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# Gascoyne Food Bowl Initiative

## Level 2 Flora and Vegetation Survey

Prepared for  
Shire of Carnarvon and Department of Agriculture and Food  
by Strategen

March 2017





# **Gascoyne Food Bowl Initiative**

## **Level 2 Flora and Vegetation Survey**

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## **Client: Shire of Carnarvon and Department of Agriculture and Food**

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# 1. Introduction

This report presents the findings of a Level 2 flora and vegetation survey undertaken for the Gascoyne Food Bowl Initiative.

## 1.1 Background

The Department of Agriculture and Food, Western Australia (DAFWA) and the Shire of Carnarvon (the Shire) have secured funding from the Western Australian State Government's *Royalties for Regions* to implement the Gascoyne Food Bowl Initiative which will increase horticultural production in the area by an additional 400 hectares, matched with borefield development.

Part of the initiative involves the introduction of a Special Control Area (SCA) to the Shire of Carnarvon District Zoning Scheme 11 to provide for subdivision and development control within the SCA boundary. The proposed SCA will involve the rezoning of approximately 594.8 ha of land from 'Rural' to 'Intensive Horticulture' (LPS10 and LPS11 project areas, the 'project area') within the survey area (Figure 1).

The scheme amendment proposal included a Level 1 flora and vegetation survey undertaken by Western Botanical in 2013 and was submitted to the Western Australian Environmental Protection Authority (EPA) for assessment under Part IV Division 3 of the *Environmental Protection Act 1986* (EP Act). The EPA provided formal correspondence to the Shire on 4 April 2016, stating that the environmental impacts of the proposed scheme amendment are not so significant to warrant formal assessment under Part IV of the EP Act, providing the advice provided by the EPA is implemented. Part of the advice provided included a recommendation that a Level 2 flora and vegetation survey is undertaken within the survey area to inform the provisions of the SCA.

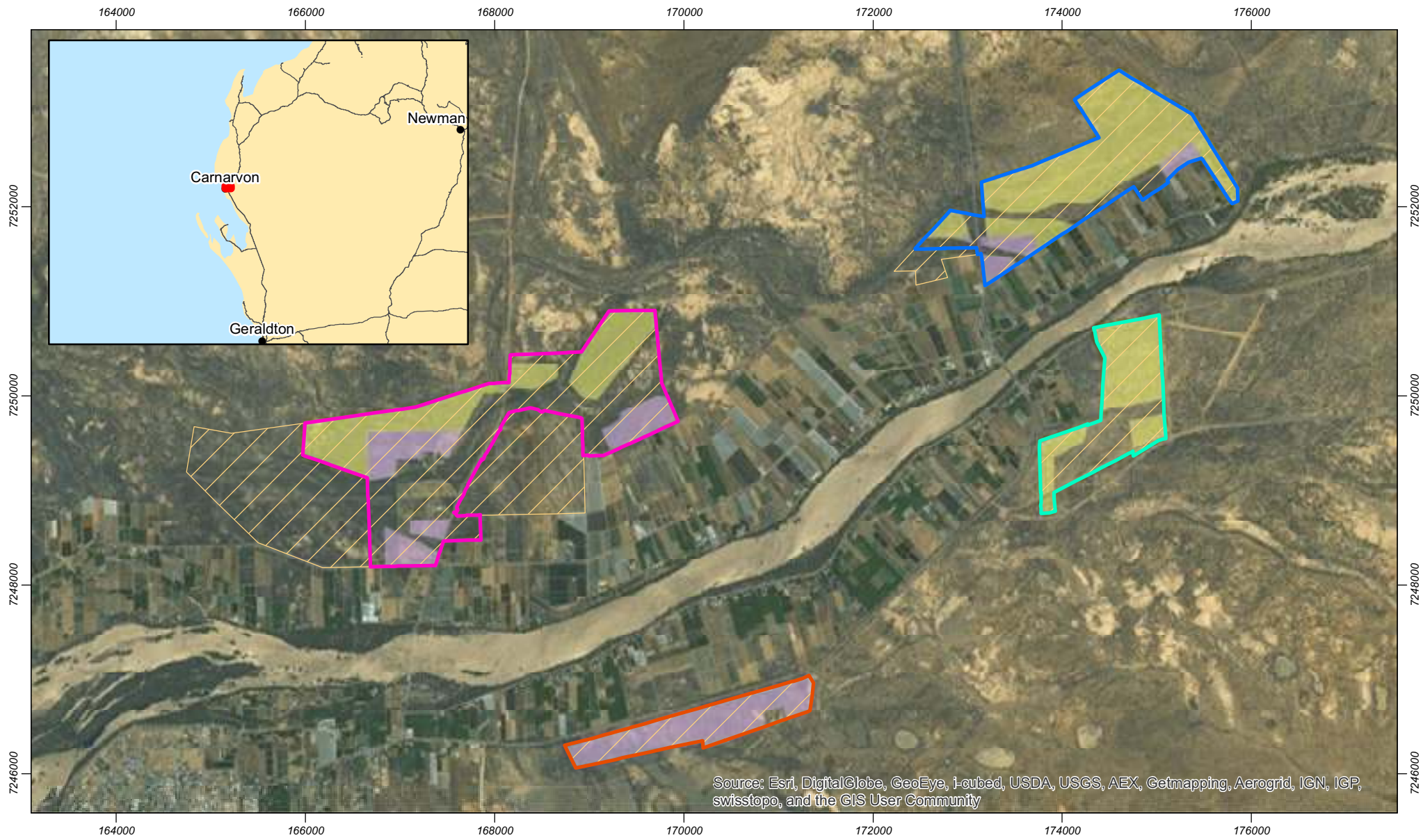
Strategen was subsequently commissioned to undertake the flora and vegetation survey.

## 1.2 Scope

The scope of this flora and vegetation survey was to undertake a desktop assessment and field assessment within the survey area (Figure 1).

The objectives were to:

- conduct a desktop survey for Threatened and Priority flora which have been identified as being present in or around the survey area
- collect and identify the vascular plant species present within the survey area
- search areas of suitable habitat for Threatened and/or Priority flora
- define and map the native vegetation communities present within the survey area
- map vegetation condition within the survey area
- provide recommendations on the local and regional significance of the vegetation communities
- prepare a report summarising the findings.



Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

**Figure 1: Survey area**

Scale 1:55,643 at A4  
 0 300 600 900 1,200 1,500 m



Coordinate System: GDA 1994 MGA Zone 50  
 Note that positional errors may occur in some areas  
 Date: 20/02/2017  
 Author: JCrute  
 Source: Aerial image: ESRI, approx. 2012.

**Legend**

- |        |                      |                    |
|--------|----------------------|--------------------|
| Area D | Special Control Area | LPS10 project area |
| Area B | Area E               | LPS11 project area |
| Area C |                      |                    |





## 2. Context

### 2.1 Legislative context

This biological survey has been conducted with reference to the following Australian and Western Australian legislation:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) – Australian Government
- *Wildlife Conservation Act 1950* (WC Act) – State
- *Environmental Protection Act 1986* (EP Act) – State
- *Biosecurity and Agriculture Management Act 2007* (BAM Act) – State.

#### 2.1.1 Conservation significant flora and ecological communities

Conservation significant flora and ecological communities are determined at a state and federal legislative level. Threatened species are listed under the EPBC Act at the Australian Government level and under the WC Act at the State level (Appendix 1). Priority species are listed by the Department of Parks and Wildlife (Parks and Wildlife) and include species of 'significant conservation value' (Appendix 1).

Threatened Ecological Communities (TECs) are listed under both the EPBC Act and EP Act (Appendix 1). Priority Ecological Communities (PECs) are listed by Parks and Wildlife and include species of significant conservation value (Appendix 1).

#### 2.1.2 Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are protected under the EP Act, and include the following:

- World Heritage areas
- areas included on the National Estate Register
- defined wetlands and associated buffers
- vegetation within 50 m of a listed Threatened species
- TECs.

#### 2.1.3 Protection of native vegetation

Native vegetation is defined under the EP Act as "indigenous aquatic or terrestrial vegetation, and includes dead vegetation unless that dead vegetation is of a class declared by regulation to be excluded from this definition but does not include vegetation in a plantation".

This definition of native vegetation does not include vegetation that was intentionally sown, planted or propagated unless either of the following applies:

- (a) the vegetation was sown, planted or propagated as required under the EP Act or another written law
- (b) the vegetation is declared to be native under Regulation 4 of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*.

Regulation 4 prescribes the kinds of intentionally planted indigenous vegetation that are “native vegetation” and which therefore require a clearing permit or exemption to clear and includes:

- (a) planting that was funded (fully or partly)
  - i. by a person who was not the owner of the land
  - ii. for the purpose of biodiversity conservation or land conservation
- (b) intentionally planted vegetation that has one of the following:
  - i. a conservation covenant or agreement to reserve under section 30B of the *Soil and Land Conservation Act 1945*
  - ii. a covenant to conserve under section 21A of the *National Trust of Australia (WA) Act 1964*
  - iii. restrictive covenant to conserve under section 129B of the *Transfer of Land Act 1983*
  - iv. some other form of binding or undertaking to establish and maintain, or maintain, the vegetation.

Native vegetation can only be cleared with a clearing permit, unless for some circumstances where exemptions apply pursuant to the EP Act and the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (the Regulations). Clearing permits issued pursuant to the Regulations may be issued as area permits or purpose permits. Exemptions for clearing under Regulation 5 of the Regulations do not apply within ESAs.

#### 2.1.4 Introduced species

The BAM Act provides for management and control of listed organisms, including introduced flora species (weeds). Species listed as declared pests under the BAM Act are classified under three categories:

- C1 Exclusion: Pests assigned under this category are not established in Western Australia, and control measures are to be taken to prevent them entering and establishing in the State
- C2 Eradication: Pests assigned under this category are present in Western Australia in low enough numbers or in sufficiently limited areas that their eradication is still a possibility
- C3 Management: Pests assigned under this category are established in Western Australia, but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size or density or moving from an area in which it is established into an area that is currently free of that pest.

Under the BAM Act, land managers are required to manage populations of declared pests as outlined under the relevant category.

## 2.2 Environmental setting

### 2.2.1 Soils and topography

The survey area is located within Carnarvon region of the *Interim Biogeographic Region of Australia* (IBRA). At a finer scale, the survey area is located within the Carnarvon 2 (CAR 2 – Wooramel subregion) bioregion which is described by Desmond & Chant (2002) as encompassing the southern and central parts of the Carnarvon Basin. This bioregion contains alluvial plains associated with downstream sections and deltas of the Gascoyne, Minilya and Wooramel Rivers as well as Lake MacLeod and the Kennedy Range. Tree to shrub steppe over hummock grasslands on and between aeolian red sand dunefields are extensive in the north and east of the bioregion as well as on top of Kennedy Range, while Permian sediments are common in northern parts. Southern areas comprise limestone plateaux overlain by red sand plains.

### 2.2.2 Climate

The Carnarvon locality experiences a seasonally arid climate, tending towards bimodal rainfall (Desmond & Chant 2002). The nearest Bureau of Meteorology (BoM) weather station at Carnarvon Airport (Station No. 6011) provides average monthly climate statistics for the Carnarvon locality (Figure 2). Average annual rainfall recorded at Carnarvon since 1945 is 224.6 mm (BoM 2017). Rainfall may occur at any time of year; however, most occurs in winter. Highest temperatures occur between December and April, with average monthly maximums ranging from 29.1°C in April to 32.6°C in February (BoM 2016). Lowest temperatures occur between June and August, with average monthly minimums ranging from 10.9°C in July to 12.3°C in June (BoM 2017).

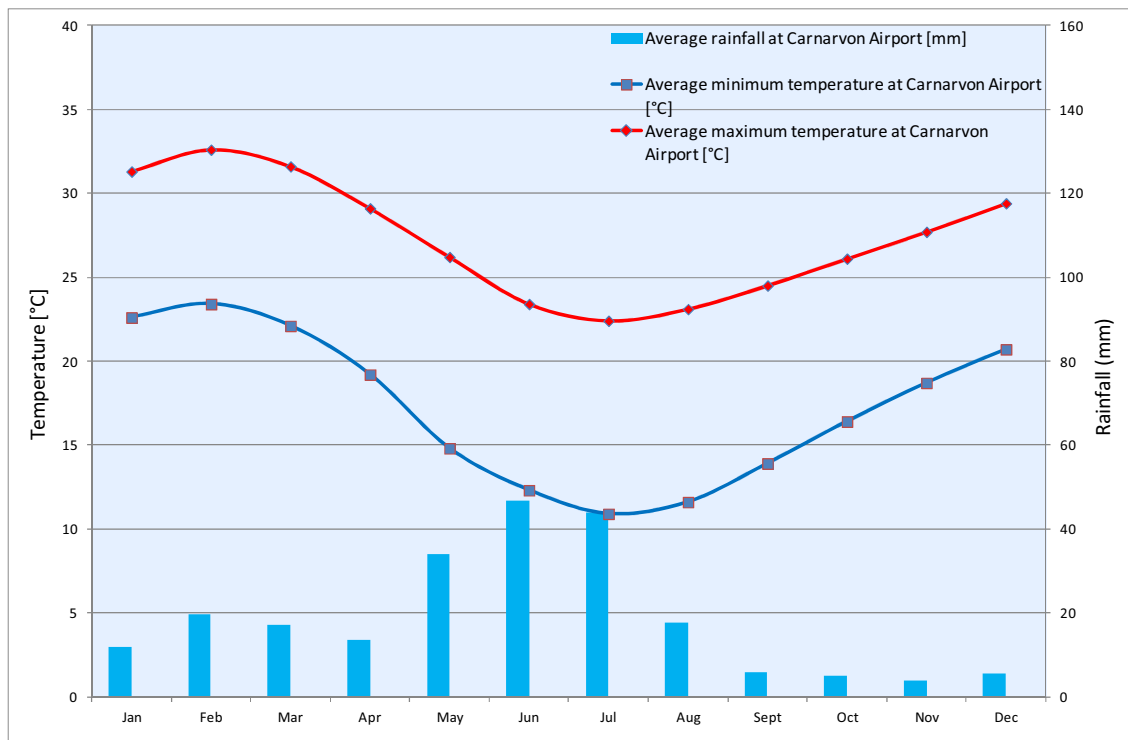


Figure 2: Mean monthly climatic data (temperature and rainfall) for Carnarvon Airport

### 2.2.3 Regional vegetation

Vegetation occurring within the region was initially mapped at a broad scale (1:1 000 000) by Beard during the 1970s. This dataset has formed the basis of several regional mapping systems, including physiographic regions defined by Beard (1976) which led to the delineation of botanical districts as described in Beard (1990) and the biogeographical region dataset (i.e. IBRA) for Western Australia (DEE 2016a).

#### *Beard (1990) Botanical Subdistrict*

The survey area occurs within the Carnarvon Botanical District which is characterised by Acacia scrub and low woodlands becoming tree and shrub steppe in the north, and with halophytes along the lower river courses (Beard 1990).

#### *IBRA subregion*

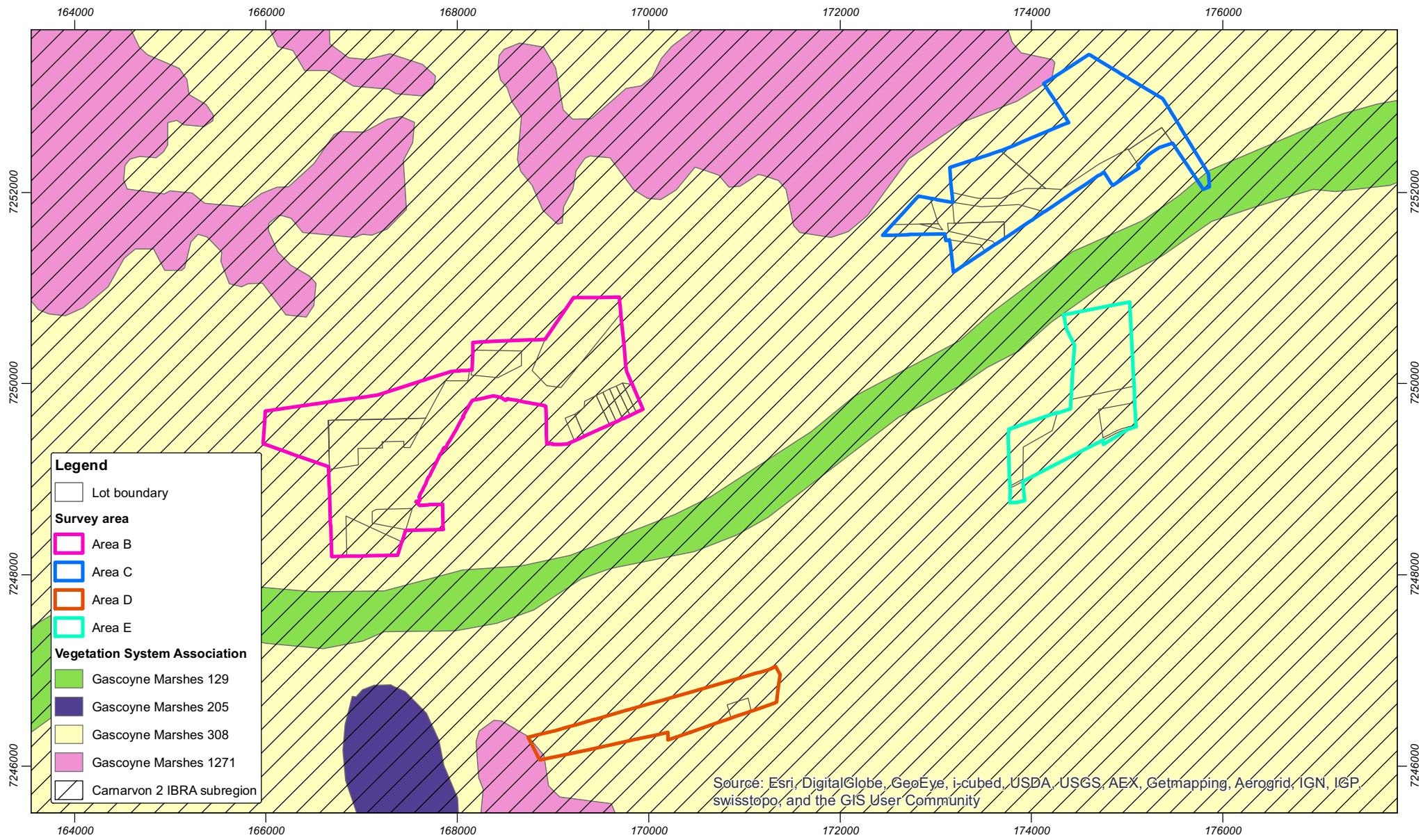
IBRA describes a system of 85 'biogeographic regions' (bioregions) and 403 subregions covering the entirety of the Australian continent (Thackway & Cresswell 1995). Bioregions are defined on the basis of climate, geology, landforms, vegetation and fauna.

The survey area occurs within the Carnarvon 2 (CAR 2 – Wooramel subregion) region which is typically comprised of Acacia shrublands (e.g. Mulga, Bowgada and *A. coriacea*) over bunch grasses on red sandy ridges and plains. Mangroves occur within the bioregion; however are confined to small areas around Lake MacLeod and near Carnarvon. Saline alluvial plains with samphire and saltbush low shrublands also occur in near-coastal areas (Desmond & Chant 2002).

#### *Vegetation system association mapping*

The survey area falls within the Gascoyne Marshes vegetation system association as defined in Government of Western Australia (2015):

- Gascoyne Marshes 129: Bare areas; dune sand
- Gascoyne Marshes 308: Mosaic: Shrublands; *Acacia sclerosperma* sparse scrub / Succulent steppe; saltbush and bluebush
- Gascoyne Marshes 1271: Bare areas; claypans.



