	Opportunistic	3	487950	6788995
	Opportunistic	1	487952	6788999
	Opportunistic	2	487946	6789019
	Opportunistic	3	487949	6789038
	Opportunistic	6	487953	6789053
	Opportunistic	5	487957	6789064
	Opportunistic	5	487964	6789089
	Opportunistic	2	487963	6789097
	Opportunistic	4	487960	6789104
	Opportunistic	4	487964	6789118
	Opportunistic	4	487979	6789141

Species	Site	Abundance	GPS coordinate (GDA94)	
			Easting	Northing
***Micromyrtus trudgenii* (P3)**	Opportunistic	2	487991	6789149
	Opportunistic	5	488007	6789153
	Opportunistic	5	488013	6789191
	Opportunistic	2	488055	6789251
	Opportunistic	2	488058	6789267
	Opportunistic	2	488067	6789277
	Opportunistic	3	488072	6789286
	Opportunistic	3	488066	6789293
	Opportunistic	5	488064	6789302
	Opportunistic	2	488064	6789311
	Opportunistic	3	488072	6789316
	Opportunistic	3	488086	6789333
	Opportunistic	6	488093	6789341
	Opportunistic	10	488094	6789375
	Opportunistic	4	488099	6789395
	Opportunistic	7	488141	6789422
	Opportunistic	1	488151	6789449
	Opportunistic	3	488151	6789458
	Opportunistic	5	488155	6789468
	Opportunistic	1	488239	6789138
	Opportunistic	2	488146	6788952
	Opportunistic	1	487348	6788496
	Opportunistic	1	487856	6789007
	Opportunistic	1	487855	6789008
	Opportunistic	1	487977	6788993
	Opportunistic	1	488007	6789025
	Opportunistic	1	488005	6789039
	Opportunistic	1	488019	6789078
	Opportunistic	2	488019	6789093
	Opportunistic	2	488018	6789093
	Opportunistic	2	488020	6789112
	Opportunistic	2	488020	6789130
	Opportunistic	2	488019	6789141
	Opportunistic	1	488016	6789154
	Opportunistic	2	488015	6789152
	Opportunistic	4	488014	6789162
	Opportunistic	2	488019	6789175
	Opportunistic	2	488022	6789185
	Opportunistic	2	488032	6789199
	Opportunistic	3	488084	6789205
	Opportunistic	3	488114	6789231
	Opportunistic	1	488179	6789318

Species	Site	Abundance	GPS coordinate (GDA94)	
			Easting	Northing
***Micromyrtus trudgenii* (P3)**	Opportunistic	1	488177	6789321
	Opportunistic	2	488177	6789325
	Opportunistic	1	488192	6789327
	Opportunistic	2	488194	6789331
	Opportunistic	3	488243	6789365
	Opportunistic	3	488250	6789360
	Opportunistic	4	488260	6789346
	Opportunistic	5	488253	6789335
	Opportunistic	2	488254	6789144
	Opportunistic	3	488240	6789140
	Opportunistic	1	488158	6789001
	Opportunistic	3	488147	6788998
	Opportunistic	2	488130	6788980
	Opportunistic	1	488110	6788926
	Opportunistic	2	488101	6788916
***Persoonia pentasticha* (P3)**	Opportunistic	2	488383	6787125
	Opportunistic	1	488366	6787219
	Opportunistic	2	488383	6787125
	Opportunistic	2	488377	6787102
	Opportunistic	1	488369	6787097
	Opportunistic	1	488365	6787078
	Opportunistic	1	488351	6787041
	Opportunistic	1	488355	6786981
	Opportunistic	1	487698	6787725
	Opportunistic	1	488099	6789253
	Opportunistic	1	487186	6788246
	Opportunistic	1	487361	6787238
	Opportunistic	1	487465	6787662
	Opportunistic	1	488383	6788942
	Opportunistic	1	488177	6789091
	Opportunistic	1	488178	6789049
	Opportunistic	1	487990	6787398
	Opportunistic	1	488178	6789112
	Opportunistic	1	487704	6787724
	Opportunistic	1	486902	6788438
***Prostanthera ?*sp. Karara (sterile) (P1)**	Opportunistic	1	487048	6786560
	Opportunistic	1	485902	6788015
	Opportunistic	6	487048	6786560
	Opportunistic	1	487050	6786553
	Opportunistic	2	486855	6786313
	Opportunistic	8	486840	6786160
	Opportunistic	5	486857	6786181

Species	Site	Abundance	GPS coordinate (GDA94)	
			Easting	Northing
***Prostanthera ?*sp. Karara (sterile) (P1)**	Opportunistic	6	486926	6786210
	Opportunistic	6	486927	6786196
	Opportunistic	5	486937	6786196
	Opportunistic	3	487322	6785938
	Opportunistic	2	487332	6785921
	Opportunistic	1	486720	6787334
	Opportunistic	1	487391	6787216
	Opportunistic	2	487330	6787258
	Opportunistic	2	487430	6787430
	Opportunistic	2	487982	6786540
	Opportunistic	1	487911	6786555
	Opportunistic	2	487896	6786595
	Opportunistic	5	487885	6786600
	Opportunistic	3	487865	6786620
	Opportunistic	1	487827	6786631
	Opportunistic	1	487864	6786753
	Opportunistic	20	487059	6786460
	Opportunistic	20	486946	6786329
	Opportunistic	10	486903	6786274
	Opportunistic	10	486888	6786247
	Opportunistic	20	486868	6786233
	Opportunistic	10	486692	6786145
	Opportunistic	5	486964	6786073
	Opportunistic	10	487192	6785921
	Opportunistic	50	487233	6785865
	Opportunistic	20	487316	6785812
	Opportunistic	5	487405	6785755
	Opportunistic	50	486983	6786324
	Opportunistic	20	487110	6786470
	Opportunistic	25	487126	6786491
	Opportunistic	20	487606	6787477
	Opportunistic	1	486214	6788269
	Opportunistic	1	488221	6787231
	Opportunistic	6	487633	6787170
	Opportunistic	1	487596	6787179
	Opportunistic	6	487479	6787154
	Opportunistic	6	487037	6786476
	Opportunistic	2	487485	6787321
	Opportunistic	1	486896	6786444
	Opportunistic	1	486893	6786445
	Opportunistic	1	486886	6786436
	Opportunistic	1	486893	6786433