**Legend**

- Lot boundary
- Survey area**
- Area B
- Area C
- Area D
- Area E
- Vegetation System Association**
- Gascoyne Marshes 129
- Gascoyne Marshes 205
- Gascoyne Marshes 308
- Gascoyne Marshes 1271
- Camarvon 2 IBRA subregion

Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

**Figure 3: Regional vegetation mapping**

Scale 1:55,000 at A4

Coordinate System: GDA 1994 MGA Zone 50  
 Note that positional errors may occur in some areas  
 Date: 20/02/2017  
 Author: JCrute  
 Source: Aerial image: ESRI, approx. 2012.



## 3. Methods

### 3.1 Desktop assessment

A desktop assessment was conducted using Florabase, Parks and Wildlife, and Department of Environment and Energy (DEE) databases to identify the possible occurrence of TECs, PECs and Threatened and Priority flora potentially occurring within the survey area (Appendix 2). The Level 1 flora and vegetation report prepared by Western Botanical (Western Botanical 2013) was also reviewed prior to the field assessment.

### 3.2 Field assessment

The field survey was conducted according to standards set out in Guidance Statement 51 (EPA 2004). The assessment of flora and vegetation within the survey area was undertaken by four ecologists between 17-20 October 2016. Table 1 identifies staff involved in the field surveys, their role and qualifications. The survey area was traversed on foot to record changes in vegetation structure and type and 35 vegetation quadrats, encompassing 30 m x 30 m were surveyed to identify vegetation types (Appendix 3; Appendix 4).

Table 1: Personnel

Name	Role
Mr. D. Panickar Strategen (Lead Ecologist)	Planning, fieldwork, data interpretation and report preparation
Ms. C. Courtauld Strategen (Ecologist)	Planning, fieldwork, data interpretation and report preparation
Mr. S. Hitchcock Maia Environmental Consultancy (Director / Botanist)	Planning, fieldwork, data interpretation and report preparation
Rochelle Haycock Maia Environmental Consultancy (Botanist)	Planning, fieldwork, data interpretation and report preparation

Site selection for vegetation mapping was based on differences in structure and species composition of the communities present within the survey area. Vegetation mapping sites were determined from aerial photographs. The survey area was traversed on foot, allowing for opportunistic sites to be placed where a change in vegetation structure or composition was observed.

Flora and vegetation was described and sampled systematically at each quadrat and additional opportunistic collecting was undertaken wherever previously unrecorded plants were observed. At each site the following floristic and environmental parameters were noted:

- GPS location
- topography
- soil type and colour
- outcropping rocks and their type
- percentage cover and average height of each vegetation stratum.

For each vascular plant species, the average height, number of plants and percent cover were recorded.

All plant specimens collected during the field surveys were identified using appropriate reference material or through comparisons with pressed specimens housed at the Western Australian Herbarium where necessary. Nomenclature of the species recorded is in accordance with Western Australian Herbarium (1998-).

### 3.3 Data analysis and vegetation mapping

#### *Pattern analysis*

A number of different pattern analyses were carried out on the data collected from quadrats in the survey area. Prior to carrying out the analyses, annual, weed and singleton species were removed from the data. Version 3.12 of the multivariate statistical analysis package PATN (Belbin, 1989; Belbin, 2004) was used to analyse the data. The statistical analyses included using only species presence and absence data and then presence and absence and cover data. Two different association measures, Bray-Curtis and Kulczynski, were used in each analysis for each of the species data types and four separate analyses were carried out to define the floristic communities of the survey area.

#### *Indicator Species Analysis*

After carrying out the pattern analyses and defining the floristic communities an indicator species analysis was run on the quadrat data. PC-Ord (McCune & Mefford, 2010) was used selecting the Dufrene and Legendre (1997) analysis option to determine indicator species for each community. Indicator species are considered to be those species with a high observed indicator value (Dai, Page & Duffy, 2006).

Indicator values are obtained by combining the relative abundances and relative frequencies of the species occurring in each community/association. A Monte Carlo Permutation Test was used to determine the significance of the observed indicator value (maximum) for each species, based on 1,000 randomisations.

Species with a 100% observed indicator value and a p value of  $\leq 0.05$  are considered to be perfect indicator species. Species with an observed indicator value of 80% - 99% and a p value of  $\leq 0.05$  are considered to be high indicator species. Species with an observed indicator value of 50% to 79% and a p value  $\leq 0.05$  are considered to be moderate indicator species. Species with an observed indicator value of  $> 30\%$  to 49% and p value of  $\leq 0.05$  are considered to be low indicator species. Species with an observed indicator value of  $\leq 30\%$  and a p value of  $\leq 0.05$  are considered to be poor indicator species. Those species with a p value  $\geq 0.05$  are not considered to be indicator species.

#### *Species Accumulation Curve*

A Species Accumulation Curve was generated for the data collected from quadrats using the software package EstimateS and the methodology outlined in Colwell (2006). The results of the species accumulation analysis are used to estimate the percentage of the flora of the area that was sampled. This estimate is calculated using the last Sobs (Mao Tau) result divided by the last Chao2 Mean listed in the results table (where: Sobs is the total number of species observed in a sample or set of samples; Sobs (Mao Tau) is the number of samples expected in the pooled quadrat samples given the empirical data; and, the Chao2 Mean is the Chao2 richness estimator (mean among runs) (Colwell, 2006)). By dividing the species richness observed (Sobs [Mao Tau]) by the species richness predicted (Chao2 Mean) the sampling effort can be estimated.

#### *Vegetation mapping*

The results of the pattern analysis carried out on quadrat data were used to define floristic communities while the growth form, height classes and cover characteristics of dominant species were used to describe the vegetation types of the survey area. Vegetation types are described using the current National Vegetation Information System (NVIS) methodology at the association level (Level 5). At this level up to three strata and a maximum of three taxa per stratum are used to describe the vegetation type (ESCAVI, 2003). The NVIS structural formation terminology is outlined in Appendix 4; it utilises growth forms, height classes and foliage cover characteristics.

Vegetation descriptions included in the site sheets (Appendix 3) use the sub-association level (Level 6), where up to eight sub-strata and a maximum of five taxa per stratum are used to describe the subassociation (ESCAVI, 2003).

Bing aerial photography mosaic (Microsoft Corporation, 2016) captured between December 2009 and July 2014 was used to map the vegetation in ArcGIS 10.2.2. A standard scale was not used while mapping the vegetation and the finest scale used was approximately 1:500 for small discreet areas and 1:5,000 at the broadest scale for larger and more widespread areas.

Vegetation condition was mapped using data collected from quadrats, notes recorded while walking traverses and from Bing aerial photography. Field assessments of vegetation condition were updated as necessary once the plant identifications had been confirmed and the number, ecological impact and invasiveness ratings of any weed species located had been determined (Parks and Wildlife 2016b). The vegetation condition scale used is that for the Eremaean and Northern Botanical Provinces indicated in EPA and Parks and Wildlife (2015) and shown in Table 2.

Table 2: Vegetation condition scale (EPA and DPaW, 2015)

Vegetation Condition	Eremaean and Northern Botanical Provinces
1	
2	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
3	Some relatively slight signs of damage caused by human activities since European settlement. For example some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds or occasional vehicle tracks.
4	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
5	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
6	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
7	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.

### *Significance ratings*

The following attributes were considered in the assessment of local conservation significance of the vegetation types (VTs) mapped: the cover of each VT mapped, the percentage of the VT surveyed, the number of CSF species located in the VT, the number of weed species recorded in the VT, the dominant condition of the vegetation of the VT, whether the VT occurs outside the survey area, and any other attributes that could increase the significance of the VT (e.g. whether the VT could be a GDE, dependent on surface flow or runoff or is described as an Environmentally Sensitive Area [ESA]). The attributes and scoring system used to assess the local significance of the VTs mapped in the survey area are listed in Appendix 5.

## 3.4 Survey limitations and constraints

Table 3 displays the evaluation of the flora and vegetation assessment against a range of potential limitations that may have an effect on that assessment. Based on this evaluation, the assessment has not been subject to constraints that would affect the thoroughness of the assessment and the conclusions reached.



Table 3: Flora and vegetation survey potential limitations and constraints

Potential limitation	Impact on assessment	Comment
Sources of information and availability of contextual information (i.e. pre-existing background versus new material).	<b>Not a constraint.</b>	The survey has been undertaken in the Carnarvon region which has been well studied and documented with ample literature available (Beard 1990). Additionally, the survey area was subject to a Level 1 flora and vegetation survey in 2013 which contains site specific information pertaining to flora and vegetation (Western Botanical 2013).
Scope (i.e. what life forms, etc., were sampled).	<b>Not a constraint.</b>	Due to the degraded nature and uniform distribution of vegetation within the survey area and timing of the survey (i.e. spring); most life forms are likely to have been sampled adequately during the time of the survey.
Proportion of flora/fauna collected and identified (based on sampling, timing and intensity).	<b>Not a constraint.</b>	The proportion of flora surveyed was adequate. The entire survey area was traversed and flora species were recorded systematically.
Completeness and further work which might be needed (i.e. was the relevant survey area fully surveyed).	<b>Not a constraint</b>	The information collected during the survey was sufficient to assess the vegetation that was present during the time of the survey.
Mapping reliability.	<b>Not a constraint.</b>	Aerial photography of a suitable scale was used to map the survey area and identify potential fauna habitat. Sites were chosen from these aerials to reflect changes in community structure. Opportunistic sites were also used if differences were observed during on ground reconnaissance. Vegetation types were assigned to each site based on topography, soil type and presence/absence and percent foliage cover of vegetation.
Timing, weather, season, cycle.	<b>Not a constraint.</b>	Flora and vegetation surveys are normally conducted 6-8 weeks post west season in the Eremaean Province (i.e. surveys should be undertaken in August-September). The field assessment was conducted in October (i.e. spring) in fine weather conditions. While the survey was conducted slightly later than recommended, annual species were still present and able to be identified in most cases, therefore this factor is not considered to be a constraint.
Disturbances (fire flood, accidental human intervention, etc.).	<b>Not a constraint.</b>	The survey area and regional surrounds have been subject to disturbance over a significant period of time. Given the wide range of this disturbance, this is not considered to be a limitation within the survey area.
Intensity (in retrospect, was the intensity adequate).	<b>Not a constraint.</b>	The survey area was traversed on foot and all differences in vegetation structure were recorded appropriately.
Resources (i.e. were there adequate resources to complete the survey to the required standard).	<b>Not a constraint.</b>	The available resources were adequate to complete the survey.
Access problems (i.e. ability to access survey area).	<b>Not a constraint.</b>	Existing tracks enabled adequate access to survey the vegetation and fauna within the survey area. Where access was not available by car, the area was easily traversed by foot.
Experience levels (e.g. degree of expertise in species identification to taxon level).	<b>Not a constraint.</b>	All survey personnel have the appropriate training in sampling and identifying the flora of the region.

## 4. Results

### 4.1 Desktop assessment results

A total of 386 native vascular plant taxa from 63 plant families have the potential to occur within the survey area (Parks and Wildlife 2007-; DEE 2016c). The majority of taxa were from within the Fabaceae (56 taxa), Chenopodiaceae (48 taxa) and Asteraceae (48 taxa) families (Appendix 2).

#### 4.1.1 Threatened and Priority flora

A desktop survey for Threatened and Priority flora that may potentially occur within the survey area was undertaken using NatureMap (Parks and Wildlife 2007-), the Western Australian Herbarium (Western Australian Herbarium 1998-), and the DEE Protected Matters Search Tool (DEE 2016c).

Flora within Western Australia that is considered to be under threat may be classed as either Threatened flora or Priority flora. Where flora has been gazetted as Threatened flora under the WC Act, the taking of such flora without the written consent of the Minister is an offence. The WC Act defines “to take” flora as to gather, pluck, cut, pull up, destroy, dig up, remove or injure the flora or to cause or permit the same to be done by any means. Parks and Wildlife (2015) contains the current list of Threatened flora in Western Australia.

Priority flora are considered to be species which are potentially under threat, but for which there is insufficient information available concerning their distribution and/or populations to make a proper evaluation of their conservation status. Parks and Wildlife categorises Priority flora according to their conservation priority using five categories, P1 (highest conservation significance) to P5 (lowest conservation significance), to denote the conservation priority status of such species. Priority flora species are regularly reviewed and may have their priority status changed when more information on the species becomes available. Appendix 1 defines levels of Threatened and Priority flora (Western Australian Herbarium 1998-).

At the national level, the EPBC Act lists Threatened species as extinct, extinct in the wild, critically endangered, endangered, vulnerable, or conservation dependent. Appendix 1 defines each of these categories of Threatened species. The EPBC Act prohibits an action that has or will have a significant impact on a listed Threatened species without approval from the Australian Government Minister for the Environment. The current EPBC Act list of Threatened flora may be found on the DEE (2016d) website.

Table 4 shows the Threatened and Priority flora potentially occurring within the survey area. The desktop assessment identified one Threatened flora and eight Priority flora species that have been recorded in the regional area. Of these, based on specific habitat requirements, one Threatened flora species and eight Priority flora species were considered to have the potential to occur within the survey area.

Western Botanical (2013) identified *Gnephosis* sp. Billabong (P 1) as highly likely to occur within the survey area. This species has since been renamed to *Gnephosis gynotricha* and removed from the Priority species list, and is no longer considered to be of conservation significance.

Table 4: Threatened and Priority flora potentially occurring within the survey area

Species	Conservation status		Description	Potential to occur
	EPBC Act	WC Act		
<i>Tecticornia bulbosa</i>	<b>Threatened - Vulnerable</b>	Threatened	A low sprawling shrub growing to 1 m high by 1-3 m in diameter. The spreading branches consist of barrel-shaped segments (known as 'articles') about 15 mm long and 12 mm wide, which are coated with a thick waxy powder. The articles are hairless and pale blue or pink. The lateral flowering spikes, which are up to 20 mm long, are stalkless with opposite bracts that are united and have wavy edges. The hermaphroditic flowers are arranged in groups of three. Flowering occurs in June. The outer floral whorl is united and has succulent side walls, but is otherwise thin, hard and brittle. The tip is flattened and divided into two lateral lobes. The fruiting spike is dark brown and persistent. Enclosing the fruitlets are cup-shaped leathery bracts. The fruitlets are partially spiny and eventually become free from one another and from the bracts. The seeds produced by this shrub are smooth and pale brown. Habitat for this species includes saline sandy clay or red/brown loam (Western Australian Herbarium 1998-, DotE 2015d).	<b>Possible</b> – Preferred soil type/habitat occurs within the survey area
<i>Abutilon</i> sp. Pritzelianum (S. van Leeuwen 5095)	Not listed	Priority 1	No information is available on this species.	<b>Undeterminable</b> – Limited information is available on this species – may occur
<i>Myriocephalus nudus</i>	Not listed	Priority 1	An annual, herb, growing to 0.2 m tall. Flowers are yellow, occurring in January or April to November. Habitat for this species includes moist areas, along rivers and creeks and granite outcrops (Western Australian Herbarium 1998-).	<b>Possible</b> – Preferred soil type/habitat occurs within the survey area
<i>Schoenia filifolia</i> subsp. <i>arenicola</i>	Not listed	Priority 1	An erect, single-stemmed annual, herb growing to 0.5 m tall. Flowers are yellow, occurring from August to September. Habitat for this species includes sand and red clay on sub-coastal sand ridges (Western Australian Herbarium 1998).	<b>Possible</b> – Preferred soil type/habitat occurs within the survey area
<i>Atriplex spinulosa</i>	Not listed	Priority 1	A monoecious, erect, rounded annual herb, growing up to 0.2 m tall.	<b>Undeterminable</b> – Limited information is available on this species – may occur
<i>Acacia ryaniana</i>	Not listed	Priority 2	A prostrate, straggly or domed, spinescent shrub, 0.1-0.4 m tall. Flowers are yellow, occurring from June to November. Habitat for this species includes white or red sand on coastal sand dunes (Western Australian Herbarium 1998).	<b>Unlikely</b> – Preferred soil type/habitat does not occur within the survey area
<i>Chthonocephalus tomentellus</i>	Not listed	Priority 2	A prostrate to ascending annual herb. Flowers are yellow, occurring from August to November. Habitat for this species includes red sand on undulating plains, sand dunes, and near saline depressions (Western Australian Herbarium 1998).	<b>Possible</b> – Preferred soil type/habitat occurs within the survey area
<i>Rumex crystallinus</i>	Not listed	Priority 2	An annual herb, 0.06-0.4 m tall. Flowering occurs in August and November. Habitat for this species includes arid and semi-arid areas (Western Australian Herbarium 1998).	<b>Possible</b> – Preferred soil type/habitat occurs within the survey area
<i>Sporobolus blakei</i>	Not listed	Priority 3	A tufted perennial, grass-like or herb, 0.45-0.6 m tall. Flowers are green-purple, occurring in March or June to July. Habitat for this species includes red sandy clay and loam and creeks (Western Australian Herbarium 1998).	<b>Possible</b> – Preferred soil type/habitat occurs within the survey area

#### 4.1.2 Threatened and Priority Ecological Communities

A TEC is defined under the EP Act as an ecological community listed, designated or declared under a written law or a law of the Australian Government as Threatened, Endangered or Vulnerable. There are four State categories of TECs (DEC 2010)<sup>1</sup>:

- presumed totally destroyed (PD)
- critically endangered (CR)
- endangered (EN)
- vulnerable (VU).

A description of each of these TEC categories is presented in Appendix 1. TECs are gazetted as such (Parks and Wildlife 2015a) and some Western Australian TECs listed by Parks and Wildlife (2015c) are also listed as Threatened under the EPBC Act.

Under the EPBC Act, a person must not undertake an action that has or will have a significant impact on a listed TEC without approval from the Australian Government Minister for the Environment, unless those actions are not prohibited under the EPBC Act. A description of each of these categories of TECs is presented in Appendix 1. The current EPBC Act list of TECs can be located on the DEE (2016e) website.

Ecological communities identified as Threatened, but not listed as TECs, are classified as Priority Ecological Communities (PECs). These communities are under threat, but there is insufficient information available concerning their distribution to make a proper evaluation of their conservation status. Parks and Wildlife categorises PECs according to their conservation priority, using five categories, P1 (highest conservation significance) to P5 (lowest conservation significance), to denote the conservation priority status of such ecological communities. Appendix 1 defines PECs (DEC 2010). Parks and Wildlife (2016) contains a list of current PECs.

One TEC (*Subtropical and Temperate Coastal Saltmarsh* – Vulnerable [EPBC Act]) and no PECs were identified as having the potential to occur within 5 km of the survey area by the desktop survey. This TEC is located approximately 4 km to the west of Area B.

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<sup>1</sup>The Department of Environment and Conservation is still listed as the author of all TEC and PEC databases and have been referred to as such in this document instead of the Department of Parks and Wildlife (Parks and Wildlife).

## 4.2 Field survey results

### 4.2.1 Native flora

A total of 103 native vascular plant taxa from 68 plant genera and 29 plant families were recorded from quadrats within the survey area. The majority of taxa were recorded within the Chenopodiaceae (21 taxa) and Asteraceae (20 taxa) families (Appendix 3; Appendix 4). The relatively low number of plant genera recorded reflects the disturbed nature of the survey area.

### 4.2.2 Threatened and Priority flora

No Threatened flora species as listed under section 178 of the EPBC Act or pursuant to Schedule 1 of the WC Act and as listed by Parks and Wildlife (2015) were recorded within the survey area. One Priority flora species as listed by Western Australian Herbarium (1998-) was potentially recorded within the survey area. The species identification for *Corchorus congener* was unable to be confirmed due to lack of suitable flowering/fruitlet material, however it is highly likely that this is the species recorded within the survey area. Table 5 and Figure 4 display the species recorded and their locations within the survey area.

Western Botanical (2013) identified *Gnephosis* sp. Billabong (P 1) as highly likely to occur within the survey area. This species was recorded within the survey area, however has since been renamed to *Gnephosis gynotricha* and removed from the Priority species list, and is no longer considered to be of conservation significance.

Table 5: Locations of Threatened and Priority flora species recorded within the survey area

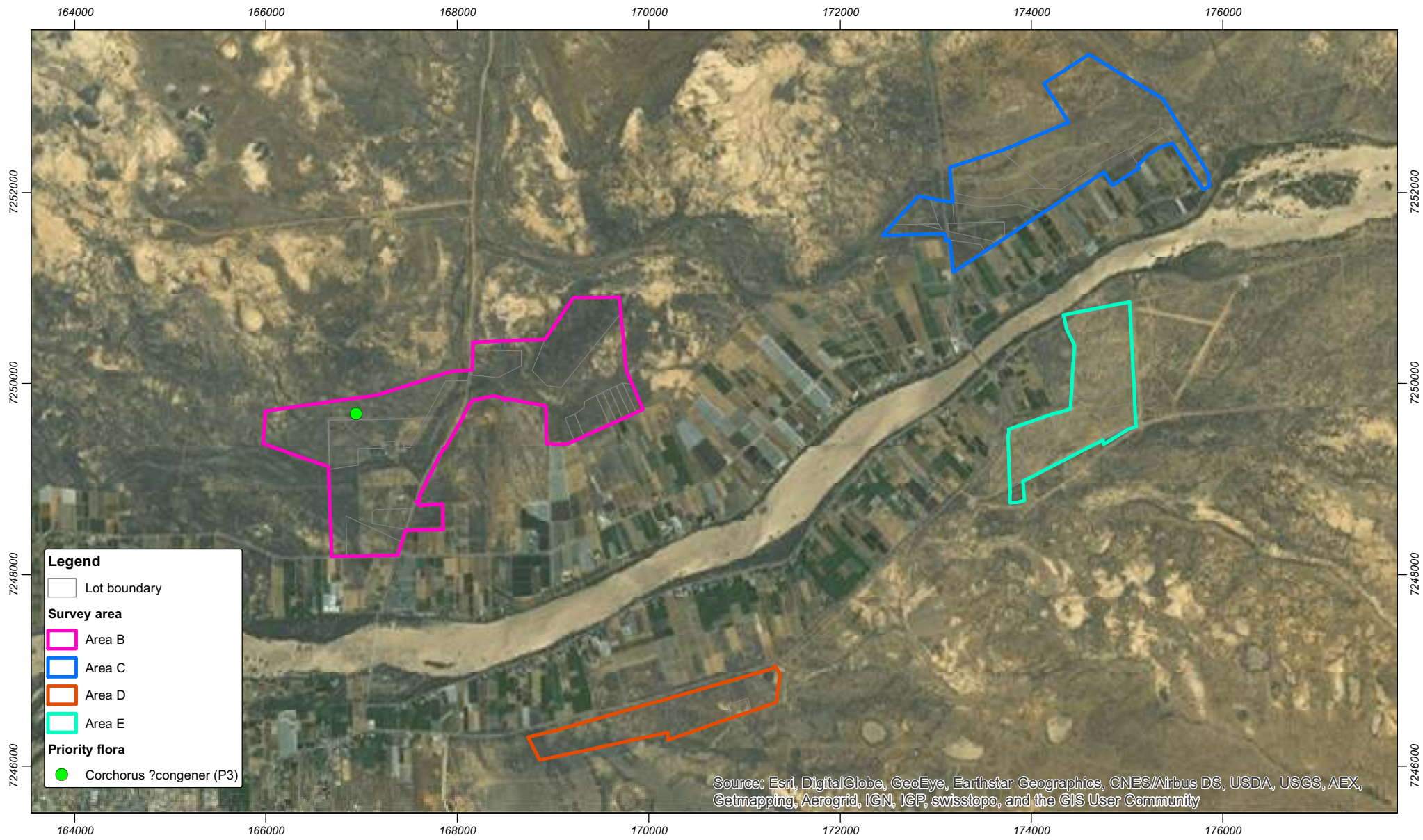
Species	Conservation status		GPS location (GDA 94)	
	EPBC Act	WC Act	Easting	Northing
<i>Corchorus ?congener</i>	Not listed	Priority 3	773411	7250999

### 4.2.3 Introduced (exotic) taxa

A total of 14 introduced (exotic) taxa were recorded within the survey area (Appendix 3; Appendix 4):

- *\*Asphodelus fistulosus*
- *\*Brassica rapa*
- *\*Cenchrus ciliaris*
- *\*Cenchrus setiger*
- *\*Chenopodium murale*
- *\*Chloris virgata*
- *\*Malvastrum americanum*
- *\*Medicago polymorpha*
- *\*Mesembryanthemum crystallinum*
- *\*Prosopis pallida*
- *\*Rumex vesicarius*
- *\*Sisymbrium erysimoides*
- *\*Sonchus oleraceus*
- *\*Vachellia farnesiana*.

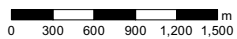
None of these species is a Declared Plant species in Western Australia pursuant to section 22 of the *Biosecurity and Agriculture Management Act 2007* (BAM Act) according to the Western Australian Department of Agriculture and Food (DAFWA 2016).



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

**Figure 4: Location of Priority Flora located within the survey area**

Scale 1:55,000 at A4



Coordinate System: GDA 1994 MGA Zone 50  
 Note that positional errors may occur in some areas  
 Date: 21/02/2017  
 Author: JCrute  
 Source: Aerial image: ESRI, approx. 2012.

#### 4.2.4 Accumulated species – sites surveyed (species-area curve)

The species-area curve (Figure 5), based on a species accumulation analysis of the 35 quadrats was used to evaluate the adequacy of sampling (Colwell 2013). The results of the analysis are presented in Appendix 4. The species accumulation analysis indicate that 71% of the flora estimated to be in the survey area were recorded when the 105 confirmed taxa recorded in the 35 quadrats assessed in the survey area were included in the analysis. However, this estimate does not include the 12 additional taxa recorded opportunistically and in the one relevé assessed.

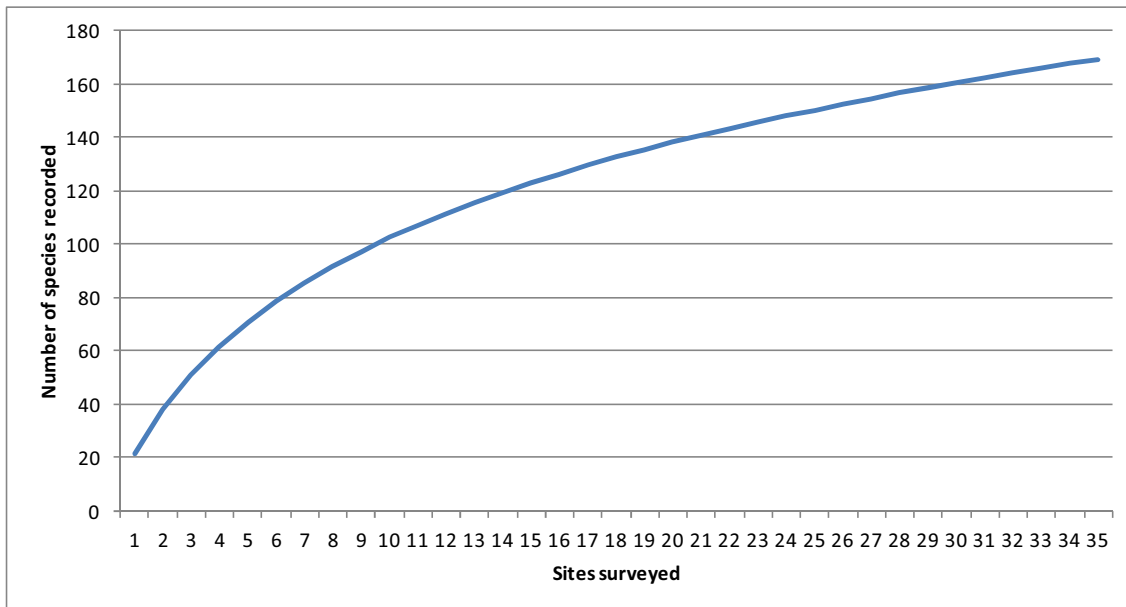


Figure 5: Averaged randomised Species Accumulation Curve

#### 4.2.5 Vegetation types

Six native vegetation types (VTs) were defined and mapped within the survey area (Appendix 3; Figure 6) and are summarised in Table 6. Areas containing vegetation in parkland cleared or highly degraded state have not been counted as unique native VTs but have been included in Table 6 for area calculation purposes. Total areas occupied within the survey area by each of the identified VTs are set out in Table 7.

Table 6: Vegetation Types

Vegetation Type	Description
ASL (1): <i>Acacia</i> Shrubland	Tall Sparse to Open Shrubland of <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> and / or <i>A. synchronicia</i> with a Sparse to Open Shrubland of <i>Rhagodia eremaea</i> and <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> and an Open Tussock Grassland of * <i>Cenchrus ciliaris</i> and / or <i>Chloris pumilio</i> .
ASL (2): <i>Acacia</i> Shrubland	Tall Sparse Shrubland of <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> and / or <i>A. synchronicia</i> with a Sparse Chenopod Shrubland of <i>Atriplex amnicola</i> and <i>A. semilunaris</i> and Sparse Tussock Grassland of * <i>Cenchrus ciliaris</i> .
EWL (3): <i>Eucalyptus</i> woodland	Low Woodland of <i>Eucalyptus victrix</i> with a Sparse Tall Shrubland of <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> and <i>Rhagodia eremaea</i> and an Open Tussock grassland of * <i>Cenchrus ciliaris</i> .
CSL (4): Chenopod shrubland	Low Open mixed Chenopod Shrubland ( <i>Atriplex holocarpa</i> , <i>A. amnicola</i> , <i>Threlkeldia diffusa</i> ).
CSL (5): Chenopod shrubland	Open Chenopod Shrubland of <i>Maireana polypterygia</i> with a mixed Low Sparse Chenopod Shrubland ( <i>Sclerolaena eurotioides</i> , <i>Atriplex codonocarpa</i> , <i>A. semilunaris</i> ) with a Low Open Forbland of <i>Tetragonia diptera</i> .
CDSL (6): <i>Chenopodium</i> and <i>Duma</i> shrubland	<i>Chenopodium</i> and <i>Duma</i> Shrubland Open Shrubland of <i>Chenopodium auricomum</i> and <i>Duma florulenta</i> with a Low Sparse mixed Tussock grassland ( <i>Eulalia aurea</i> , <i>Panicum decompositum</i> , <i>Sporobolus mitchellii</i> ) and +/- Isolated Low Trees of <i>Eucalyptus victrix</i> .
Cleared	Cleared areas.

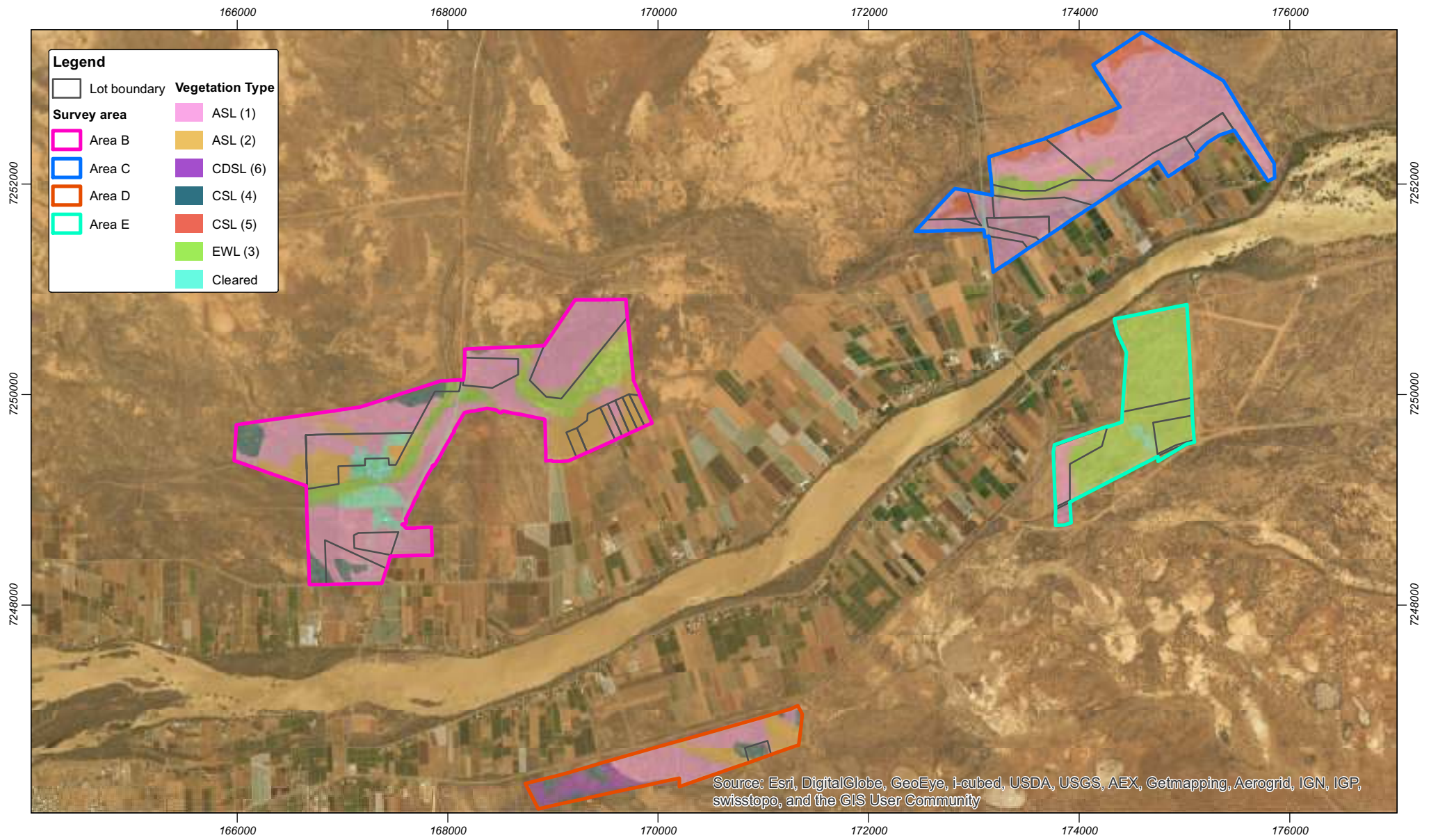
### Vegetation type coverage

The total area mapped within the survey area and project area was 878.49 ha and 594.76 ha, respectively, and which includes fully cleared areas (Table 7). The dominant native VT within the survey area was ASL (1) which can be broadly described as a 'Tall Sparse to Open Shrubland of *Acacia sclerosperma* subsp. *sclerosperma* and / or *A. synchronicia* with a Sparse to Open Shrubland of *Rhagodia eremaea* and *Alectryon oleifolius* subsp. *oleifolius* and an Open Tussock Grassland of \**Cenchrus ciliaris* and / or *Chloris pumilio*'.

Table 7: Area (ha) and percentage covered by each VT mapped within the survey area and project area

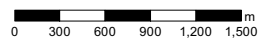
VT	Survey area		Project area			
	B, C, D and E		LPS10		LPS11	
	Area (ha)	% of the Survey area	Area (ha)	% of the project area	Area (ha)	% of the project area
ASL (1)	486.06	55.33	98.42	51.92	267.79	66.09
ASL (2)	78.35	8.92	49.51	26.12	10.33	2.55
EWL (3)	188.25	21.43	0.15	0.08	84.15	20.77
CSL (4)	35.92	4.09	14.02	7.40	14.03	3.46
CSL (5)	25.30	2.88	0.00	0.00	24.87	6.14
CDSL (6)	19.20	2.19	19.20	10.13	0.00	0.00
Cleared	45.41	5.16	8.27	4.35	4.02	0.99
<b>TOTAL</b>	<b>878.49</b>	<b>100.00</b>	<b>189.57</b>	<b>100.00</b>	<b>405.19</b>	<b>100.00</b>





**Figure 6: Vegetation Types (VTs) mapped within the survey area**

Scale 1:50,000 at A4



Coordinate System: GDA 1994 MGA Zone 50  
 Note that positional errors may occur in some areas  
 Date: 20/02/2017  
 Author: JCrute  
 Source: Aerial image: ESRI, approx. 2012.



#### 4.2.6 Vegetation condition

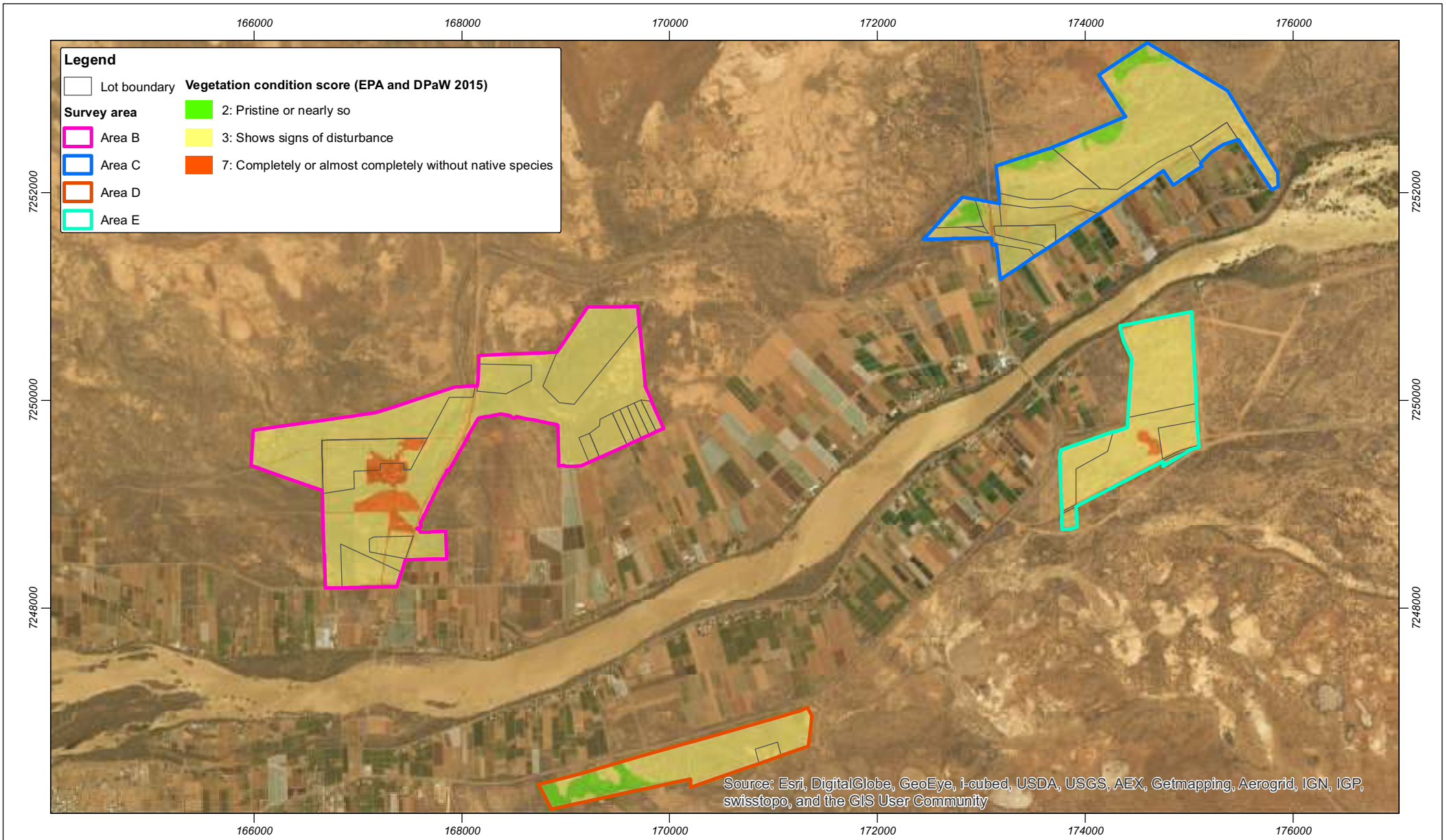
The survey area and project area show signs of having been degraded for a long period of time through historical clearing and grazing by livestock. As such, majority of the vegetation condition within the survey area is rated as 3 (vegetation structure altered) and the remainder (i.e. areas excluded or isolated from grazing) as 2 (pristine or nearly so); Figure 7; Figure 7).