Species	Site	Abundance	GPS coordinate (GDA94)	
			Easting	Northing
***Prostanthera ?*sp. Karara (sterile) (P1)**	Opportunistic	2	486899	6786433
	Opportunistic	3	486886	6786427
	Opportunistic	1	486824	6786381
	Opportunistic	25	487591	6787341
	Opportunistic	5	487562	6787361
	Opportunistic	2	487533	6787373
	Opportunistic	15	487527	6787377
	Opportunistic	15	487519	6787381
	Opportunistic	3	487478	6787384
	Opportunistic	3	487447	6787383
	Opportunistic	5	487419	6787392
	Opportunistic	5	487408	6787399
	Opportunistic	20	487660	6787285
	Opportunistic	20	487627	6787299
	Opportunistic	20	487606	6787309
	Opportunistic	20	487594	6787317
***Psammomoya implexa* (P3)**	KH01	25	487091	6789654
	Opportunistic	20	487091	6789654
	Opportunistic	1	487514	6789173
	Opportunistic	1	487518	6789171
	Opportunistic	2	487518	6789169
	Opportunistic	5	487517	6789165
	Opportunistic	2	487513	6789165
	Opportunistic	20	487516	6789161
	Opportunistic	7	487530	6789171
	Opportunistic	1	487503	6789174
	Opportunistic	2	487391	6789281
	Opportunistic	2	487384	6789285
	Opportunistic	4	487378	6789296
	Opportunistic	20	487365	6789305
	Opportunistic	20	487354	6789317
	Opportunistic	10	487297	6789373
	Opportunistic	10	487269	6789388
	Opportunistic	5	487229	6789389
	Opportunistic	20	487204	6789406
	Opportunistic	5	487134	6789430
	Opportunistic	10	487079	6789486
	Opportunistic	2	487052	6789515
	Opportunistic	20	487038	6789534
	Opportunistic	15	487024	6789549
	Opportunistic	10	487081	6789657
	Opportunistic	25	487127	6789650

Species	Site	Abundance	GPS coordinate (GDA94)	
			Easting	Northing
***Psammomoya implexa* (P3)**	Opportunistic	10	487165	6789634
	Opportunistic	10	487181	6789636
	Opportunistic	5	487200	6789627
	Opportunistic	20	487326	6789541
	Opportunistic	4	487375	6789510
	Opportunistic	1	487531	6789441
	Opportunistic	100	488089	6787582
	Opportunistic	75	488151	6787562
	Opportunistic	20	488325	6787467
	Opportunistic	2	487471	6789480
	Opportunistic	2	487469	6789484
	Opportunistic	2	487461	6789491
	Opportunistic	5	487431	6789524
	Opportunistic	15	487411	6789541
	Opportunistic	1	487384	6789539
	Opportunistic	10	487283	6789611
	Opportunistic	25	487259	6789628
	Opportunistic	15	487210	6789665
	Opportunistic	15	487106	6789718
	Opportunistic	50	487089	6789731
	Opportunistic	10	487067	6789748
	Opportunistic	50	486959	6789843
	Opportunistic	20	486945	6789866
	Opportunistic	50	486912	6789879
	Opportunistic	25	486893	6789875
	Opportunistic	25	486875	6789889
	Opportunistic	25	486868	6789902
	Opportunistic	25	486856	6789917
	Opportunistic	2	486835	6789895
	Opportunistic	15	486837	6789876
	Opportunistic	10	486803	6789823
	Opportunistic	10	486808	6789811
	Opportunistic	10	486787	6789774
	Opportunistic	5	486772	6789764
	Opportunistic	25	486756	6789740
	Opportunistic	15	486724	6789519
	Opportunistic	15	486745	6789504
	Opportunistic	5	486756	6789494
	Opportunistic	2	486769	6789485
	Opportunistic	1	486784	6789473
	Opportunistic	6	486794	6789465
	Opportunistic	1	486827	6789458

Species	Site	Abundance	GPS coordinate (GDA94)	
			Easting	Northing
***Psammomoya implexa* (P3)**	Opportunistic	25	486845	6789452
	Opportunistic	25	486856	6789439
	Opportunistic	50	486878	6789422
	Opportunistic	10	486899	6789413
	Opportunistic	10	486912	6789396
	Opportunistic	10	486923	6789392
	Opportunistic	4	486939	6789383
	Opportunistic	25	487008	6789342
	Opportunistic	5	487029	6789318
	Opportunistic	15	487067	6789298
	Opportunistic	5	487132	6789239
	Opportunistic	15	487149	6789228
	Opportunistic	5	487177	6789210
	Opportunistic	5	487199	6789201
	Opportunistic	4	487212	6789196
	Opportunistic	4	487390	6789097
	Opportunistic	7	487432	6789079
	Opportunistic	1	487937	6788124
	Opportunistic	5	488598	6789126
	Opportunistic	6	488588	6789104
	Opportunistic	100	488572	6789084
	Opportunistic	2	488207	6788522
	Opportunistic	3	488206	6788500
	Opportunistic	1	487287	6789832
	Opportunistic	2	487273	6789860
	Opportunistic	20	487261	6789863
	Opportunistic	20	487242	6789873
	Opportunistic	50	487222	6789884
	Opportunistic	50	487205	6789901
	Opportunistic	50	486544	6789424
	Opportunistic	50	486560	6789402
	Opportunistic	50	486591	6789371
	Opportunistic	50	486616	6789359
	Opportunistic	50	486647	6789342
	Opportunistic	100	486671	6789313
	Opportunistic	100	486698	6789291
	Opportunistic	100	486722	6789273
	Opportunistic	100	486755	6789246
	Opportunistic	50	486807	6789219
	Opportunistic	15	486677	6789025
	Opportunistic	100	486666	6789051
	Opportunistic	100	486622	6789076