Parks and Wildlife ranking of the weed species located in the quadrats were considered while assessing vegetation condition. Many of the weed species were widely distributed and dominant in some areas (e.g. \**Cenchrus ciliaris*) and most weed species were considered to have moderate to high ecological impact and rapid invasiveness according to the Parks and Wildlife Midwest assessment spreadsheet (Parks and Wildlife 2013).

Table 8 gives a numerical breakdown of the area occupied by each vegetation condition rating within the survey area and project area.

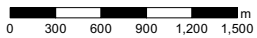
Table 8: Area (ha) and percentage covered by each vegetation condition category mapped within the survey area and project area

Vegetation Condition	Comment	Survey area		Project area			
		Area (ha)	% of the survey area	Area (ha) <u>LPS 10</u>	% of the project area <u>LPS 10</u>	Area (ha) <u>LPS 11</u>	% of the project area <u>LPS 11</u>
2 (pristine or nearly so)	Areas where there was little evidence of disturbance by feral animals or human activities were mapped as 2. The diversity and cover of weed species was lower than areas mapped as 3. This rating was consistent at quadrats on clay pans and loamy plains (chenopod shrublands) with less palatable plant species for feral animals to graze on and areas away from existing plantations and homesteads.	44.50	5.07	19.20	10.13	24.87	6.14
3 (vegetation structure altered)	The structure of vegetation in these areas was obviously altered from ongoing disturbance from feral animals or human activities. This was particularly evident in Area E where vegetation cover was visibly denser outside of the fenced lot boundaries. This is quite obvious when looking at aerial photographs. The cover and diversity of weed species in the areas mapped as 3 was higher than in those mapped as 2. There was often damage to individual taller shrubs from horses and other feral animals. Fenced cattle / horse yards along with old abandoned vehicles and general household rubbish were also recorded in these areas.	788.57	89.76	162.10	85.51	376.30	92.87
Cleared		45.42	5.17	8.27	4.36	4.02	0.99
<b>Total</b>		<b>878.49</b>	<b>100</b>	<b>189.57</b>	<b>100</b>	<b>405.19</b>	<b>100</b>



**Figure 7: Vegetation condition mapped within the survey area**

Scale 1:50,000 at A4



Coordinate System: GDA 1994 MGA Zone 50  
 Note that positional errors may occur in some areas  
 Date: 20/02/2017  
 Author: JCrute  
 Source: Aerial image: ESRI, approx. 2012.



### 4.3 Vegetation types and Beard Vegetation Associations

Three of Beard's vegetation associations (VAs) occur in the Study Area (129, 308 and 1271) and the VTs mapped in these VAs are listed in Table 9. There is some similarity between the species and cover of the shrubs in the VAs with the VTs mapped in the VAs. Two of the VTs do not match the description for any of the VAs mapped in the survey area (EWL (3) and CDSL (6)). Both contain *Eucalyptus victrix* as a tree layer and the three VAs mapped in the survey area do not contain *E. victrix*. Grey cells in Table 9 indicate where one or more of the species in Beard's description also occur in the mapped VTs. Differences reflect the different scales at which the vegetation was mapped, quality of aerial photographs available for the mapping and the sampling carried out by Beard in the survey area and surrounds.

Table 9: Beard vegetation associations and mapped vegetation types

VT	VA (NVIS Level 5) and Maia vegetation types mapped within them (indicated by an "x")		
	<b>129:</b> <i>Acacia sclerosperma</i> Sparse Shrubland.	<b>308:</b> <i>Acacia sclerosperma</i> , <i>Hakea preissii</i> and <i>Senna</i> sp. Sparse Shrubland.	<b>1271:</b> <i>Atriplex</i> sp., <i>Maireana</i> sp. mixed Sparse Chenopod Shrubland.
ASL (1)	x	x	
ASL (2)	x	x	
EWL (3)			
CSL (4)		x	x
CSL (5)		x	x
CDSL (6)			

Note: VT = mapped vegetation type, VA = Beard vegetation association, VA source = Department of Agriculture and Food Western Australia (DAFWA) (2012).

### 4.4 Threatened and Priority Ecological Communities

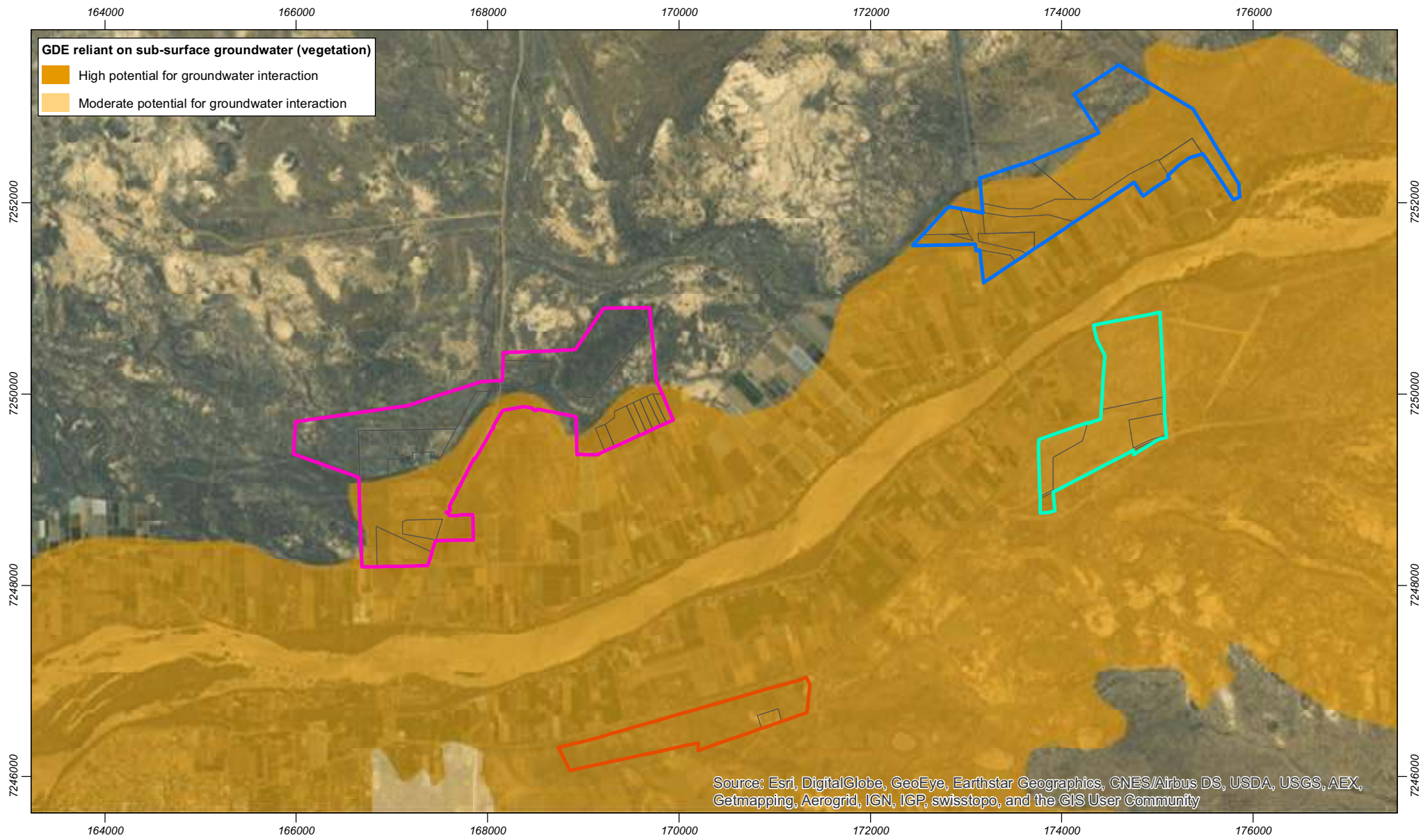
No TECs or PECs occur within the survey area and none of the VTs identified during the survey resemble the TECs or PECs listed in the Midwest bioregion.

### 4.5 Groundwater Dependent Ecosystems and Inflow Dependent Ecosystems

Some of the species that occur in VTs EWL (3) and CDSL (6), particularly the trees and larger shrubs, are likely to use groundwater at least some time during the year. The Bureau of Meteorology Groundwater Dependent Atlas indicates that the entire survey area has a high potential for groundwater interaction (BoM 2017) (Figure 8).

Figure 9 indicates that there is low potential for a GDE reliant on surface expression of groundwater (rivers, springs, wetlands) across the majority of the survey area except for some of the southern portion of Area E (those areas associated with the McNeil Claypans), which show a moderate potential.

As indicated in Figure 10, all of Area D, most of Areas C and E and the southern portion of Area B are highly likely to be Inflow Dependent Ecosystems (IDEs) while the remaining areas are likely to be IDEs. As the survey area lies on the Gascoyne River flood plains, all of the VTs are likely to be dependent on seasonal surface water from high rainfall events. Inflow dependence refers to areas that are wetter than surrounding areas either seasonally or permanently, because they receive water from inflows (e.g. surface water, soil water etc.) in addition to rainfall. While these ecosystems are not listed as conservation significant communities, they have the potential to be impacted by drawdown and should be considered in an environmental impact assessment if such activities are proposed.



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

**Figure 8: Groundwater Dependent Ecosystems (GDE) reliant on subsurface groundwater (vegetation)**

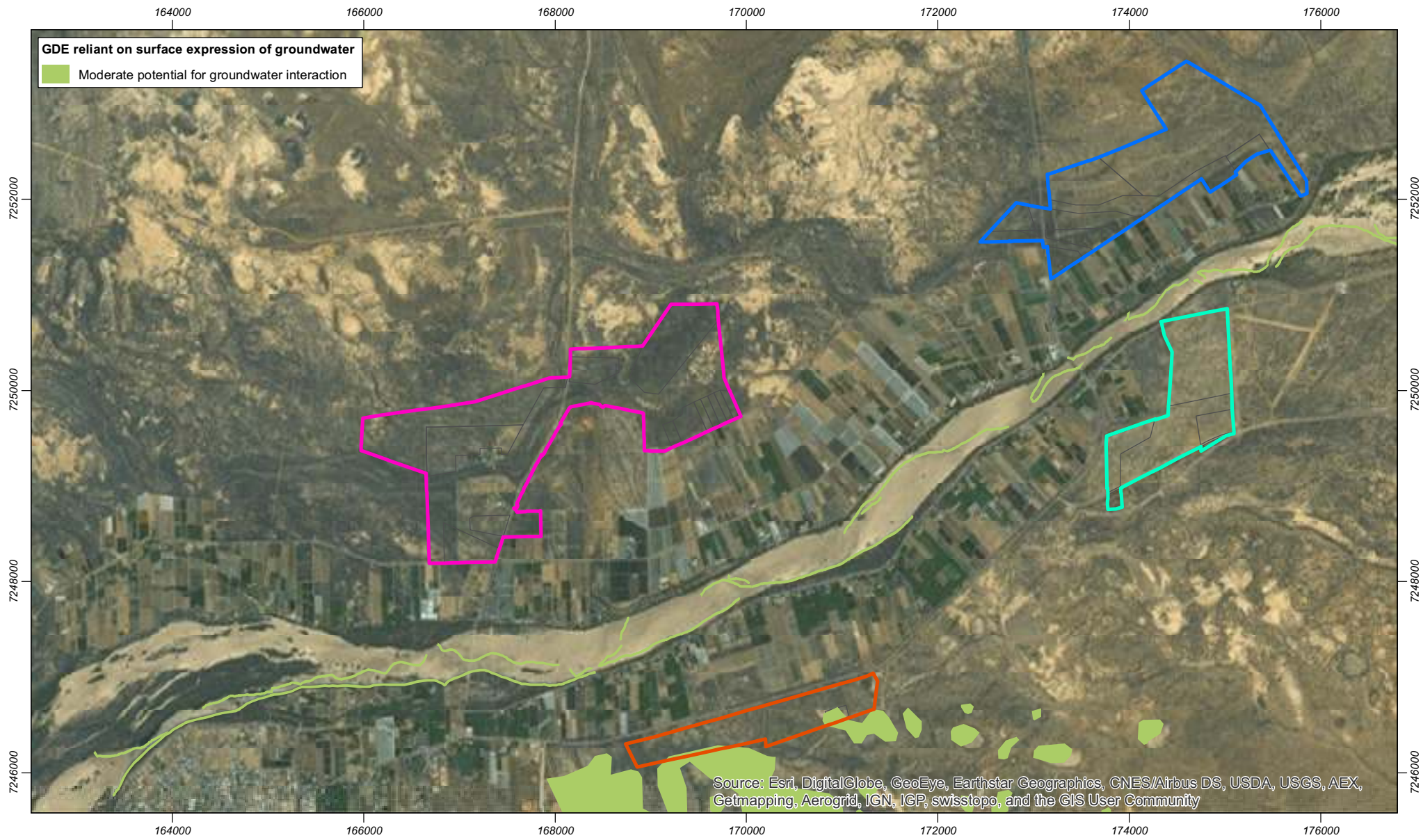
Scale 1:55,000 at A4  
 0 300 600 900 1,200 1,500 m

Coordinate System: GDA 1994 MGA Zone 50  
 Note that positional errors may occur in some areas  
 Date: 21/02/2017  
 Author: JCrute  
 Source: Aerial image: ESRI, approx. 2012; GDE Subsurface data: BoM 2017.

**Legend**

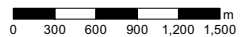
- Lot boundary
- Area B
- Area D
- Area C
- Area E





**Figure 9: Groundwater Dependent Ecosystems reliant on surface expression of groundwater (rivers, springs, wetlands)**

Scale 1:55,000 at A4



Coordinate System: GDA 1994 MGA Zone 50  
 Note that positional errors may occur in some areas

Date: 21/02/2017

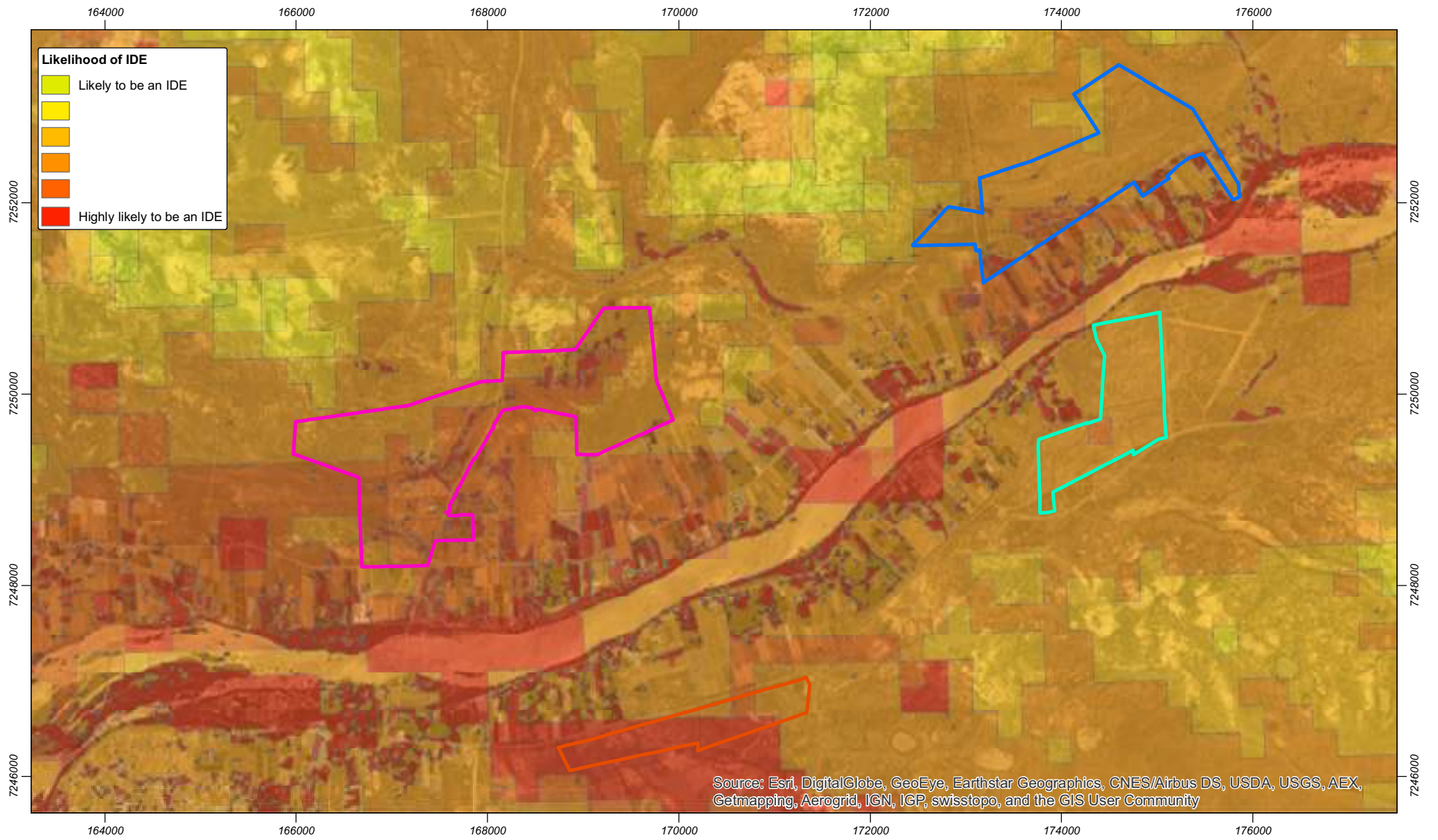
Author: JCrute

Source: Aerial image: ESRI, approx. 2012; GDE surface data: BoM 2017.

**Legend**

- Survey area Area D
- Area B
- Area E
- Area C
- Lot boundary





Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

**Figure 10: Inflow Dependent Ecosystems (IDE) reliant on other sources of water in addition to rainfall (e.g. surface water, soil water, irrigation)**

Scale 1:55,000 at A4  
 0 300 600 900 1,200 1,500 m



Coordinate System: GDA 1994 MGA Zone 50  
 Note that positional errors may occur in some areas  
 Date: 27/02/2017  
 Author: JCrute  
 Source: Aerial image: ESRI, approx. 2012; GDE Subsurface data: BoM 2017.