Species	Site	Abundance	GPS coordinate (GDA94)	
			Easting	Northing
***Psammomoya implexa* (P3)**	Opportunistic	50	486562	6789096
	Opportunistic	25	486534	6789110
	Opportunistic	25	486522	6789134
	Opportunistic	20	486498	6789174
	Opportunistic	15	486458	6789204
	Opportunistic	50	486445	6789214
	Opportunistic	3	486552	6788649
	Opportunistic	7	486564	6788644
	Opportunistic	5	486589	6788634
	Opportunistic	5	486605	6788627
	Opportunistic	2	487822	6787519
	Opportunistic	10	488573	6789135
	Opportunistic	10	488549	6789038
	Opportunistic	10	488278	6788602
	Opportunistic	25	488251	6788533
	Opportunistic	100	488254	6788512
	Opportunistic	75	488252	6788476
	Opportunistic	50	487965	6788055
	Opportunistic	1	487896	6787964
	Opportunistic	50	487239	6789712
	Opportunistic	20	487195	6789730
	Opportunistic	10	487174	6789734
	Opportunistic	50	487200	6789773
	Opportunistic	20	487159	6789795
	Opportunistic	5	487082	6789837
	Opportunistic	75	487049	6789832
	Opportunistic	100	486992	6789861
	Opportunistic	100	486918	6789890
	Opportunistic	100	486895	6789932
	Opportunistic	100	486872	6789931
	Opportunistic	6	486612	6789495
	Opportunistic	4	486639	6789479
	Opportunistic	50	486742	6789429
	Opportunistic	50	486862	6789330
	Opportunistic	100	486872	6789314
	Opportunistic	20	486899	6789304
	Opportunistic	15	487024	6789193
	Opportunistic	15	487035	6789154
	Opportunistic	20	487064	6789155
	Opportunistic	100	487089	6789127
	Opportunistic	100	487138	6789093
	Opportunistic	15	487218	6789051

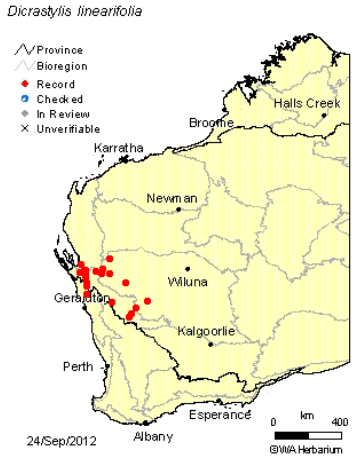
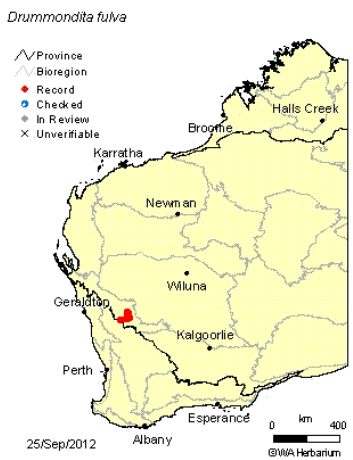
Species	Site	Abundance	GPS coordinate (GDA94)	
			Easting	Northing
***Psammomoya implexa* (P3)**	Opportunistic	4	487254	6789039
	Opportunistic	15	485998	6788135
	Opportunistic	10	485989	6788160
	Opportunistic	10	485986	6788178
	Opportunistic	20	485930	6788243
	Opportunistic	5	485918	6788267
	Opportunistic	20	485895	6788311
	Opportunistic	50	485900	6788332
	Opportunistic	10	485839	6788341
	Opportunistic	7	485793	6788339
	Opportunistic	5	485770	6788299
	Opportunistic	10	485754	6788289
	Opportunistic	15	485739	6788282
	Opportunistic	1	486615	6788747
	Opportunistic	50	486655	6788703
	Opportunistic	20	486705	6788690
	Opportunistic	10	486730	6788662
	Opportunistic	1	488053	6787622
	Opportunistic	25	488107	6787592
	Opportunistic	100	488141	6787572
	Opportunistic	100	488296	6787440
	Opportunistic	100	488338	6787426
	Opportunistic	75	486678	6788849
	Opportunistic	50	486730	6788886
	Opportunistic	3	487216	6788976
	Opportunistic	3	487941	6787741
	Opportunistic	3	487940	6787741
	Opportunistic	3	487962	6787762
	Opportunistic	5	487971	6787773
	Opportunistic	5	487983	6787789
	Opportunistic	5	487980	6787806
	Opportunistic	5	487956	6787827
	Opportunistic	5	487447	6789383
	Opportunistic	5	487440	6789394
	Opportunistic	10	487430	6789411
	Opportunistic	5	487416	6789414
	Opportunistic	5	487401	6789432
	Opportunistic	3	487385	6789435
	Opportunistic	3	487370	6789437
	Opportunistic	5	487365	6789443
	Opportunistic	5	487347	6789443
	Opportunistic	5	487337	6789446

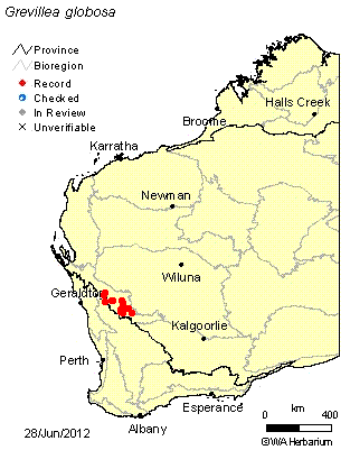
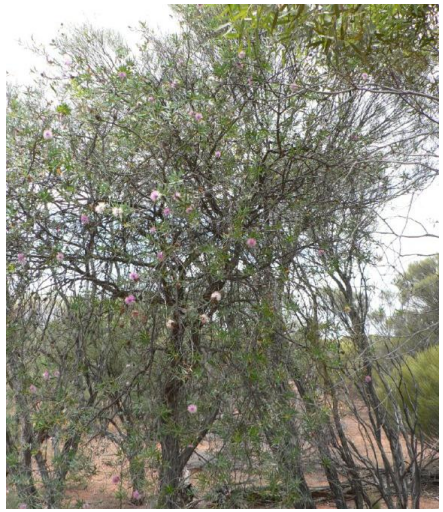
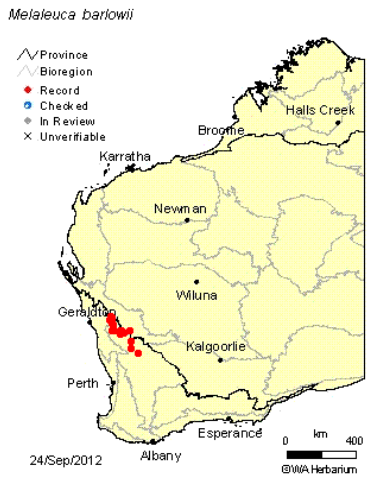
Species	Site	Abundance	GPS coordinate (GDA94)	
			Easting	Northing
***Psammomoya implexa* (P3)**	Opportunistic	5	487311	6789444
	Opportunistic	5	487308	6789441
	Opportunistic	5	487309	6789443
	Opportunistic	5	487309	6789443
	Opportunistic	5	487277	6789440
	Opportunistic	10	487271	6789450
	Opportunistic	6	487267	6789470
	Opportunistic	10	487262	6789508
	Opportunistic	1	487236	6789514
	Opportunistic	10	487221	6789517
	Opportunistic	10	487202	6789541
	Opportunistic	10	487196	6789550
	Opportunistic	3	487154	6789589
	Opportunistic	5	487110	6789607
	Opportunistic	5	487085	6789623
	Opportunistic	10	487078	6789625
	Opportunistic	10	487003	6789655
	Opportunistic	10	486968	6789687
	Opportunistic	10	486951	6789711
	Opportunistic	10	486934	6789741
	Opportunistic	5	486903	6789782
	Opportunistic	5	486879	6789794
	Opportunistic	5	486854	6789806
	Opportunistic	10	486842	6789811
	Opportunistic	10	486813	6789836
	Opportunistic	5	486706	6789632
	Opportunistic	5	486746	6789620
	Opportunistic	5	486772	6789611
	Opportunistic	10	486811	6789608
	Opportunistic	10	486827	6789586
	Opportunistic	10	486835	6789568
	Opportunistic	10	486870	6789545
	Opportunistic	10	486877	6789528
	Opportunistic	10	486901	6789478
	Opportunistic	10	486930	6789461
	Opportunistic	50	486961	6789458
	Opportunistic	50	486989	6789446
	Opportunistic	10	487022	6789427
	Opportunistic	10	487037	6789413
	Opportunistic	10	487046	6789403
	Opportunistic	10	487057	6789397
	Opportunistic	10	487137	6789345

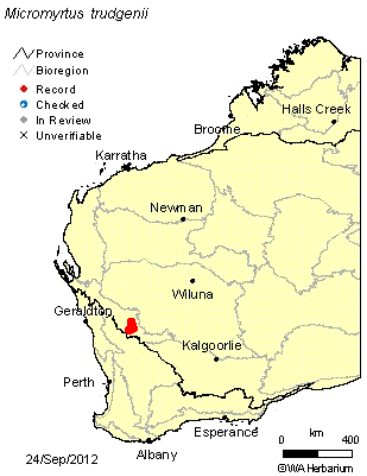
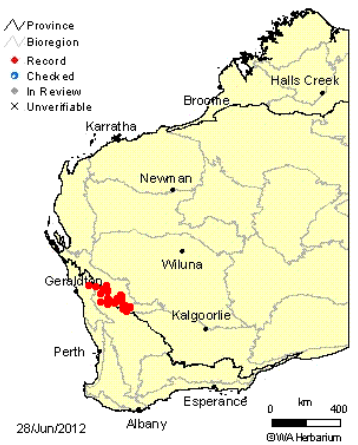
Species	Site	Abundance	GPS coordinate (GDA94)	
			Easting	Northing
***Psammomoya implexa* (P3)**	Opportunistic	6	487166	6789329
	Opportunistic	25	487229	6789297
	Opportunistic	15	487281	6789255
	Opportunistic	1	487522	6789094
	Opportunistic	5	486027	6788268
	Opportunistic	2	486005	6788297
	Opportunistic	1	485992	6788315
	Opportunistic	1	485979	6788326
	Opportunistic	1	485972	6788338
	Opportunistic	2	485968	6788353
	Opportunistic	2	485964	6788358
	Opportunistic	5	485951	6788360
	Opportunistic	6	485868	6788415
	Opportunistic	2	485862	6788420
	Opportunistic	2	485842	6788433
	Opportunistic	4	485841	6788437
	Opportunistic	2	485833	6788445
	Opportunistic	2	485839	6788453
	Opportunistic	8	485846	6788457
	Opportunistic	8	485854	6788463
	Opportunistic	10	486591	6789249
	Opportunistic	10	486585	6789258
	Opportunistic	10	486583	6789270
	Opportunistic	5	486573	6789288
	Opportunistic	10	486561	6789303
	Opportunistic	7	486524	6789323
	Opportunistic	7	486507	6789327
	Opportunistic	3	486459	6789351
	Opportunistic	1	486428	6789320
	Opportunistic	1	486421	6789306
	Opportunistic	1	486517	6788928
	Opportunistic	3	486525	6788921
	Opportunistic	5	486617	6788862
	Opportunistic	5	486625	6788843
	Opportunistic	5	486631	6788834
	Opportunistic	5	486648	6788807
	Opportunistic	3	486682	6788792
	Opportunistic	3	486684	6788791
	Opportunistic	5	486695	6788780
	Opportunistic	5	486729	6788767
	Opportunistic	5	486765	6788753
	Opportunistic	3	488060	6787514