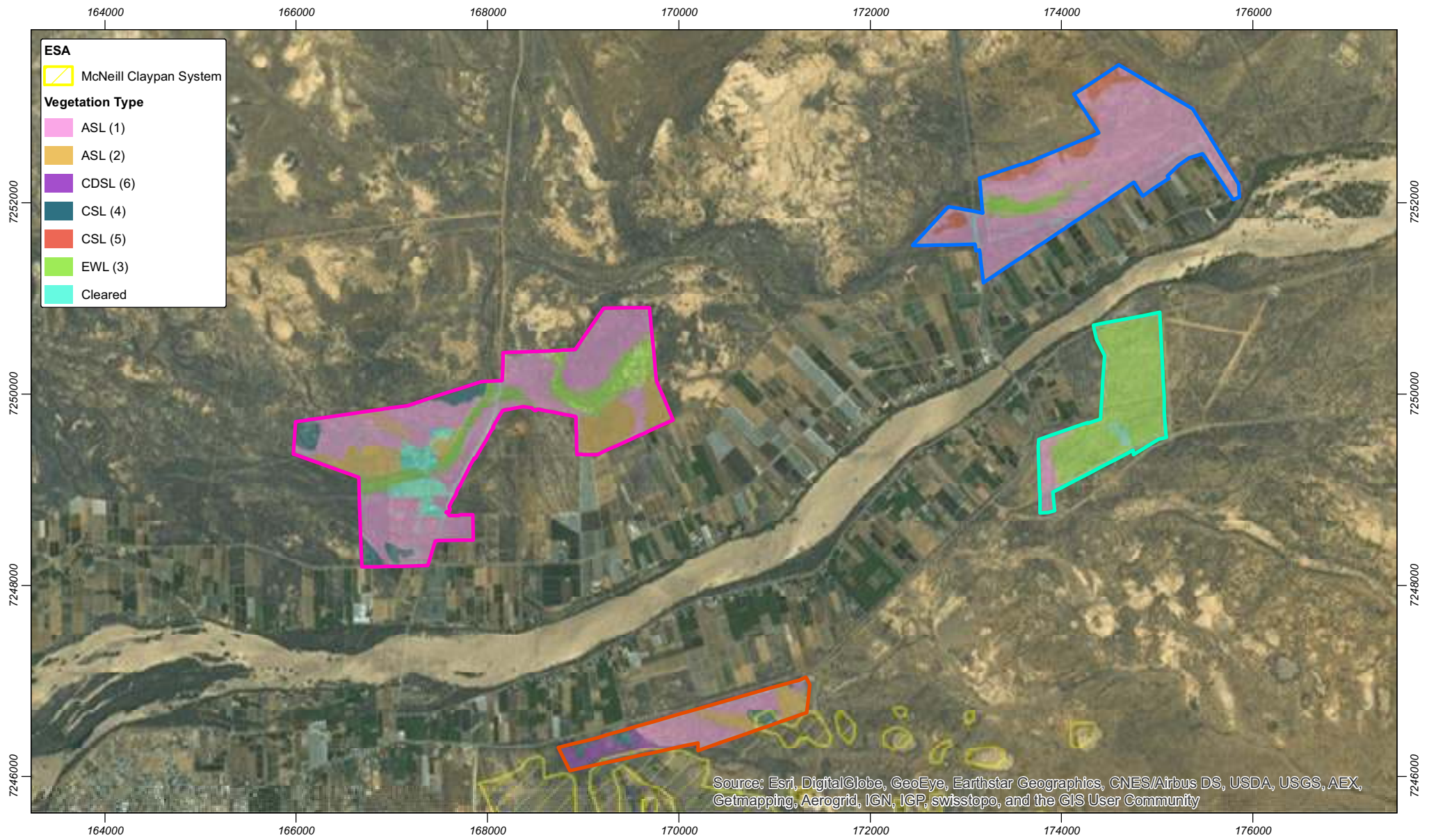
**Legend**  
 Area B (pink outline) Area D (orange outline) Lot boundary (grey outline)  
 Area C (blue outline) Area E (cyan outline)



## 4.6 Environmentally Sensitive Areas

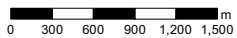
One ESA, the McNeill Claypan System boundary, extends into parts of Area D (Figure 11). The McNeill Claypan is described in Australian Government (2017) as “*Flats low lying, covered in rushes and is completely inundated by water after rain, contains some water all year round in an area where permanent surface water is rare. Some run off from north side of Browne Range and Flats fringed by Euc sp. Bird life is profuse after good rains and contains better than average bird life for the area all year round*”. Two VTs fall within the ESA boundary, CSL (4) and CDSL (6) (Figure 11). CSL (4) was also mapped in Area B and the areas mapped in the southern portion of Area D are part of the ESA, while those in Area B are not.





**Figure 11: Environmentally Sensitive Areas (ESAs) within the survey area**

Scale 1:55,000 at A4



Coordinate System: GDA 1994 MGA Zone 50

Note that positional errors may occur in some areas

Date: 21/02/2017

Author: JCrute

Source: Aerial image: ESRI, approx. 2012; GDE Subsurface data: BoM 2017.

**Legend**

- Survey area
  - Area C
  - Area E
- Area B
- Area D
- Lot boundary



## 4.7 Conservation significant vegetation

The significance of the vegetation of the survey area is discussed in the following subsections. Regional or other vegetation mapping which extends over the survey area includes Beard's vegetation mapping and land systems mapping. The region used for this significance assessment is the Wooramel subregion of the Carnarvon bioregion.

Local significance of the vegetation of the survey area is assessed using predominantly vegetation types mapped in the survey area; however, an analysis of the local significance of the Vegetation Associations (VAs) mapped by Beard and of the land systems mapped in the survey area is also included.

### 4.7.1 Regional and Local Significance of Beard's Vegetation Associations

The regional and local significance assessments for the three VAs mapped in the survey area (VA 129, 308 and 1271) are included in Appendix 5.

#### *Vegetation Association regional significance*

The attributes and scoring systems used to assess the regional significance of the VAs of the survey area are listed in Appendix 5, Table A 1. The results of the significance assessment are listed in Appendix 5, Table A 2.

- Using this scoring system, VA 308 is rated as having high regional conservation significance and VAs 129 and 1271 as moderate regional conservation significance.

#### *Vegetation Association local significance*

The attributes and scoring systems used to assess the local significance of the VAs of the survey area are listed in Appendix 5, Table A 3. The results of the significance assessment are listed in Appendix 5, Table A 4.

- Using this system two VAs 129 and 308 are rated as having low local conservation significance and VA 1271 is rated as having moderate local conservation significance.

## 4.8 Regional and Local Significance of Land Systems

The regional and local significance of the three land systems mapped in the survey area (Chargoo, Delta and River) is assessed in Appendix 5.

#### *Land System regional significance*

The attributes and scoring systems used to assess the regional significance of the land systems of the survey area are listed in Appendix 5, Table A 5. The results of the significance assessment are listed in Appendix 5, Table A 6.

- Using this scoring system, Delta land system is rated as having high regional conservation significance and the Chargoo and River land systems as moderate regional conservation significance.

#### *Land System local significance*

The attributes and scoring systems used to assess the local significance of the land systems of the survey area are listed in Appendix 5, Table A 7. The results of the significance assessment are listed in Appendix 5, Table A 8.

- Using this scoring system the Delta and River land systems are rated as having low local conservation significance and the Chargoo land system as having moderate local conservation significance.

***Vegetation Type local significance***

The attributes and scoring system used to assess the local significance of the VTs mapped in the survey area are listed in Appendix 5, Table A 9 and the results of the significance assessment are listed and summarised in Appendix 5, Table A 10.

The local significance rating calculated using the conservation significance scoring system is moderate for the six vegetation types mapped in the survey area.

Table 10: Local conservation significance of mapped vegetation types

VT code	Cover of Survey (Local) Area (%)	# of quadrats assessed in VT	% of VT assessed by traverses	CSF in VT	# of CSF in VT	# of weed species in VT	Average veg. condition	Occurs outside survey area?	Any other attributes increasing CS?	Local CS
ASL (1)	55.33	19	13.32		0	6	3	Yes	GDE, IDE	Moderate
ASL (2)	8.92	3	12.16	C?c (?P3)	1	5	3	Yes	GDE, IDE	Moderate
EWL (3)	21.43	3	10.49		0	6	3	Yes	GDE, IDE	Moderate
CSL (4)	4.09	5	14.86		0	5	3	Yes	ESA, GDE, IDE	Moderate
CSL (5)	2.88	2	16.51		0	2	2	Yes	GDE, IDE	Moderate
CDSL (6)	2.19	3	16.51		0	2	2	Yes	GDE, IDE	Moderate

Notes: VT = vegetation type; % = percentage; # = number; CSF = conservation significant flora; veg. = vegetation; CS = conservation significance; IDE = Inflow dependent ecosystem; GDE = groundwater dependent ecosystem; C?c = Corchorus ?congener; ?P3 = potential Priority 3.

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## 5. Discussion

Vegetation within the survey area comprises six VTs and cleared areas. Transitions between VTs were generally discontinuous, though occasionally abrupt with margins representing admixtures of more than one VT. This discontinuity is primarily due to changes in soil profile and topography, and presence of cleared areas. At a broad scale, the majority of the survey area was observed to be in various states of degradation due to historical clearing within the survey area. The majority of the remnant vegetation shows signs of degradation and structural alteration.

The flora and vegetation assessment conducted within the survey area was undertaken during October 2016, during the prime flowering time for majority of species within the area with field reconnaissance focussing on traversing the entire survey area to delineate broad vegetation types. This is consistent with the requirements of a Level 2 flora and vegetation survey as specified in GS 51.

The number of species recorded within the survey area totalled 103 native vascular plant taxa from 68 plant genera and 29 plant families and 14 introduced taxa. No Declared Plant species pursuant to section 22 of the BAM Act were recorded within the survey area (DAFWA 2016).

No Threatened flora species as listed under section 178 of the EPBC Act or pursuant to Schedule 1 of the WC Act and as listed by Parks and Wildlife (2015) were recorded within the survey area. One Priority flora species (*Corchorus ?congener* [P3]) as listed by Western Australian Herbarium (1998-) was recorded within the survey area. Given that the survey was conducted during the prime flowering time for majority of the conservation significant species potentially occurring within the survey area, it is highly unlikely that occurrences of other conservation significant species are present within the survey area.

Vegetation condition within the survey area ranged from 7 (areas completely or almost completely without native species) to 2 (pristine or nearly so) as per the vegetation condition scale (EPA and Parks and Wildlife 2015). The majority of the survey area (approximately 93%) was mapped on the condition scale as 3 (Some signs of disturbance). It is worth noting that a large portion of vegetation within the survey area has experienced modification due to historical land use including clearing and cattle grazing over the area.

Vegetation recorded within the survey area did not resemble known TECs or PECs listed in the Midwest bioregion. The closest TEC to the survey area (*Subtropical and Temperate Coastal Saltmarsh*) is located 4 km from the survey area. Based on the statistical analyses undertaken as part of this assessment, it can be reasonably assumed that no TECs or PECs occur within the survey area. One ESA, the McNeill Claypan System boundary, extends into parts of Area D. Two VTs fall within the ESA boundary, CSL (4) and CDSL (6).

Three of Beard's Vegetation Associations (VA 129, 308 and 1271) occur within the survey area, corresponding to vegetation mapped within four out of the six VTs (ASL(1), ASL(2), CSL(4), CSL(5)). Based on the significance assessment, VA 308 has high regional conservation significance and VAs 129 and 1271 have moderate regional conservation significance. VA 1271 has moderate and VAs 129 and 308 have low local conservation significance. The Delta land system within the survey area is rated as having high regional conservation significance, whilst the Chargoo and River land systems have moderate regional conservation significance. The Chargoo land system has moderate local conservation significance whilst the other land systems within the survey area are rated to have low local conservation significance. Using the conservation significance scoring system, the six vegetation types mapped within the survey area were rated as having moderate local conservation significance.

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The survey area has a high potential for groundwater interaction and some of the species that occur in VTs EWL (3) and CDSL (6), particularly the trees and larger shrubs, are likely to directly access groundwater at least some time during the year. Area D, most of Areas C and E and the southern portion of Area B are highly likely to be Inflow Dependent Ecosystems (IDEs) while the remaining areas are likely to be IDEs. As the survey area lies on the Gascoyne River flood plains, all of the VTs mapped are likely to be dependent on seasonal surface water from high rainfall events. While IDEs are not listed as conservation significant communities, they have the potential to be impacted by drawdown and should be considered in an environmental impact assessment if such activities are proposed.

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## 6. Conclusion

The Level 2 flora and vegetation survey (conducted October 2016) has been successful in collecting data to define and assess the presence, extent and significance of vegetation types within the survey area.

Approximately 878.5 ha of vegetation ranging in condition (scale 2- almost pristine to 7- almost no native species present) was recorded within the survey area (includes weed infested areas).

No Threatened flora species as listed under section 178 of the EPBC Act or pursuant to Schedule 1 of the WC Act and as listed by Parks and Wildlife (2015) were recorded within the survey area. One Priority flora species (*Corchorus ?congener* [P3]) as listed by Western Australian Herbarium (1998-) was recorded within the survey area. Given that the survey was conducted during the prime flowering time for majority of the conservation significant species potentially occurring within the survey area, it is highly unlikely that occurrences of other conservation significant species are present within the survey area.

The vegetation recorded within the survey area did not resemble known TECs or PECs listed in the Midwest bioregion. The closest TEC to the survey area (Subtropical and Temperate Coastal Saltmarsh) is located 4 km from the survey area. Based on the statistical analyses undertaken as part of this assessment, it can be reasonably assumed that no TECs or PECs occur within the survey area.

One ESA, the McNeill Claypan System boundary, extends into parts of Area D. Two VTs fall within the ESA boundary, CSL (4) and CDSL (6).

Using the conservation significance scoring system, the survey area contains VAs and land systems of moderate to high regional conservation significance and low to moderate local conservation significance. The six vegetation types mapped within the survey area were rated as having moderate local conservation significance.

As the survey area lies on the Gascoyne River flood plains, all of the VTs mapped are likely to be dependent on seasonal surface water from high rainfall events. Area D, most of Areas C and E and the southern portion of Area B are highly likely to be Inflow Dependent Ecosystems (IDEs).

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**Appendix 1**  
**Conservation significant flora and**  
**ecological community definitions**



### ***Conservation Codes for Western Australia (Western Australian Herbarium 1998-)***

Under the *Wildlife Conservation Act* (1950), the Minister for the Environment may declare species of flora to be protected if they are considered to be in danger of extinction, rare or otherwise in need of special protection. Schedules 1 and 2 deal with those that are threatened and those that are presumed extinct, respectively.

#### **T: Threatened Flora (Declared Rare Flora – Extant)**

Species 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 (Schedule 1 under the *Wildlife Conservation Act 1950*).

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
- X: Presumed Extinct Flora (Declared Rare Flora – Extinct).

Species that have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such (Schedule 2 under the *Wildlife Conservation Act 1950*).

#### ***Priority Flora***

Species that have not yet been adequately surveyed to be listed under Schedule 1 or 2 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 or fauna. 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.

#### **Priority One: Poorly-known Species**

Species that are known from one or a few collections or sight records (generally less than 5), 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.

#### **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 immediate threat from known threatening processes.

### **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.

### **Priority Four: Rare, Near Threatened and other species in need of monitoring**

1. 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.
2. 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.
3. Species that have been removed from the list of threatened species during the past 5 years for reasons other than taxonomy.

### **Priority 5: 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 5 years.

## ***Definition of Threatened Ecological Communities (DEC 2010)***

### **Presumed Totally Destroyed (PD)**

An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and either of the following applies:

- records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats or
- all occurrences recorded within the last 50 years have since been destroyed.

### **Critically Endangered (CR)**

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:

1. 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:
  - (a) 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)
  - (b) 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.
2. Current distribution is limited, and one or more of the following apply:
  - (a) 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)
  - (b) there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes
  - (c) 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.
3. 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).

### **Endangered (EN)**

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:

1. 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:
  - (a) 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)
  - (b) 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.

2. Current distribution is limited, and one or more of the following apply"
  - (a) 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)
  - (b) there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes
  - (c) 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.
3. 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).

**Vulnerable (VU)**

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:

1. The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated.
2. 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.
3. 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.



## ***Definition of Priority Ecological Communities (DEC 2010)***

### **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.

### **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.

### **Priority Three: Poorly known ecological communities**

- communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation
- 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
- 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.

### **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. These include:

1. 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.
2. 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.
3. Ecological communities that have been removed from the list of threatened communities during the past five years.

### **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.



**Appendix 2**  
**Desktop assessment results (Parks and**  
**Wildlife 2007-, DEE 2016c)**



# NatureMap Species Report

Created By Guest user on 03/02/2017

**Kingdom** Plantae  
**Current Names Only** Yes  
**Core Datasets Only** Yes  
**Method** 'By Circle'  
**Centre** 113° 41' 47" E, 24° 50' 10" S  
**Buffer** 15km  
**Group By** Family

Family	Species	Records
Acanthaceae	2	9
Aizoaceae	4	7
Amaranthaceae	14	30
Apocynaceae	3	6
Asparagaceae	5	7
Asphodelaceae	1	2
Asteraceae	48	115
Boraginaceae	4	5
Brassicaceae	5	16
Cactaceae	4	5
Campanulaceae	4	6
Capparaceae	1	3
Caryophyllaceae	1	4
Chenopodiaceae	48	125
Convolvulaceae	7	17
Crassulaceae	3	4
Cymodoceaceae	2	4
Cyperaceae	11	21
Elatinaceae	1	1
Euphorbiaceae	7	16
Fabaceae	56	160
Frankeniaceae	2	5
Gentianaceae	1	1
Geraniaceae	2	4
Goodeniaceae	7	15
Gyrostemonaceae	1	3
Hemerocallidaceae	1	5
Juncaginaceae	1	1
Lamiaceae	2	18
Lauraceae	1	1
Loranthaceae	3	3
Lythraceae	2	3
Malvaceae	15	25
Marsileaceae	1	1
Martyniaceae	1	3
Molluginaceae	1	2
Moringaceae	1	1
Myrtaceae	8	31
Nitriaceae	1	4
Nyctaginaceae	3	16
Oleaceae	1	4
Orobanchaceae	1	1
Papaveraceae	1	2
Passifloraceae	2	3
Phrymaceae	1	2
Phyllanthaceae	1	1
Plantaginaceae	3	6
Plumbaginaceae	1	3
Poaceae	42	114
Polygonaceae	3	6
Portulacaceae	3	7
Primulaceae	2	7
Proteaceae	2	3
Rhodomelaceae	1	1
Santalaceae	4	6
Sapindaceae	2	4
Scrophulariaceae	13	25
Solanaceae	8	16
Tamaricaceae	1	5
Thymelaeaceae	1	5
Typhaceae	1	1
Urticaceae	1	1
Zygophyllaceae	6	14
<b>TOTAL</b>	<b>386</b>	<b>942</b>