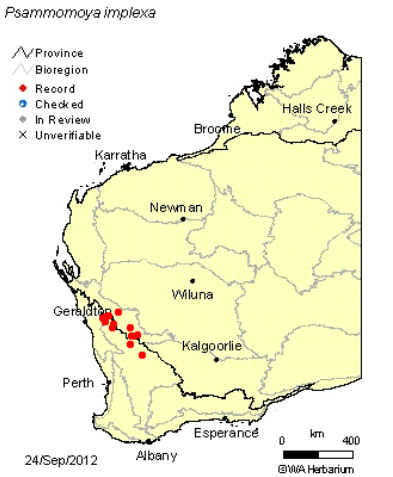
Species	Site	Abundance	GPS coordinate (GDA94)	
			Easting	Northing
***Psammomoya implexa* (P3)**	Opportunistic	20	488062	6787511
	Opportunistic	20	488080	6787500
	Opportunistic	20	488096	6787483
	Opportunistic	20	488239	6787354
	Opportunistic	20	488265	6787353
	Opportunistic	10	488294	6787330
	Opportunistic	5	488317	6787283

Table N.2: Descriptions of Priority Flora recorded in the Survey Area (FloraBase 2012).

Species	Previously recorded locations (FloraBase 2012)	Description (FloraBase 2012)	Habitat (FloraBase 2012)
Dicrastylis linearifolia Munir (P3)  (Source: N. Krawczyk)		Much-branched shrub, inflorescence with scale-like indumentums; stamens are usually 5; upper surface of leaves are hairy and 1 to 3 m high. It produces white flowers from November to December.	Occurs in sandplains with red sand.
Drummondita fulva A.S. Markey & R.A. Meissn. (P3)  (Source: N. Cadd)		Erect, branching shrub, between 0.5 to 1.5 m high.	Occurs in lower to upper slopes and hillcrests in skeletal, shallow, acidic soils of red-brown / orange-red sandy loams and clayey silts.

Species	Previously recorded locations (FloraBase 2012)	Description (FloraBase 2012)	Habitat (FloraBase 2012)
Grevillea globosa C. A. Gardner (P3)  (Source: J. Atkinson)		Spreading, domed shrub, between 1 and 3 m high, with narrow leaves between 4 and 18 cm long. Produces cream and white and green or red to brown flowers in January, June or November.	Previously found in Mulga shrubland in red loam or in mallee woodland in yellow, lateritic sand.
Melaleuca barlowii Craven (P3)  (Source: J. Borger)		Spindly shrub between 1.5 to 1.8 m high. Flowers pink in April.	Occurs in shrubland and roadside reserves in yellow-brown sand or red-brown clay loam.

Species	Previously recorded locations (FloraBase 2012)	Description (FloraBase 2012)	Habitat (FloraBase 2012)
Micromyrtus trudgenii Rye (P3)  (Source: J. Smartt)		Erect, open shrub between 1 to 2 m high.	Occurs on tops and slopes of hills and ridges. Situated in red-brown loamy clay, yellow-brown soils, gravel, siltstone, quartz, basalt, banded ironstone and dolerite.
Persoonia pentasticha P.H. Weston (P3)  (Source: J. Atkinson)		Erect, spreading shrub between 0.4 to 1.8 m high. Flowers yellow from August to November.	Previously found on sand and loam at the base of granite outcrops.

Species	Previously recorded locations (FloraBase 2012)	Description (FloraBase 2012)	Habitat (FloraBase 2012)
Prostanthera sp. Karara (D. Coultas & K. Greenacre Opp 8) (P1)  (Source: N. Krawczyk)		Small shrub up to 0.5 m high with thick, grey, terete leaves; silky fine hairs; leaves opposite. Produces white/purple flowers.	Previously found on low rises in red-brown silty clay loam or red silty loam.
Psammomoya implexa Keighery (P3)  (Source: N. Krawczyk)		Large, spreading, much-branched shrub up to 1 m high. Produces white flowers from August to October.	Previously collected from areas of stony rises in red-brown soils.

Appendix O: Priority Flora Densities Mapping

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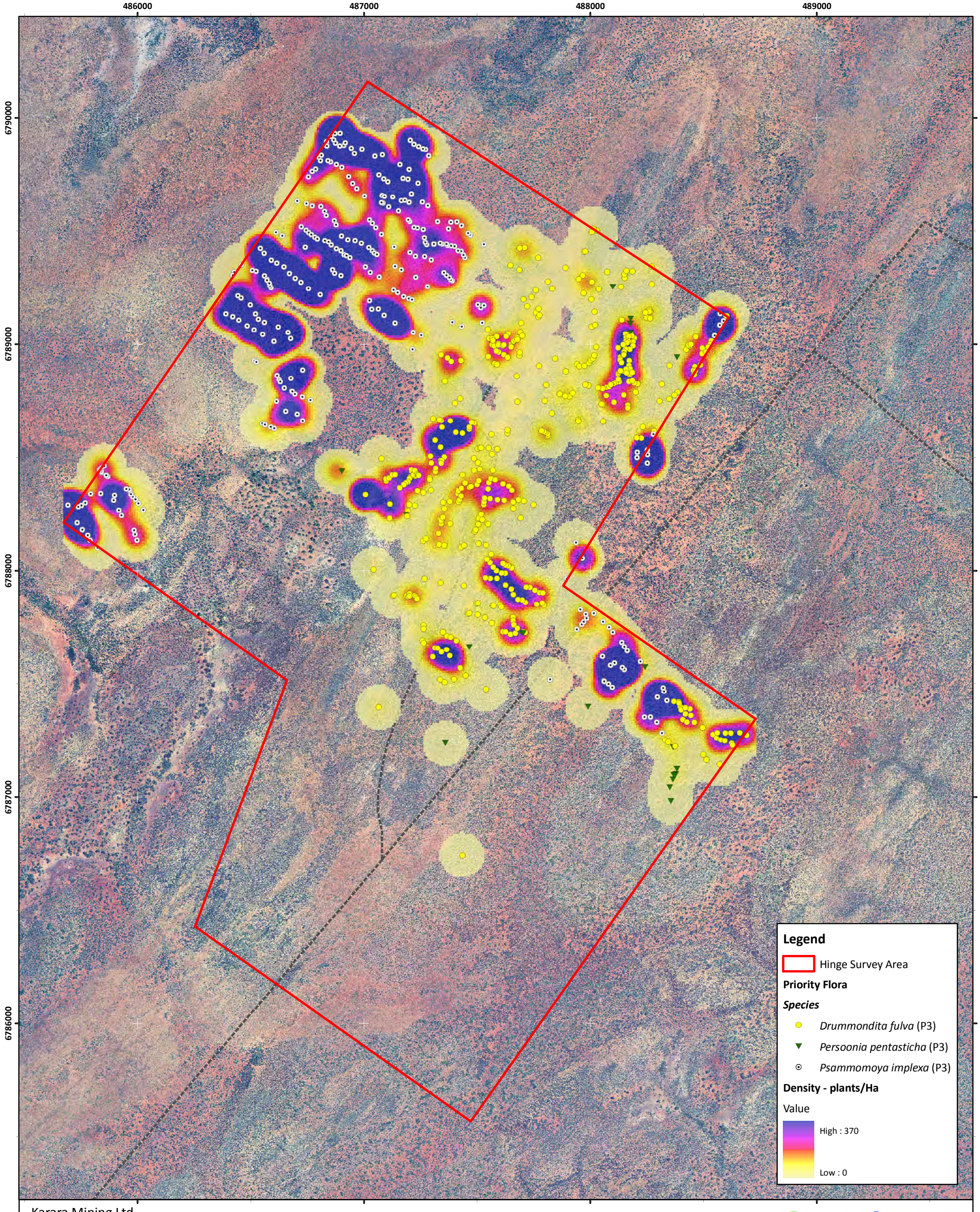

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Appendix O1: Priority Flora - Density Analysis A

Author: M. Gardener	Date: 12-12-2012
Drawn: C. Dyde	Figure Ref: 16002-12FMV1RevA_20121212_AppendixO1_PriFloraDensity

Datum: GDA 1994 - Projection: MGA Zone 50 - Scale: 1:15,000 (A3)

Metres

0 200 400 600 800 1,000

N

astron environmental services

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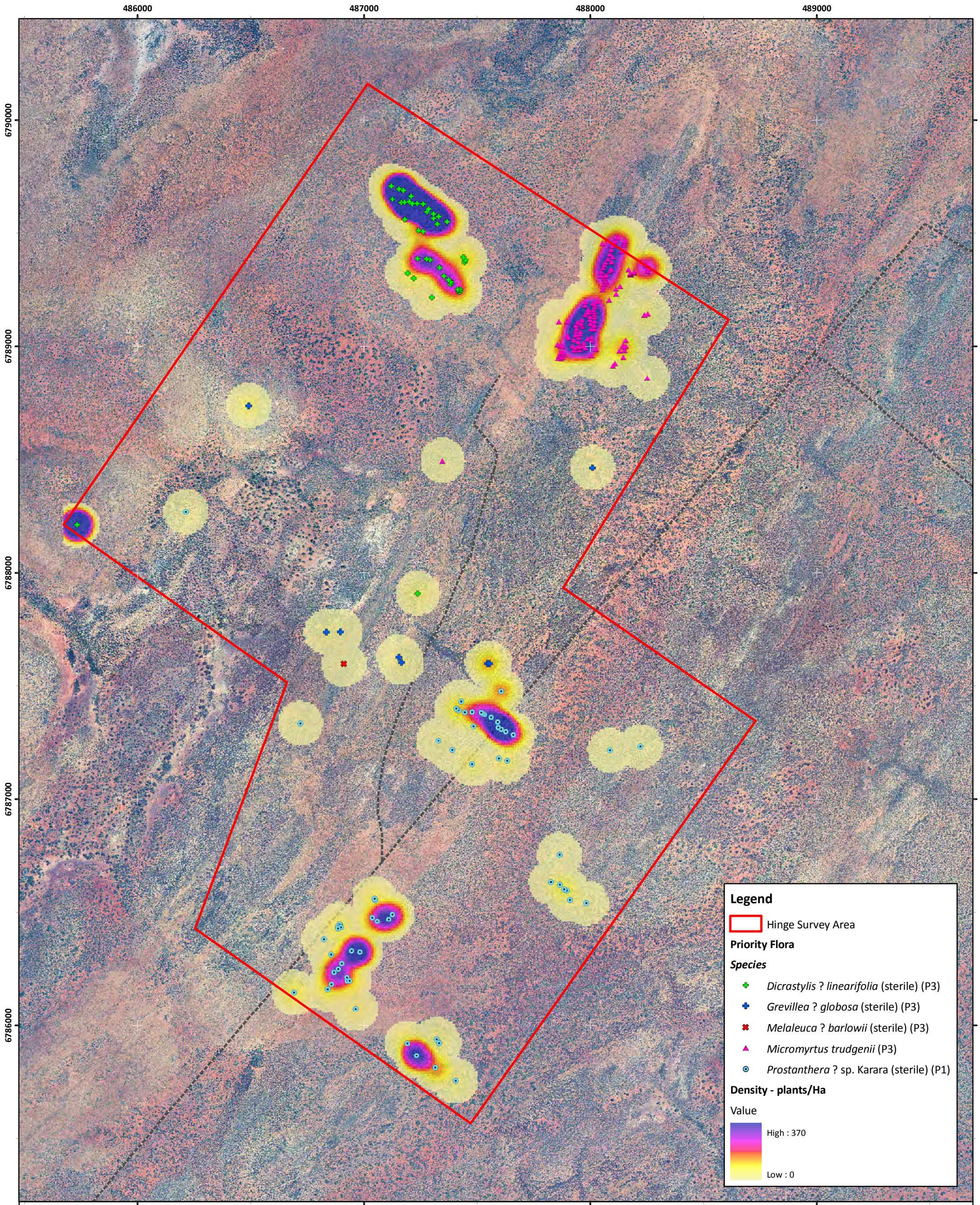