Name ID Species Name

Naturalised

Conservation Code

Endemic To Query Area

## Acanthaceae

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
1.	6828 <i>Avicennia marina</i> (White Mangrove)			
2.	11320 <i>Dipteracanthus australasicus</i> subsp. <i>australasicus</i>			
<b>Aizoaceae</b>				
3.	2797 <i>Carpobrotus rossii</i> (Karkalla)			
4.	2810 <i>Gunniopsis septifraga</i>			
5.	2813 <i>Mesembryanthemum crystallinum</i> (Iceplant)	Y		
6.	2821 <i>Tetragonia diptera</i>			
<b>Amaranthaceae</b>				
7.	2646 <i>Aerva javanica</i> (Kapok Bush)	Y		
8.	2652 <i>Alternanthera nodiflora</i> (Common Joyweed)			
9.	2653 <i>Alternanthera pungens</i> (Khaki Weed)	Y		
10.	2666 <i>Amaranthus mitchellii</i> (Boggabri Weed)			
11.	2677 <i>Gomphrena celosioides</i> (Gomphrena Weed)	Y		
12.	18367 <i>Gomphrena kanisii</i>			
13.	2708 <i>Ptilotus chamaecladus</i>			
14.	2717 <i>Ptilotus divaricatus</i> (Climbing Mulla Mulla)			
15.	2731 <i>Ptilotus helipteroides</i> (Hairy Mulla Mulla)			
16.	41001 <i>Ptilotus nobilis</i> subsp. <i>nobilis</i> (Yellow Tails)			
17.	2747 <i>Ptilotus obovatus</i> (Cotton Bush)			
18.	34701 <i>Ptilotus polakii</i> subsp. <i>juxtus</i>			
19.	2751 <i>Ptilotus polystachyus</i> (Prince of Wales Feather)			
20.	2766 <i>Ptilotus villosiflorus</i>			
<b>Apocynaceae</b>				
21.	6584 <i>Cynanchum floribundum</i> (Dumara Bush, Tjipa)			
22.	16538 <i>Marsdenia graniticola</i>			
23.	13006 <i>Sarcostemma viminalis</i> subsp. <i>australe</i>			
<b>Asparagaceae</b>				
24.	1208 <i>Acanthocarpus preissii</i>			
25.	1209 <i>Acanthocarpus robustus</i>			
26.	1211 <i>Acanthocarpus verticillatus</i>			
27.	1290 <i>Dichopogon tyleri</i>			
28.	46756 <i>Thysanotus exfimbriatus</i>			
<b>Asphodelaceae</b>				
29.	1364 <i>Asphodelus fistulosus</i> (Onion Weed)	Y		
<b>Asteraceae</b>				
30.	19902 <i>Actinobole drummondianum</i>			
31.	7822 <i>Angianthus acrohyalinus</i> (Hook-leaf Angianthus)			
32.	7832 <i>Angianthus milnei</i> (Cone-spike Angianthus)			
33.	7854 <i>Bidens bipinnata</i> (Bipinnate Beggartick)	Y		
34.	7871 <i>Brachyscome ciliaris</i>			
35.	7878 <i>Brachyscome iberidifolia</i>			
36.	7891 <i>Calocephalus francisii</i> (Fine-leaf Beauty-heads)			
37.	7905 <i>Calotis multicaulis</i> (Many-stemmed Burr-daisy)			
38.	19759 <i>Centipeda crateriformis</i> subsp. <i>crateriformis</i>			
39.	7918 <i>Centipeda cunninghamii</i> (Common Sneezewood, Gukwonderuk, Old Man Weed)			
40.	7919 <i>Centipeda minima</i> (Spreading Sneezewood, Kanjirala, Inteng-inteng, Karengkal, Kata-palkalpa, Munyu-parnti-parnti)			
41.	19762 <i>Centipeda minima</i> subsp. <i>macrocephala</i>			
42.	7934 <i>Chthonocephalus tomentellus</i>		P2	
43.	7939 <i>Conyza bonariensis</i> (Flaxleaf Fleabane)	Y		
44.	7951 <i>Cratystylis subspinescens</i> (Australian Sage, Spiny Grey Bush)			
45.	12739 <i>Erymophyllum ramosum</i>			
46.	7988 <i>Gnephosis arachnoidea</i> (Cobwebby-headed Gnephosis)			
47.	7995 <i>Gnephosis gynotricha</i>			
48.	7998 <i>Gnephosis macrocephala</i>			
49.	14349 <i>Gnephosis</i> sp. <i>Billabong</i> (B. Nordenstam & A. Anderberg 203)		P1	
50.	8002 <i>Gnephosis tenuissima</i>			
51.	29594 <i>Helichrysum luteoalbum</i> (Jersey Cudweed)			
52.	8045 <i>Helipterum craspedioides</i> (Yellow Billy Buttons)			
53.	8086 <i>Hypochaeris glabra</i> (Smooth Catsear)	Y		
54.	29046 <i>Lactuca serriola</i> forma <i>serriola</i>	Y		
55.	8109 <i>Minuria integerrima</i> (Smooth Minuria)			
56.	8119 <i>Myriocephalus nudus</i>		P1	
57.	17925 <i>Myriocephalus oldfieldii</i>			
58.	20611 <i>Pembertonia latisquamea</i>			
59.	17817 <i>Pluchea dunlopii</i>			
60.	17816 <i>Pluchea ferdinandi-muelleri</i>			

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61.	8168 <i>Pluchea rubelliflora</i>			
62.	8170 <i>Pluchea tetranthera</i>			
63.	45240 <i>Podolepis aristata</i> subsp. <i>auriculata</i>			
64.	13242 <i>Rhodanthe chlorocephala</i> subsp. <i>splendida</i>			
65.	13300 <i>Rhodanthe citrina</i>			
66.	13246 <i>Rhodanthe humboldtiana</i>			
67.	13297 <i>Rhodanthe psammophila</i>			
68.	13254 <i>Rhodanthe stricta</i>			
69.	45154 <i>Roebuckiella cheilocarpa</i> var. <i>cheilocarpa</i>			
70.	45146 <i>Roebuckiella oncocarpa</i>			
71.	8200 <i>Schoenia cassiniana</i> ( <i>Schoenia</i> )			
72.	13288 <i>Schoenia filifolia</i> subsp. <i>arenicola</i>		P1	
73.	8207 <i>Senecio glossanthus</i> ( <i>Slender Groundsel</i> )			
74.	25883 <i>Senecio pinnatifolius</i> var. <i>pinnatifolius</i>			
75.	8231 <i>Sonchus oleraceus</i> ( <i>Common Sowthistle</i> )	Y		
76.	8238 <i>Streptoglossa liatroides</i>			
77.	8254 <i>Urospermum picroides</i> ( <i>False Hawkbit</i> )	Y		
<b>Boraginaceae</b>				
78.	17299 <i>Heliotropium ammophilum</i>			
79.	6727 <i>Trichodesma zeylanicum</i> ( <i>Camel Bush, Kumbalin</i> )			
80.	13559 <i>Trichodesma zeylanicum</i> var. <i>grandiflorum</i>			
81.	11750 <i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>			
<b>Brassicaceae</b>				
82.	3000 <i>Brassica tournefortii</i> ( <i>Mediterranean Turnip</i> )	Y		
83.	3002 <i>Cakile maritima</i> ( <i>Sea Rocket</i> )	Y		
84.	3029 <i>Lepidium linifolium</i>			
85.	3030 <i>Lepidium lyratogynum</i>			
86.	3072 <i>Sisymbrium orientale</i> ( <i>Indian Hedge Mustard</i> )	Y		
<b>Cactaceae</b>				
87.	20759 <i>Cylindropuntia fulgida</i> var. <i>mamillata</i>	Y		
88.	46204 <i>Opuntia dejecta</i>	Y		
89.	44779 <i>Opuntia ficus-indica</i>	Y		
90.	46205 <i>Opuntia microdasys</i>	Y		
<b>Campanulaceae</b>				
91.	7403 <i>Lobelia heterophylla</i> ( <i>Wing-seeded Lobelia</i> )			
92.	36863 <i>Lobelia heterophylla</i> subsp. <i>heterophylla</i>			
93.	<i>Wahlenbergia</i> sp.			
94.	7393 <i>Wahlenbergia tumidifruca</i>			
<b>Capparaceae</b>				
95.	2976 <i>Capparis lasiantha</i> ( <i>Split Jack, Balqarda</i> )			
<b>Caryophyllaceae</b>				
96.	2905 <i>Polycarpon tetraphyllum</i> ( <i>Fourleaf Allseed</i> )	Y		
<b>Chenopodiaceae</b>				
97.	2450 <i>Atriplex amnicola</i> ( <i>Swamp Saltbush</i> )			
98.	2453 <i>Atriplex codonocarpa</i> ( <i>Flat-topped Saltbush</i> )			
99.	2459 <i>Atriplex holocarpa</i> ( <i>Pop Saltbush</i> )			
100.	19894 <i>Atriplex lentiformis</i>	Y		Y
101.	2466 <i>Atriplex lindleyi</i>			
102.	11698 <i>Atriplex paludosa</i> subsp. <i>moquiniana</i>			
103.	2476 <i>Atriplex semilunaris</i> ( <i>Annual Saltbush</i> )			
104.	2477 <i>Atriplex spinulosa</i>		P1	
105.	2481 <i>Atriplex vesicaria</i> ( <i>Bladder Saltbush</i> )			
106.	2485 <i>Chenopodium auricomum</i> ( <i>Queensland Bluebush</i> )			
107.	2489 <i>Chenopodium gaudichaudianum</i> ( <i>Cottony Saltbush</i> )			
108.	2494 <i>Chenopodium murale</i> ( <i>Nettle-leaf Goosefoot</i> )	Y		
109.	11632 <i>Dysphania glomulifera</i> subsp. <i>eremaea</i>			
110.	2505 <i>Dysphania platycarpa</i>			
111.	12064 <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> ( <i>Barrier Saltbush</i> )			
112.	2533 <i>Maireana amoena</i>			
113.	2534 <i>Maireana aphylla</i> ( <i>Cotton Bush</i> )			
114.	2535 <i>Maireana appressa</i>			
115.	2538 <i>Maireana carnosia</i> ( <i>Cottony Bluebush</i> )			
116.	2547 <i>Maireana lanosa</i> ( <i>Woolly Bluebush</i> )			
117.	2557 <i>Maireana platycarpa</i> ( <i>Shy Bluebush</i> )			
118.	2558 <i>Maireana polypterygia</i> ( <i>Gascoyne Bluebush</i> )			
119.	11662 <i>Maireana tomentosa</i> subsp. <i>tomentosa</i>			
120.	11733 <i>Osteocarpum acropterum</i> var. <i>acropterum</i> ( <i>Babbagia</i> )			

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121.	2582 <i>Rhagodia eremaea</i> (Thorny Saltbush)			
122.	11728 <i>Rhagodia latifolia</i> subsp. <i>latifolia</i>			
123.	11240 <i>Rhagodia preissii</i> subsp. <i>obovata</i>			
124.	30434 <i>Salsola australis</i>			
125.	2591 <i>Sarcocornia blackiana</i>			
126.	2593 <i>Sarcocornia quinqueflora</i> (Beaded Samphire)			
127.	2604 <i>Sclerolaena costata</i>			
128.	2607 <i>Sclerolaena densiflora</i>			
129.	2609 <i>Sclerolaena diacantha</i> (Grey Copperburr)			
130.	2612 <i>Sclerolaena eurotioides</i> (Fluffy Bindii)			
131.	8877 <i>Sclerolaena gardneri</i>			
132.	2628 <i>Sclerolaena recurvicauspis</i>			
133.	2641 <i>Tecticornia arborea</i> (Bullii Bullii)			
134.	31617 <i>Tecticornia bulbosa</i> (Large-articed Samphire)		T	
135.	31492 <i>Tecticornia disarticulata</i>			
136.	46513 <i>Tecticornia doliiformis</i>			
137.	33236 <i>Tecticornia halocnemoides</i> (Shrubby Samphire)			
138.	33238 <i>Tecticornia halocnemoides</i> subsp. <i>tenuis</i>			
139.	33319 <i>Tecticornia indica</i> subsp. <i>bidens</i>			
140.	33318 <i>Tecticornia indica</i> subsp. <i>leiostachya</i> (Samphire)			
141.	31674 <i>Tecticornia peltata</i>			
142.	31618 <i>Tecticornia pruinosa</i>			
143.	2642 <i>Tecticornia verrucosa</i>			
144.	2644 <i>Threlkeldia diffusa</i> (Coast Bonefruit)			
<b>Convolvulaceae</b>				
145.	11167 <i>Bonamia erecta</i>			
146.	6612 <i>Convolvulus clementii</i>			
147.	6614 <i>Convolvulus remotus</i>			
148.	6663 <i>Cuscuta epithymum</i> (Lesser Dodder, Greater Dodder)	Y		
149.	11783 <i>Ipomoea carnea</i> subsp. <i>fistulosa</i>	Y		
150.	6633 <i>Ipomoea muelleri</i> (Poison Morning Glory, Yumbu)			
151.	11312 <i>Ipomoea pes-caprae</i> subsp. <i>brasiliensis</i>			
<b>Crassulaceae</b>				
152.	3137 <i>Crassula colorata</i> (Dense Stonecrop)			
153.	3139 <i>Crassula exserta</i>			
154.	20271 <i>Crassula extrorsa</i>			
<b>Cymodoceaceae</b>				
155.	126 <i>Amphibolis antarctica</i> (Sea Nymph)			
156.	128 <i>Cymodocea angustata</i>			
<b>Cyperaceae</b>				
157.	750 <i>Bulbostylis barbata</i>			
158.	771 <i>Cyperus alterniflorus</i>			
159.	774 <i>Cyperus bifax</i> (Downs Nutgrass)			
160.	777 <i>Cyperus bulbosus</i> (Bush Onion, Tjanmata)			
161.	809 <i>Cyperus rigidellus</i>			
162.	810 <i>Cyperus rotundus</i> (Nut Grass)	Y		
163.	814 <i>Cyperus squarrosus</i>			
164.	818 <i>Cyperus vaginatus</i> (Stiffleaf Sedge)			
165.	822 <i>Eleocharis acuta</i> (Common Spikerush)			
166.	828 <i>Eleocharis pallens</i> (Pale Spikerush)			
167.	911 <i>Isolepis congrua</i>			
<b>Elatinaceae</b>				
168.	11642 <i>Bergia perennis</i> subsp. <i>obtusifolia</i>			
<b>Euphorbiaceae</b>				
169.	34237 <i>Beyeria cinerea</i> subsp. <i>borealis</i>			
170.	35307 <i>Euphorbia australis</i> var. <i>australis</i>			
171.	4629 <i>Euphorbia hirta</i> (Asthma Plant)	Y		
172.	4635 <i>Euphorbia myrtoides</i>			
173.	42869 <i>Euphorbia porcata</i>			
174.	4644 <i>Euphorbia shakoensis</i>			
175.	12097 <i>Euphorbia tannensis</i> subsp. <i>eremophila</i> (Desert Spurge)			
<b>Fabaceae</b>				
176.	3209 <i>Acacia ampliceps</i>			
177.	13500 <i>Acacia coriacea</i> subsp. <i>coriacea</i>			
178.	3452 <i>Acacia murrayana</i> (Sandplain Wattle)			
179.	29016 <i>Acacia pyrifolia</i> var. <i>morrisonii</i>			
180.	29015 <i>Acacia pyrifolia</i> var. <i>pyrifolia</i>			



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181.	19499 <i>Acacia ramulosa</i> var. <i>ramulosa</i>			
182.	13071 <i>Acacia ryaniana</i>		P2	
183.	13078 <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i>			
184.	13070 <i>Acacia synchronicia</i>			
185.	3577 <i>Acacia tetragonophylla</i> (Kurara, Wakalpuka)			
186.	3680 <i>Aeschynomene indica</i> (Budda Pea)			
187.	3769 <i>Clitoria ternatea</i>	Y		
188.	3774 <i>Crotalaria cunninghamii</i> (Green Birdflower, Bilbun)			
189.	20175 <i>Crotalaria cunninghamii</i> subsp. <i>sturtii</i>			
190.	18147 <i>Crotalaria incana</i> subsp. <i>incana</i>	Y		
191.	20179 <i>Crotalaria medicaginea</i> var. <i>neglecta</i>			
192.	17117 <i>Cullen cinereum</i>			
193.	17417 <i>Cullen discolor</i>			
194.	17118 <i>Cullen leucanthum</i>			
195.	17116 <i>Cullen martinii</i>			
196.	3871 <i>Erythrina vesperilio</i> (Yulbah)			
197.	3938 <i>Glycine canescens</i> (Silky Glycine)			
198.	45436 <i>Indigofera chamaeclada</i> subsp. <i>pubens</i>			
199.	3973 <i>Indigofera colutea</i> (Sticky Indigo)			
200.	14884 <i>Indigofera occidentalis</i>			
201.	3994 <i>Isotropis forrestii</i>			
202.	4046 <i>Lablab purpureus</i> (Lablab Bean)	Y		
203.	4060 <i>Lotus australis</i> (Austral Trefoil)			
204.	4061 <i>Lotus cruentus</i> (Redflower Lotus)			
205.	4079 <i>Medicago polymorpha</i> (Burr Medic)	Y		
206.	4080 <i>Medicago sativa</i> (Alfalfa)	Y		
207.	4085 <i>Melilotus indicus</i>	Y		
208.	4097 <i>Mirbelia ramulosa</i>			
209.	33482 <i>Peltophorum pterocarpum</i>	Y		
210.	18373 <i>Prosopis glandulosa</i> x <i>velutina</i>	Y		
211.	3620 <i>Prosopis pallida</i> (Mesquite, Algaroba)	Y		
212.	4190 <i>Rhynchosia australis</i> (Rhynchosia)			
213.	12276 <i>Senna artemisioides</i> subsp. <i>filifolia</i>			
214.	12280 <i>Senna artemisioides</i> subsp. <i>oligophylla</i>			
215.	12305 <i>Senna glutinosa</i> subsp. <i>chatelainiana</i>			
216.	12309 <i>Senna glutinosa</i> subsp. <i>pruinosa</i>			
217.	4196 <i>Sesbania cannabina</i> (Sesbania Pea)			
218.	4217 <i>Swainsona beasleyana</i>			
219.	13592 <i>Swainsona calcicola</i>			
220.	4225 <i>Swainsona ecallosa</i>			
221.	4226 <i>Swainsona elegans</i>			
222.	12356 <i>Swainsona formosa</i>			
223.	4231 <i>Swainsona kingii</i>			
224.	13586 <i>Swainsona paucifoliolata</i>			
225.	4242 <i>Swainsona pterostylis</i>			
226.	19531 <i>Tephrosia rosea</i> var. <i>clementii</i>			
227.	15947 <i>Tephrosia</i> sp. <i>B Kimberley Flora</i> (C.A. Gardner 7300)			
228.	41815 <i>Tephrosia</i> sp. <i>Carnarvon</i> (J.H. Ross 2681)			
229.	39422 <i>Tephrosia</i> sp. <i>Onslow</i> (K.R. Newbey 10571)			
230.	4316 <i>Trigonella suavissima</i> (Sweet Fenugreek)			
231.	30716 <i>Vachellia farnesiana</i> (Mimosa Bush)	Y		
<b>Frankeniaceae</b>				
232.	5191 <i>Frankenia cinerea</i>			
233.	5209 <i>Frankenia pauciflora</i> (Seaheath)			
<b>Gentianaceae</b>				
234.	41660 <i>Schenkia australis</i>			
<b>Geraniaceae</b>				
235.	4333 <i>Erodium cicutarium</i> (Common Storksbill)	Y		
236.	4335 <i>Erodium cygnorum</i> (Blue Heronsbill)			
<b>Goodeniaceae</b>				
237.	11326 <i>Dampiera incana</i> var. <i>fuscescens</i>			
238.	7495 <i>Goodenia berardiana</i>			
239.	7501 <i>Goodenia corynocarpa</i>			
240.	7565 <i>Goodenia xanthosperma</i> (Yellow-seeded Goodenia)			
241.	7606 <i>Scaevola crassifolia</i> (Thick-leaved Fan-flower)			
242.	7644 <i>Scaevola spinescens</i> (Currant Bush, Maroon)			
243.	7648 <i>Scaevola tomentosa</i> (Raggedleaf Fanflower)			