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Appendix O2: Priority Flora - Density Analysis B

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Author: M. Gardener	Date: 12-12-2012
Drawn: C. Dyde	Figure Ref: 16002-12FMV1RevA_20121212_AppendixO2_PriFloraDensity

Datum: GDA 1994 - Projection: MGA Zone 50 - Scale: 1:15,000 (A3)

0 200 400 600 800 1,000 Metres

N

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Appendix P: Introduced Flora Locations and Descriptions

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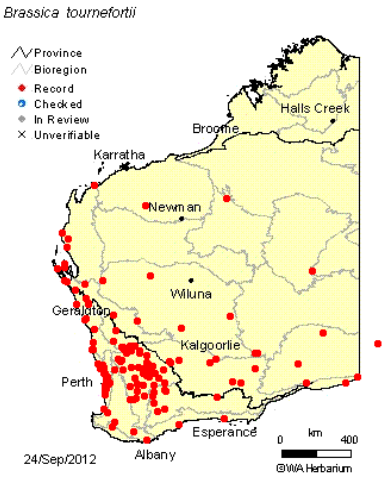
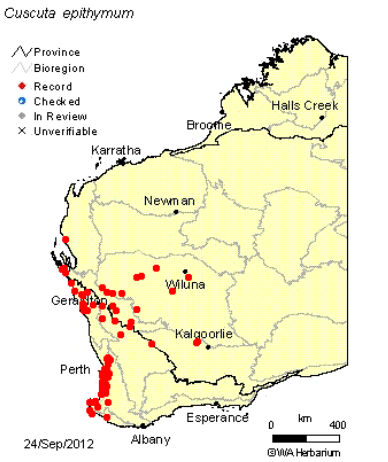
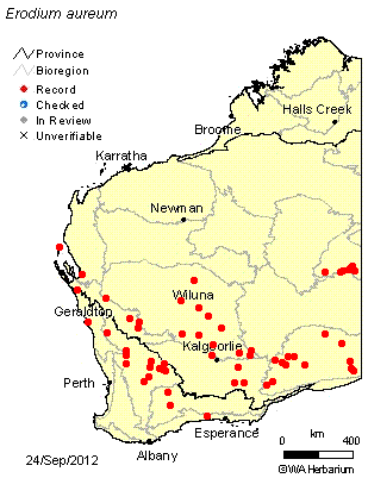
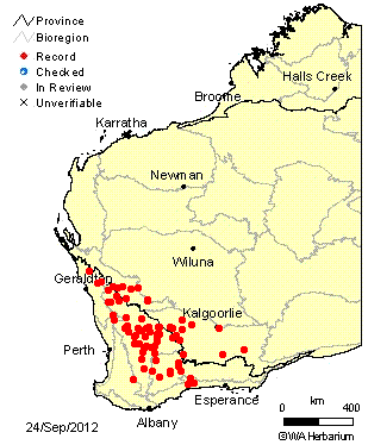
Table P.1: Locations of Introduced Flora recorded in the survey area.

Species	Site	Abundance	GPS coordinate (GDA94)	
			Easting	Northing
Brassica tournefortii	Opportunistic	1	487509	6788748
Cuscuta epithymum	KH08	+	486256	6788212
	KH10	+	486477	6787966
	KH11	+	486588	6788358
	KH12	+	486880	6788441
Erodium aureum	Opportunistic	3	487525	6788801
	Opportunistic	4	487505	6788754
	Opportunistic	1	487456	6788671
? Mesembryanthemum nodiflorum	KH12	+	486880	6788441
Wahlenbergia capensis	Opportunistic	1	487455	6788672

Table P.2: Descriptions of Introduced Flora recorded in the survey area (FloraBase 2012).

Species	Previously recorded locations (FloraBase 2012)	Description (FloraBase 2012)	Habitat (FloraBase 2012)
**Brassica tournefortii*  (Source: FloraBase)	 	Annual herb between 0.10 to 0.60 m high. Produces yellow-cream-white flowers from June to November.	Often found in disturbed ground, roadside, cultivation and seaside within sandy soils.
**Cuscuta epithymum*  (Source: FloraBase)	 	Parasitic, twining, annual herb or climber. It produces white flowers from August to December.	Often found in sandy soils over limestone or granite.

Species	Previously recorded locations (FloraBase 2012)	Description (FloraBase 2012)	Habitat (FloraBase 2012)
**Erodium aureum*  (Source: Atlas of Living Australia)		Spreading, short-lived perennial herb between 0.04 to 0.20 m high. It produces pink-purple flowers from July to October.	Often occurs in sand, sandy clay and loam soils.
**Mesembryanthemum nodiflorum*  (Source: J. Atkinson)		Prostrate or erect, succulent annual herb, between 0.02-0.20 m high. It produces white flowers from September to November.	Often occurs in sandy clay, loam, clay loam in claypans and saline areas.

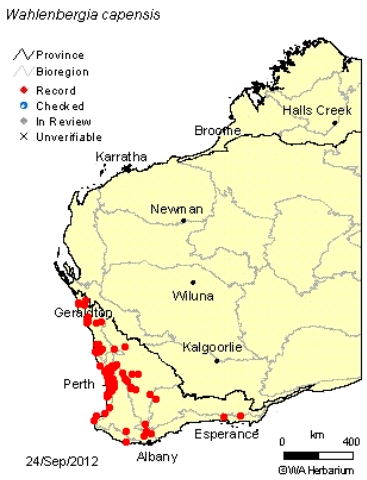
Species	Previously recorded locations (FloraBase 2012)	Description (FloraBase 2012)	Habitat (FloraBase 2012)
* *Wahlenbergia capensis*  (Source: FloraBase)	 	Slender, erect annual herb between 0.10 to 0.50 m high. It produces blue / blue-green flowers from September to November.	Occurs in sandy soils in disturbed grounds or plains.

Table P.3: Summary Assessment of Introduced Flora recorded in the survey area (DEC 2011).

Species	Environmental Weed Strategy Rating (Low, Mild, Moderate, High)	Ecological Impact (Low, Moderate, High, Unknown)	Current Distribution (Limited, Moderate, High, Extensive, Unknown)	Potential Distribution (Limited, Moderate, High, Extensive, Unknown)	Invasiveness (Rapid, Moderate, Slow)	General Trend (Increasing, Stable, Decreasing, Unknown)	Status (Outside, Emerging, Established, Unknown)	Feasibility for Control (Low, Moderate, High, Unknown)
***Brassica tournefortii** (Prickly Turnip, Mediterranean Turnip)	High	High	Extensive	Extensive	Rapid	Increasing	-	Low
***Cuscuta epithymum** (Lesser Dodder)	-	Unknown	Extensive	Extensive	Rapid	Stable	-	Low
***Erodium aureum**	-	Low	Moderate	Extensive	Rapid	Increasing	-	Low
***Mesembryanthemum nodiflorum** (Slender Iceplant)	-	High	Extensive	Extensive	Rapid	Increasing	-	Unknown

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Appendix Q: Map of Introduced Flora Locations

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Legend

- Hinge Survey Area
- Tracks

Introduced Flora

Species

- **Brassica tournefortii*
- **Cuscuta epithymum*
- **Erodium aureum* ?
- **Wahlenbergia capensis*
- ?**Mesembryanthemum nodiflorum*

Karara Mining Ltd.
Hinge Vegetation and Flora Survey

Appedix Q: Introduced Flora Locations

Author: M. Gardener	Date: 12-12-2012
Drawn: C. Dyde	Figure Ref: 16002-12FMV1RevA_20121212_AppendixP_Weeds

Datum: GDA 1994 - Projection: MGA Zone 50 - Scale: 1:15,000 (A3)

0 200 400 600 800 1,000 Metres

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astron environmental services

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Appendix R: Limitations

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Table R.1: Statement of limitations of the vegetation and flora survey.

Potential limitation	Statement regarding potential limitations
(i) Sources of information and availability of contextual information. Is the region well documented?	Contextual information is available from IBRA (Desmond and Chant 2001), Beard (1976) mapping and Payne et al. 1998. land system mapping. Numerous consultants' reports have previously been completed within the survey area. Contextual information is therefore not a limiting factor for this survey.
(ii) Scope. The level of survey and detail required to undertake the survey. Was there adequate time to complete the survey to the desired standard?	There was adequate time to complete the Level 2 survey and verify the vegetation mapping.
(iii) Proportion of flora collected and identified. Was the survey sampling, timing and intensity considered adequate? Was the survey conducted at what was considered an appropriate time of the year for plant collection? Were any taxonomic groups considered to be under-represented?	The annual rainfall in the year preceding the survey was below the long term average. As this followed on from a year of above average rainfall (2011) conditions were generally good and it is estimated that at least 70 - 80% of the full suite of species was recorded. By early October most taxonomic groups had finished flowering or fruiting specimens which is one reason such a high proportion of specimen could not be conclusively identified. Furthermore, most annual species had died of by time of survey making identification near impossible.
(iv) Completeness. Is there further work which may be required i.e. was the relevant area fully surveyed?	The survey area is considered adequately surveyed for a Level 2 assessment. The targeted survey covered the whole survey area.
(v) Mapping reliability. Were the aerial photographs, satellite images and site maps available considered adequate to fully understand the area surveyed? Was the mapping generated considered to have a high degree of reliability?	Site maps used in the field were adequate. The mapping was verified at a scale consistent with the FCT mapping previously completed as part of the regional assessment (Woodman 2012). Some fine scale variation within FCTs was therefore not captured.
(vi) Timing. When was the survey conducted in terms of season, rainfall, severe weather events etc? Was the survey conducted at an appropriate time for access?	The timing of the survey was considered a limiting factor. See also (iii).
(vii) Disturbance. Had the survey area been impacted by any disturbance which may have limited the survey, i.e. fire, flood, accidental human intervention etc?	Vegetation in the survey area was generally intact and disturbance was not a limiting factor of this survey.
(viii) Intensity. In retrospect, was the intensity considered to be adequate?	The intensity of the survey was considered adequate to compile a representative species list, verify the previous vegetation mapping and complete a Level 2 survey.

Potential limitation	**Statement regarding potential limitations**
(ix) Resources. Were the appropriate tools and materials available to complete the task effectively?	Resources were adequate to complete the survey and all appropriate tools and materials required to complete the tasks were available.
(x) Access. Were there any factors limiting access to the survey area?	Adequate resources were available to complete the task effectively.
(xi) Experience. Were personnel undertaking the field survey and plant identification trained and/or experienced in undertaking the required tasks?	The botanists responsible for undertaking the field survey are experienced in conducting Level 2 and targeted surveys. Specimen identification was completed by botanists experienced in taxonomic identification of Western Australian flora species.