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<b>Gyrostemonaceae</b>				
244.	2784 <i>Gyrostemon ramulosus</i> (Corkybark)			
<b>Hemerocallidaceae</b>				
245.	1286 <i>Corynotheca pungens</i>			
<b>Juncaginaceae</b>				
246.	146 <i>Triglochin minutissima</i>			
<b>Lamiaceae</b>				
247.	41063 <i>Quoya loxocarpa</i>			
248.	41061 <i>Quoya paniculata</i>			
<b>Lauraceae</b>				
249.	12073 <i>Cassytha aurea</i> var. <i>aurea</i>			
<b>Loranthaceae</b>				
250.	2383 <i>Amyema preissii</i> (Wireleaf Mistletoe)			
251.	11874 <i>Amyema sanguinea</i> var. <i>sanguinea</i>			
252.	12051 <i>Lysiana exocarpi</i> subsp. <i>exocarpi</i> (Harlequin Mistletoe)			
<b>Lythraceae</b>				
253.	5278 <i>Ammannia multiflora</i>			
254.	17848 <i>Lythrum wilsonii</i>			
<b>Malvaceae</b>				
255.	4892 <i>Abutilon geranioides</i>			
256.	4895 <i>Abutilon lepidum</i>			
257.	4902 <i>Abutilon oxycarpum</i> (Flannel Weed)			
258.	43021 <i>Abutilon</i> sp. <i>Pritzelianum</i> (S. van Leeuwen 5095)		P1	
259.	4904 <i>Alyogyne cuneiformis</i> (Coastal Hibiscus)			
260.	40916 <i>Androcalva lachna</i>			
261.	40910 <i>Androcalva luteiflora</i> (Yellow-flowered Rulingia)			
262.	18410 <i>Corchorus camarvonensis</i>			
263.	4910 <i>Gossypium australe</i> (Native Cotton)			
264.	17782 <i>Hannafordia quadrivalvis</i> subsp. <i>recurva</i>			
265.	29316 <i>Hibiscus austrinus</i>			
266.	4962 <i>Malvastrum americanum</i> (Spiked Malvastrum)	Y		
267.	18149 <i>Sida rohlenae</i> subsp. <i>rohlenae</i>			
268.	16927 <i>Sida</i> sp. <i>Camarvon</i> (P.S. Short 2492)			
269.	5106 <i>Waltheria indica</i>			
<b>Marsileaceae</b>				
270.	75 <i>Marsilea exarata</i>			
<b>Martyniaceae</b>				
271.	7121 <i>Proboscidea louisianica</i> (Purple Flower Devil's Claw)	Y		
<b>Molluginaceae</b>				
272.	2835 <i>Glinus lotoides</i> (Hairy Carpet Weed)			
<b>Moringaceae</b>				
273.	19717 <i>Moringa oleifera</i>	Y		
<b>Myrtaceae</b>				
274.	5640 <i>Eucalyptus eudesmioides</i> (Malalie, Marlari)			
275.	14548 <i>Eucalyptus victrix</i>			
276.	5845 <i>Lamarchea hakeifolia</i>			
277.	5915 <i>Melaleuca glomerata</i>			
278.	44567 <i>Scholtzia obovata</i>			
279.	6041 <i>Scholtzia umbellifera</i>			
280.	44710 <i>Thryptomene dampieri</i>			
281.	6081 <i>Verticordia forrestii</i> (Forrest's Featherflower)			
<b>Nitrariaceae</b>				
282.	4366 <i>Nitraria billardierei</i> (Nitre Bush)			
<b>Nyctaginaceae</b>				
283.	2770 <i>Boerhavia coccinea</i> (Tar Vine, Wituka)			
284.	2775 <i>Boerhavia schomburgkiana</i>			
285.	2776 <i>Commicarpus australis</i> (Perennial Tar Vine)			
<b>Oleaceae</b>				
286.	6500 <i>Jasminum calcareum</i>			
<b>Orobanchaceae</b>				
287.	7103 <i>Striga curviflora</i>			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
<b>Papaveraceae</b>				
288.	17797 <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	Y		
<b>Passifloraceae</b>				
289.	5226 <i>Passiflora foetida</i> ( <i>Stinking Passion Flower</i> )	Y		
290.	14096 <i>Passiflora foetida</i> var. <i>hispida</i>	Y		
<b>Phrymaceae</b>				
291.	7082 <i>Mimulus gracilis</i>			
<b>Phyllanthaceae</b>				
292.	45696 <i>Phyllanthus hamelinii</i> ( <i>Shark Bay Phyllanthus</i> )			
<b>Plantaginaceae</b>				
293.	7098 <i>Stemodia grossa</i> ( <i>Marsh Stemodia, Mindjaara</i> )			
294.	<i>Stemodia</i> sp.			
295.	7102 <i>Stemodia viscosa</i> ( <i>Pagurda</i> )			
<b>Plumbaginaceae</b>				
296.	6490 <i>Muellerolimon salicorniaceum</i>			
<b>Poaceae</b>				
297.	207 <i>Aristida contorta</i> ( <i>Bunched Kerosene Grass</i> )			
298.	226 <i>Arundo donax</i> ( <i>Giant Reed</i> )	Y		
299.	229 <i>Astrebula pectinata</i> ( <i>Barley Mitchell Grass</i> )			
300.	17237 <i>Austrostipa elegantissima</i>			
301.	258 <i>Cenchrus ciliaris</i> ( <i>Buffel Grass</i> )	Y		
302.	259 <i>Cenchrus echinatus</i> ( <i>Burrgrass</i> )	Y		
303.	272 <i>Chloris virgata</i> ( <i>Feathertop Rhodes Grass</i> )	Y		
304.	273 <i>Chrysopogon fallax</i> ( <i>Golden Beard Grass</i> )			
305.	275 <i>Chrysopogon pallidus</i> ( <i>Ribbongrass</i> )			
306.	279 <i>Cymbopogon ambiguus</i> ( <i>Scentgrass</i> )			
307.	283 <i>Cynodon dactylon</i> ( <i>Couch</i> )	Y		
308.	290 <i>Dactyloctenium radulans</i> ( <i>Button Grass</i> )			
309.	13741 <i>Dichanthium sericeum</i> subsp. <i>humilius</i>			
310.	353 <i>Eleusine indica</i> ( <i>Crowsfoot Grass</i> )	Y		
311.	368 <i>Enteropogon ramosus</i> ( <i>Windmill Grass, Curly Windmill Grass</i> )			
312.	369 <i>Eragrostis australasica</i> ( <i>Canegrass</i> )			
313.	378 <i>Eragrostis dielsii</i> ( <i>Mallee Lovegrass</i> )			
314.	388 <i>Eragrostis leptocarpa</i> ( <i>Drooping Lovegrass</i> )			
315.	398 <i>Eragrostis tenellula</i> ( <i>Delicate Lovegrass</i> )			
316.	399 <i>Eragrostis xerophila</i> ( <i>Knotty-butt Neverfail</i> )			
317.	403 <i>Eriachne benthamii</i> ( <i>Swamp Wanderrie</i> )			
318.	414 <i>Eriachne obtusa</i> ( <i>Northern Wandarrie Grass</i> )			
319.	425 <i>Eriochloa procera</i> ( <i>Cupgrass</i> )			
320.	11011 <i>Eulalia aurea</i>			
321.	471 <i>Leptochloa digitata</i> ( <i>Whorled Cane Grass</i> )			
322.	19126 <i>Leptochloa fusca</i> subsp. <i>muelleri</i>			
323.	503 <i>Panicum decompositum</i> ( <i>Native Millet, Kaltu-kaltu</i> )			
324.	513 <i>Paractaenum novae-hollandiae</i> ( <i>Reflexed Panic Grass</i> )			
325.	11232 <i>Paractaenum novae-hollandiae</i> subsp. <i>novae-hollandiae</i>			
326.	514 <i>Paractaenum refractum</i>			
327.	522 <i>Paspalidium jubiflorum</i> ( <i>Warrego Grass</i> )			
328.	11151 <i>Rostraria pumila</i>	Y		
329.	606 <i>Setaria dielsii</i> ( <i>Diels' Pigeon Grass</i> )			
330.	612 <i>Setaria surgens</i> ( <i>Pigeon Grass</i> )			
331.	625 <i>Spinifex longifolius</i> ( <i>Beach Spinifex</i> )			
332.	13571 <i>Sporobolus blakei</i>		P3	
333.	633 <i>Sporobolus mitchellii</i> ( <i>Ratstail Couch</i> )			
334.	635 <i>Sporobolus virginicus</i> ( <i>Marine Couch</i> )			
335.	673 <i>Themeda triandra</i>			
336.	678 <i>Tragus australianus</i> ( <i>Small Burrgrass</i> )			
337.	706 <i>Triraphis mollis</i> ( <i>Needle Grass</i> )			
338.	717 <i>Urochloa piligera</i>			
<b>Polygonaceae</b>				
339.	44508 <i>Duma florulenta</i>			
340.	2434 <i>Rumex crystallinus</i> ( <i>Shiny Dock</i> )		P2	
341.	46433 <i>Rumex spinosus</i>	Y		
<b>Portulacaceae</b>				
342.	2864 <i>Calandrinia ptychosperma</i>			
343.	2867 <i>Calandrinia remota</i>			
344.	2884 <i>Portulaca oleracea</i> ( <i>Purslane, Wakati</i> )			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
<b>Primulaceae</b>				
345.	6484 <i>Samolus repens</i> (Creeping Brookweed)			
346.	14027 <i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076)			
<b>Proteaceae</b>				
347.	2196 <i>Hakea preissii</i> (Needle Tree, Dandjin)			
348.	16897 <i>Hakea stenophylla</i> subsp. <i>stenophylla</i>			
<b>Rhodomelaceae</b>				
349.	26441 <i>Acanthophora spicifera</i>			
<b>Santalaceae</b>				
350.	2332 <i>Anthobolus foveolatus</i>			
351.	10977 <i>Exocarpos aphyllus</i> (Leafless Ballart)			
352.	2356 <i>Santalum acuminatum</i> (Quandong, Warnga)			
353.	2357 <i>Santalum lanceolatum</i> (Northern Sandalwood, Yarnguli)			
<b>Sapindaceae</b>				
354.	11487 <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i>			
355.	4766 <i>Dodonaea inaequifolia</i>			
<b>Scrophulariaceae</b>				
356.	15051 <i>Eremophila crenulata</i>			
357.	15052 <i>Eremophila forrestii</i> subsp. <i>forrestii</i>			
358.	17152 <i>Eremophila forrestii</i> subsp. <i>hastieana</i> (Grey Poverty Bush)			
359.	16696 <i>Eremophila fraseri</i> subsp. <i>fraseri</i>			
360.	17175 <i>Eremophila glabra</i> subsp. <i>albicans</i>			
361.	17173 <i>Eremophila glabra</i> subsp. <i>psammophora</i>			
362.	14191 <i>Eremophila glabra</i> subsp. <i>tomentosa</i>			
363.	7227 <i>Eremophila laanii</i>			
364.	16734 <i>Eremophila mackinlayi</i> subsp. <i>mackinlayi</i>			
365.	16363 <i>Eremophila maculata</i> subsp. <i>brevifolia</i> (Native Fuchsia)			
366.	7238 <i>Eremophila maitlandii</i> (Shark Bay Poverty Bush)			
367.	15170 <i>Eremophila pterocarpa</i> subsp. <i>pterocarpa</i>			
368.	17158 <i>Myoporum montanum</i> (Native Myrtle)			
<b>Solanaceae</b>				
369.	6962 <i>Datura leichhardtii</i> (Native Thornapple)	Y		
370.	6974 <i>Nicotiana glauca</i> (Tree Tobacco)	Y		
371.	11331 <i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>			
372.	11856 <i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>			
373.	7018 <i>Solanum lasiophyllum</i> (Flannel Bush, Mindjulu)			
374.	7026 <i>Solanum orbiculatum</i> (Wild Tomato)			
375.	11241 <i>Solanum orbiculatum</i> subsp. <i>orbiculatum</i> (Round-leaved Solanum)			
376.	7029 <i>Solanum phlomoides</i>			
<b>Tamaricaceae</b>				
377.	15741 <i>Tamarix aphylla</i> (Athele Tree)	Y		
<b>Thymelaeaceae</b>				
378.	11185 <i>Pimelea microcephala</i> subsp. <i>microcephala</i>			
<b>Typhaceae</b>				
379.	98 <i>Typha domingensis</i> (Bulrush, Djandjidd)			
<b>Urticaceae</b>				
380.	12670 <i>Parietaria cardiostegia</i>			
<b>Zygophyllaceae</b>				
381.	4374 <i>Tribulus astrocarpus</i>			
382.	4377 <i>Tribulus hirsutus</i>			
383.	4380 <i>Tribulus occidentalis</i> (Perennial Caltrop)			
384.	4383 <i>Tribulus terrestris</i> (Caltrop)	Y		
385.	4390 <i>Zygophyllum fruticosum</i> (Shrubby Twinleaf)			
386.	4395 <i>Zygophyllum retivalve</i>			

**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

<sup>1</sup> For NatureMap's purposes, species flagged as endemic are those whose records are wholly 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.



# 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: 03/02/17 13:51:02

[Summary](#)

[Details](#)

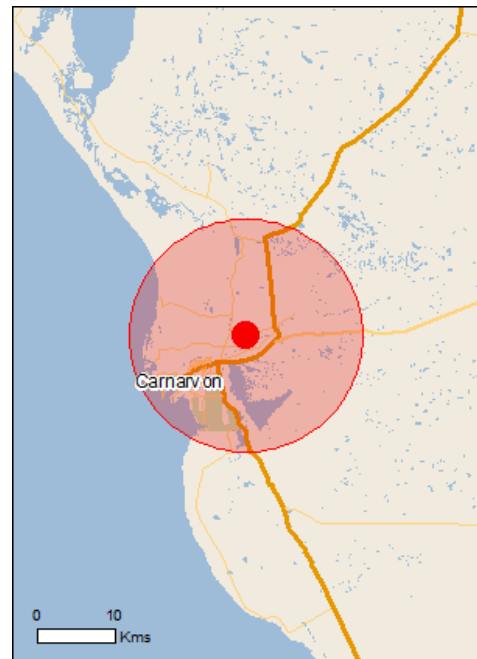
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

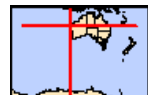
[Acknowledgements](#)



This map may contain data which are  
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[Coordinates](#)

Buffer: 15.0Km



# 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](#).

<a href="#">World Heritage Properties:</a>	1
<a href="#">National Heritage Places:</a>	1
<a href="#">Wetlands of International Importance:</a>	None
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Area:</a>	None
<a href="#">Listed Threatened Ecological Communities:</a>	1
<a href="#">Listed Threatened Species:</a>	25
<a href="#">Listed Migratory Species:</a>	46

## Other Matters Protected by the EPBC Act

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

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

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

<a href="#">Commonwealth Land:</a>	2
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	73
<a href="#">Whales and Other Cetaceans:</a>	10
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Commonwealth Reserves Marine:</a>	None

## Extra Information

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

<a href="#">State and Territory Reserves:</a>	2
<a href="#">Regional Forest Agreements:</a>	None
<a href="#">Invasive Species:</a>	10
<a href="#">Nationally Important Wetlands:</a>	2
<a href="#">Key Ecological Features (Marine)</a>	None

# Details

## Matters of National Environmental Significance

World Heritage Properties		[ Resource Information ]
Name	State	Status
<a href="#">Shark Bay, Western Australia</a>	WA	Declared property

National Heritage Properties		[ Resource Information ]
Name	State	Status
Natural		
<a href="#">Shark Bay, Western Australia</a>	WA	Listed place

### Listed Threatened Ecological Communities [ Resource Information ]

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.

Name	Status	Type of Presence
<a href="#">Subtropical and Temperate Coastal Saltmarsh</a>	Vulnerable	Community likely to occur within area

### Listed Threatened Species [ Resource Information ]

Name	Status	Type of Presence
Birds		
<a href="#">Calidris canutus</a> Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Calidris tenuirostris</a> Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Charadrius leschenaultii</a> Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Leipoa ocellata</a> Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Limosa lapponica baueri</a> Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat may occur within area
<a href="#">Limosa lapponica menzbieri</a> Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area

Name	Status	Type of Presence
<a href="#">Pezoporus occidentalis</a> Night Parrot [59350]	Endangered	Species or species habitat may occur within area
<a href="#">Pterodroma mollis</a> Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
<a href="#">Sternula nereis nereis</a> Australian Fairy Tern [82950]	Vulnerable	Breeding likely to occur within area
<a href="#">Thalassarche cauta cauta</a> Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche cauta steadi</a> White-capped Albatross [82344]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche impavida</a> Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche melanophris</a> Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area

#### Mammals

<a href="#">Eubalaena australis</a> Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
<a href="#">Megaptera novaeangliae</a> Humpback Whale [38]	Vulnerable	Congregation or aggregation known to occur within area

#### Reptiles

<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Breeding known to occur within area
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

#### Sharks

<a href="#">Carcharias taurus (west coast population)</a> Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Carcharodon carcharias</a> White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Rhincodon typus</a> Whale Shark [66680]	Vulnerable	Species or species habitat may 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
<b>Migratory Marine Birds</b>		
<a href="#">Anous stolidus</a> Common Noddy [825]		Species or species



Name	Threatened	Type of Presence
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		habitat may occur within area  Species or species habitat likely to occur within area
<a href="#">Fregata ariel</a> Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
<a href="#">Puffinus carneipes</a> Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat likely to occur within area
<a href="#">Sterna caspia</a> Caspian Tern [59467]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Thalassarche cauta (sensu stricto)</a> Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Species or species habitat may occur within area
<a href="#">Thalassarche impavida</a> Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche melanophris</a> Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche steadi</a> White-capped Albatross [64462]	Vulnerable*	Species or species habitat may occur within area
<b>Migratory Marine Species</b>		
<a href="#">Balaenoptera edeni</a> Bryde's Whale [35]		Species or species habitat may occur within area
<a href="#">Carcharodon carcharias</a> White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Breeding known to occur within area
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
<a href="#">Dugong dugon</a> Dugong [28]		Species or species habitat known to occur within area
<a href="#">Eubalaena australis</a> Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
<a href="#">Lamna nasus</a> Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
<a href="#">Manta alfredi</a> Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta		Species or species habitat known to occur

Name	Threatened	Type of Presence
Ray [84994] <a href="#">Manta birostris</a> Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		within area  Species or species habitat may occur within area
<a href="#">Megaptera novaeangliae</a> Humpback Whale [38]	Vulnerable	Congregation or aggregation known to occur within area
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
<a href="#">Orcinus orca</a> Killer Whale, Orca [46]		Species or species habitat may occur within area
<a href="#">Rhincodon typus</a> Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
<b>Migratory Terrestrial Species</b>		
<a href="#">Hirundo rustica</a> Barn Swallow [662]		Species or species habitat known to occur within area
<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within area
<a href="#">Motacilla flava</a> Yellow Wagtail [644]		Species or species habitat known to occur within area
<b>Migratory Wetlands Species</b>		
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat known to occur within area
<a href="#">Arenaria interpres</a> Ruddy Turnstone [872]		Species or species habitat known to occur within area
<a href="#">Calidris alba</a> Sanderling [875]		Species or species habitat known to occur within area
<a href="#">Calidris canutus</a> Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Calidris ruficollis</a> Red-necked Stint [860]		Species or species habitat known to occur within area
<a href="#">Calidris tenuirostris</a> Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Charadrius leschenaultii</a> Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Charadrius veredus</a> Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
<a href="#">Heteroscelus brevipes</a> Grey-tailed Tattler [59311]		Species or species

Name	Threatened	Type of Presence
<a href="#">Limosa lapponica</a> Bar-tailed Godwit [844]		habitat known to occur within area  Species or species habitat known to occur within area
<a href="#">Limosa limosa</a> Black-tailed Godwit [845]		Species or species habitat known to occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Numenius phaeopus</a> Whimbrel [849]		Species or species habitat known to occur within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Breeding known to occur within area
<a href="#">Pluvialis squatarola</a> Grey Plover [865]		Species or species habitat known to occur within area
<a href="#">Tringa glareola</a> Wood Sandpiper [829]		Species or species habitat known to occur within area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
<a href="#">Xenus cinereus</a> Terek Sandpiper [59300]		Species or species habitat known to occur within area

## Other Matters Protected by the EPBC Act

### Commonwealth Land [ Resource Information ]

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

Name
Commonwealth Land - Defence - CARNARVON TRAINING DEPOT

### 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
<b>Birds</b>		
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat known to occur within area
<a href="#">Anous stolidus</a> Common Noddy [825]		Species or species habitat may occur within area
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<a href="#">Ardea alba</a> Great Egret, White Egret [59541]		Breeding known to occur within area

Name	Threatened	Type of Presence
<a href="#">Ardea ibis</a> Cattle Egret [59542]		Species or species habitat may occur within area
<a href="#">Arenaria interpres</a> Ruddy Turnstone [872]		Species or species habitat known to occur within area
<a href="#">Calidris alba</a> Sanderling [875]		Species or species habitat known to occur within area
<a href="#">Calidris canutus</a> Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Calidris ruficollis</a> Red-necked Stint [860]		Species or species habitat known to occur within area
<a href="#">Calidris tenuirostris</a> Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Charadrius leschenaultii</a> Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Charadrius ruficapillus</a> Red-capped Plover [881]		Species or species habitat known to occur within area
<a href="#">Charadrius veredus</a> Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
<a href="#">Fregata ariel</a> Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
<a href="#">Heteroscelus brevipes</a> Grey-tailed Tattler [59311]		Species or species habitat known to occur within area
<a href="#">Himantopus himantopus</a> Black-winged Stilt [870]		Species or species habitat known to occur within area
<a href="#">Hirundo rustica</a> Barn Swallow [662]		Species or species habitat known to occur within area
<a href="#">Larus pacificus</a> Pacific Gull [811]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Limosa lapponica</a> Bar-tailed Godwit [844]		Species or species habitat known to occur within area
<a href="#">Limosa limosa</a> Black-tailed Godwit [845]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area
<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within area
<a href="#">Motacilla flava</a> Yellow Wagtail [644]		Species or species habitat known to occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Numenius phaeopus</a> Whimbrel [849]		Species or species habitat known to occur within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Breeding known to occur within area
<a href="#">Pluvialis squatarola</a> Grey Plover [865]		Species or species habitat known to occur within area
<a href="#">Pterodroma mollis</a> Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
<a href="#">Puffinus carneipes</a> Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat likely to occur within area
<a href="#">Recurvirostra novaehollandiae</a> Red-necked Avocet [871]		Species or species habitat known to occur within area
<a href="#">Sterna caspia</a> Caspian Tern [59467]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Thalassarche cauta (sensu stricto)</a> Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Species or species habitat may occur within area
<a href="#">Thalassarche impavida</a> Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche melanophris</a> Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche steadi</a> White-capped Albatross [64462]	Vulnerable*	Species or species habitat may occur within area
<a href="#">Tringa glareola</a> Wood Sandpiper [829]		Species or species habitat known to occur within area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
<a href="#">Xenus cinereus</a> Terek Sandpiper [59300]		Species or species

Name	Threatened	Type of Presence habitat known to occur within area
<b>Fish</b>		
<a href="#">Campichthys galei</a> Gale's Pipefish [66191]		Species or species habitat may occur within area
<a href="#">Choeroichthys suillus</a> Pig-snouted Pipefish [66198]		Species or species habitat may occur within area
<a href="#">Festucalex scalaris</a> Ladder Pipefish [66216]		Species or species habitat may occur within area
<a href="#">Filicampus tigris</a> Tiger Pipefish [66217]		Species or species habitat may occur within area
<a href="#">Halicampus brocki</a> Brock's Pipefish [66219]		Species or species habitat may occur within area
<a href="#">Haliichthys taeniophorus</a> Ribboned Pipehorse, Ribboned Seadragon [66226]		Species or species habitat may occur within area
<a href="#">Hippocampus angustus</a> Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area
<a href="#">Hippocampus histrix</a> Spiny Seahorse, Thorny Seahorse [66236]		Species or species habitat may occur within area
<a href="#">Hippocampus planifrons</a> Flat-face Seahorse [66238]		Species or species habitat may occur within area
<a href="#">Hippocampus trimaculatus</a> Three-spot Seahorse, Low-crowned Seahorse, Flat- faced Seahorse [66720]		Species or species habitat may occur within area
<a href="#">Lissocampus fatiloquus</a> Prophet's Pipefish [66250]		Species or species habitat may occur within area
<a href="#">Nannocampus subosseus</a> Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area
<a href="#">Solegnathus lettiensis</a> Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area
<a href="#">Solenostomus cyanopterus</a> Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
<a href="#">Solenostomus paegnius</a> Rough-snout Ghost Pipefish [68425]		Species or species habitat may occur within area
<a href="#">Stigmatopora argus</a> Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
<a href="#">Stigmatopora olivacea</a> a pipefish [74966]		Species or species habitat may occur within area
<a href="#">Syngnathoides biaculeatus</a> Double-end Pipehorse, Double-ended Pipehorse,		Species or species

Name	Threatened	Type of Presence
Alligator Pipefish [66279]		habitat may occur within area
<a href="#">Trachyrhamphus bicoarctatus</a> Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area

### Mammals

<a href="#">Dugong dugon</a> Dugong [28]		Species or species habitat known to occur within area
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### Reptiles

<a href="#">Aipysurus laevis</a> Olive Seasnake [1120]		Species or species habitat may occur within area
<a href="#">Aipysurus pooleorum</a> Shark Bay Seasnake [66061]		Species or species habitat may occur within area
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Breeding known to occur within area
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
<a href="#">Disteira kingii</a> Spectacled Seasnake [1123]		Species or species habitat may occur within area
<a href="#">Disteira major</a> Olive-headed Seasnake [1124]		Species or species habitat may occur within area
<a href="#">Emydocephalus annulatus</a> Turtle-headed Seasnake [1125]		Species or species habitat may occur within area
<a href="#">Ephalophis greyi</a> North-western Mangrove Seasnake [1127]		Species or species habitat may occur within area
<a href="#">Hydrophis elegans</a> Elegant Seasnake [1104]		Species or species habitat may occur within area
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
<a href="#">Pelamis platurus</a> Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area

### Whales and other Cetaceans

[ [Resource Information](#) ]

Name	Status	Type of Presence
<b>Mammals</b>		
<a href="#">Balaenoptera acutorostrata</a> Minke Whale [33]		Species or species habitat may occur within area
<a href="#">Balaenoptera edeni</a> Bryde's Whale [35]		Species or species habitat may occur within area

Name	Status	Type of Presence
<a href="#">Delphinus delphis</a> Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
<a href="#">Eubalaena australis</a> Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
<a href="#">Grampus griseus</a> Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
<a href="#">Megaptera novaeangliae</a> Humpback Whale [38]	Vulnerable	Congregation or aggregation known to occur within area
<a href="#">Orcinus orca</a> Killer Whale, Orca [46]		Species or species habitat may occur within area
<a href="#">Stenella attenuata</a> Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
<a href="#">Tursiops aduncus</a> Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
<a href="#">Tursiops truncatus s. str.</a> Bottlenose Dolphin [68417]		Species or species habitat may occur within area

## Extra Information

State and Territory Reserves	[ <a href="#">Resource Information</a> ]
Name	State
Chinamans Pool	WA
One Tree Point	WA

Invasive Species	[ <a href="#">Resource Information</a> ]
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 Resources Audit, 2001.	

Name	Status	Type of Presence
<b>Birds</b>		
<i>Columba livia</i> Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
<i>Streptopelia senegalensis</i> Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
<b>Mammals</b>		
<i>Capra hircus</i> Goat [2]		Species or species habitat likely to occur within area
<i>Felis catus</i> Cat, House Cat, Domestic Cat [19]		Species or species



Name	Status	Type of Presence
Oryctolagus cuniculus Rabbit, European Rabbit [128]		habitat likely to occur within area  Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area

#### Plants

Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat likely to occur within area
Cylindropuntia spp. Prickly Pears [85131]		Species or species habitat likely to occur within area
Prosopis spp. Mesquite, Algaroba [68407]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area

#### Nationally Important Wetlands

[ [Resource Information](#) ]

Name	State
<a href="#">McNeill Claypan System</a>	WA
<a href="#">Shark Bay East</a>	WA

# Caveat

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

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

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

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

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

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

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

- migratory and
- marine

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

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

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

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

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

## Coordinates

-24.8341 113.73449

# Acknowledgements

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

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

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



Please feel free to provide feedback via the [Contact Us](#) page.





**Appendix 3**  
**Site data**






Table A 1: Information collected at quadrats or relevés



Quadrat:	Q0 1	Described by:	Rochelle Haycock & Clare Courtauld	Date:	18/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	77568 5	m E	7251559	m N	
<b>Habitat:</b>	Hardpan plain					
<b>Soil:</b>	Orange sandy-loam surface crust (100%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	ASL (1)					
<b>Vegetation Type:</b>	Open Tall Shrubland of <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> with an Open Mid Shrubland of <i>Rhagodia eremaea</i> and a Sparse Low Shrubland of <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> and <i>Atriplex amnicola</i>					
<b>Vegetation Condition:</b>	2 (pristine or nearly so)					
<b>Disturbances:</b>	Weeds					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Abutilon fraseri</i> (RE), <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Acacia tetragonophylla</i> , <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> , <i>Atriplex amnicola</i> , <i>Atriplex codonocarpa</i> , <i>Capparis lasiantha</i> , <b><i>Cenchrus ciliaris</i></b> *, <i>Convolvulaceae</i> sp., <i>Convolvulus clementii</i> , <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> , <i>Exocarpos aphyllus</i> , <i>Maireana integra</i> , <i>Pluchea dunlopii</i> , <i>Ptilotus macrocephalus</i> , <i>Rhagodia eremaea</i> , <b><i>Sisymbrium erysimoides</i></b> *, <b><i>Sonchus oleraceus</i></b> *, <i>Tetragonia diptera</i> , <i>Zygophyllum retivalve</i>					
Quadrat:	Q0 2	Described by:	Rochelle Haycock & Clare Courtauld	Date:	18/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	77603 7	m E	7251763	m N	
<b>Habitat:</b>	Hardpan plain					
<b>Soil:</b>	Orange sandy-loam surface crust (100%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	ASL (1)					
<b>Vegetation Type:</b>	Sparse Tall Shrubland of <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> and <i>Acacia synchronicia</i> with a Sparse Mid Shrubland of <i>Atriplex amnicola</i> and <i>Maireana polypterygia</i> with a Sparse Tussock Grassland of <b><i>Cenchrus ciliaris</i></b> * and Isolated Low Shrubs of <i>Sclerolaena diacantha</i>					
<b>Vegetation Condition:</b>	3 (Vegetation structure altered)					
<b>Disturbances:</b>	Weeds					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Abutilon fraseri</i> (RE), <i>Abutilon oxycarpum</i> subsp. Prostrate (A.A. Mitchell PRP 1266), <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Acacia synchronicia</i> , <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> , <b><i>Asphodelus fistulosus</i></b> *, <i>Atriplex amnicola</i> , <i>Atriplex codonocarpa</i> , <i>Atriplex semilunaris</i> , <b><i>Cenchrus ciliaris</i></b> *, <b><i>Cenchrus setiger</i></b> *, <i>Chloris pumilio</i> , <i>Convolvulaceae</i> sp., <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> , <i>Euphorbia boophthona</i> , <i>Exocarpos aphyllus</i> , <i>Maireana integra</i> , <i>Maireana polypterygia</i> , <i>Pluchea dunlopii</i> , <i>Rhagodia eremaea</i> , <i>Rhodanthe stricta</i> , <i>Roebuckiella oncocarpa</i> , <i>Sclerolaena diacantha</i> , <i>Sclerolaena recurvicauspis</i> , <b><i>Sisymbrium erysimoides</i></b> *, <b><i>Sonchus oleraceus</i></b> *, <i>Tetragonia diptera</i> , <b><i>Vachellia farnesiana</i></b> *					



Quadrat:	Q0 3	Described by:	Rochelle Haycock & Clare Courtauld	Date:	18/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	77571 9	m E	7252108	m N	
<b>Habitat:</b>	Hardpan plain					
<b>Soil:</b>	Orange sandy-loam surface crust (100%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	ASL (1)					
<b>Vegetation Type:</b>	Tussock Grassland of <i>Cenchrus ciliaris</i> * and <i>Chloris pumilio</i> with a Sparse Tall Shrubland of <i>Acacia synchronicia</i> with a Sparse Mid Shrubland of <i>Rhagodia eremaea</i> and a Sparse Low Shrubland of <i>Atriplex amnicola</i>					
<b>Vegetation Condition:</b>	3 (Vegetation structure altered)					
<b>Disturbances:</b>	Weeds					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Abutilon oxycarpum</i> subsp. Prostrate (A.A. Mitchell PRP 1266), <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Acacia synchronicia</i> , <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> , <b><i>Asphodelus fistulosus</i>*</b> , <i>Atriplex amnicola</i> , <i>Atriplex semilunaris</i> , <b><i>Cenchrus ciliaris</i>*</b> , <b><i>Cenchrus setiger</i>*</b> , <i>Chloris pumilio</i> , <i>Commicarpus australis</i> , <i>Convolvulaceae</i> sp. , <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> , <i>Euphorbia boophthona</i> , <i>Gnephosis gynotricha</i> , <i>Hakea preissii</i> , <i>Maireana polypterygia</i> , <b><i>Malvastrum americanum</i>*</b> , <i>Ptilotus obovatus</i> , <i>Rhagodia eremaea</i> , <i>Sclerolaena recurvicaulis</i> , <b><i>Sisymbrium erysimoides</i>*</b> , <b><i>Sonchus oleraceus</i>*</b> , <i>Tetragonia diptera</i> , <i>Zygophyllum fruticosum</i>					
Quadrat:	Q0 4	Described by:	Rochelle Haycock & Clare Courtauld	Date:	17/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	77508 1	m E	7251552	m N	
<b>Habitat:</b>	Hardpan plain					
<b>Soil:</b>	Orange sandy-loam surface crust (100%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	ASL (1)					
<b>Vegetation Type:</b>	Open Tall Shrubland of <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> , <i>Scaevola spinescens</i> and <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> with an Open Tussock Grassland of <i>Chloris pumilio</i> and <b><i>Cenchrus ciliaris</i>*</b> with a Sparse Mid Shrubland of <i>Scaevola spinescens</i> and <i>Rhagodia eremaea</i> and a Sparse Low Shrubland of <i>Maireana aphylla</i>					
<b>Vegetation Condition:</b>	3 (Vegetation structure altered)					
<b>Disturbances:</b>	Weeds					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Abutilon geranioides</i> , <i>Abutilon oxycarpum</i> subsp. Prostrate (A.A. Mitchell PRP 1266), <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Acacia tetragonophylla</i> , <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> , <i>Atriplex amnicola</i> , <i>Atriplex codonocarpa</i> , <b><i>Cenchrus ciliaris</i>*</b> , <i>Chloris pumilio</i> , <i>Convolvulaceae</i> sp. , <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> , <i>Exocarpos aphyllus</i> , <i>Maireana aphylla</i> , <i>Ptilotus divaricatus</i> , <i>Ptilotus obovatus</i> , <i>Rhagodia eremaea</i> , <i>Scaevola spinescens</i> , <i>Setaria dielsii</i> , <b><i>Sonchus oleraceus</i>*</b> , <i>Tetragonia diptera</i>					







Quadrat:	Q0 5	Described by:	Rochelle Haycock & Clare Courtauld	Date:	17/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	77475 2	m E	7251554	m N	
<b>Habitat:</b>	Hardpan plain					
<b>Soil:</b>	Orange Sandy-loam surface crust (100%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	ASL (1)					
<b>Vegetation Type:</b>	Open Low Shrubland of <i>Maireana polypterygia</i> , <i>Atriplex amnicola</i> and <i>Ptilotus obovatus</i> with Sparse Tall Shrubland of <i>Acacia synchronicia</i>					
<b>Vegetation Condition:</b>	3 (Vegetation structure altered)					
<b>Disturbances:</b>	Weeds					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Abutilon oxycarpum</i> subsp. Prostrate (A.A. Mitchell PRP 1266), <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Acacia synchronicia</i> , <i>Acacia tetragonophylla</i> , <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> , <i>Atriplex amnicola</i> , <i>Atriplex codonocarpa</i> , <b><i>Cenchrus ciliaris</i>*</b> , <i>Chloris pumilio</i> , <i>Convolvulaceae</i> sp. , <i>Exocarpos aphyllus</i> , <i>Maireana aphylla</i> , <i>Maireana polypterygia</i> , <i>Pluchea dunlopii</i> , <i>Ptilotus obovatus</i> , <i>Rhagodia eremaea</i> , <i>Rhodanthe</i> sp., <i>Scaevola spinescens</i> , <i>Sclerolaena eurotioides</i> , <i>Setaria dielsii</i> , <b><i>Sisymbrium erysimoides</i>*</b> , <i>Tetragonia diptera</i> , <i>Threlkeldia diffusa</i>					
Quadrat:	Q0 6	Described by:	Scott Hitchcock & Daniel Panickar	Date:	18/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	77395 2	m E	7251241	m N	
<b>Habitat:</b>	Hardpan plain					
<b>Soil:</b>	Red-orange clay loose soil (50%), surface crust (50%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	CSL (4)					
<b>Vegetation Type:</b>	Open Low Shrubland of <i>Pluchea dunlopii</i> and <i>Maireana aphylla</i> with a Sparse Tussock Grassland of <b><i>Cenchrus ciliaris</i>*</b> and Isolated Tall Shrubs of <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i>					
<b>Vegetation Condition:</b>	3 (Vegetation structure altered)					
<b>Disturbances:</b>	Grazing, weeds					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Abutilon geranioides</i> , <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Acacia synchronicia</i> , <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> , <i>Aristida holathera</i> var. <i>holathera</i> , <i>Atriplex amnicola</i> , <i>Atriplex holocarpa</i> , <i>Atriplex semilunaris</i> , <i>Calandrinia polyandra</i> , <b><i>Cenchrus ciliaris</i>*</b> , <b><i>Cenchrus setiger</i>*</b> , <i>Chloris pumilio</i> , <b><i>Chloris virgata</i>*</b> , <b><i>Cucumis variabilis</i> (RE)</b> , <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> , <i>Euphorbia boophthona</i> , <i>Gnephosis arachnoidea</i> , <i>Maireana aphylla</i> , <i>Maireana integra</i> , <i>Maireana polypterygia</i> , <i>Pluchea dunlopii</i> , <i>Rhagodia eremaea</i> , <i>Scaevola spinescens</i> , <i>Sclerolaena eriacantha</i> , <i>Sclerolaena eurotioides</i> , <b><i>Sisymbrium erysimoides</i>*</b> , <b><i>Sonchus oleraceus</i>*</b>					



Quadrat:	Q07	Described by:	Scott Hitchcock & Daniel Panickar	Date:	17/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	774224	m E	7251340	m N	No photo available
<b>Habitat:</b>	Alluvial plain (Saline plain)					
<b>Soil:</b>	Red-orange clay-loam surface crust (40%), loose soil (60%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	CSL (4)					
<b>Vegetation Type:</b>	Open Low Shrubland of <i>Maireana aphylla</i> and <i>Maireana polypterygia</i> with an Open Tussock Grassland of <b><i>Cenchrus ciliaris</i>*</b> , <b><i>Chloris virgata</i>*</b> and <i>Chloris pumilio</i>					
<b>Vegetation Condition:</b>	3 (Vegetation structure altered)					
<b>Disturbances:</b>	Grazing, weeds, track					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Aristida contorta</i> , <i>Aristida holathera</i> var. <i>holathera</i> , <i>Atriplex amnicola</i> , <i>Atriplex holocarpa</i> , <i>Atriplex semilunaris</i> , <b><i>Cenchrus ciliaris</i>*</b> , <i>Chloris pumilio</i> , <b><i>Chloris virgata</i>*</b> , <i>Crassula colorata</i> var. <i>acuminata</i> , <i>Eragrostis dielsii</i> , <i>Eriachne pulchella</i> subsp. <i>dominii</i> , <i>Erodium cygnorum</i> , <i>Gnephosis arachnoidea</i> , <i>Maireana aphylla</i> , <i>Maireana integra</i> , <i>Maireana polypterygia</i> , <i>Rhodanthe stricta</i> , <i>Sclerolaena eurotioides</i> , <i>Sclerolaena recurvicaulis</i> , <i>Sporobolus caroli</i> , <i>Sporobolus mitchellii</i> , <i>Tetragonia diptera</i> , <i>Threlkeldia diffusa</i>					
Quadrat:	Q08	Describe d by:	Scott Hitchcock & Daniel Panickar	Date:	18/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	773411	m E	7250999	m N	
<b>Habitat:</b>	Sandplain					
<b>Soil:</b>	Red-orange fine sand loose soil (100%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	ASL (2)					
<b>Vegetation Type:</b>	Open Tussock Grassland of <i>Cenchrus ciliaris</i> * with Sparse Mid Shrubland of <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> and Sparse Low Shrubland of <i>Heliotropium ammophilum</i> , <b><i>Corchorus ?congener (potential P3)</i></b>					
<b>Vegetation Condition:</b>	3 (Vegetation structure altered)					
<b>Disturbances:</b>	Weeds, grazing					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <b><i>Asphodelus fistulosus</i>*</b> , <i>Atriplex amnicola</i> , <i>Atriplex semilunaris</i> , <b><i>Brassica rapa</i>* (RE)</b> , <i>Calandrinia polyandra</i> , <i>Calocephalus francisii</i> , <b><i>Cenchrus ciliaris</i>*</b> , <b><i>Cenchrus setiger</i>*</b> , <i>Commicarpus australis</i> , <b><i>Corchorus ?congener (potential P3)</i></b> , <i>Heliotropium ammophilum</i> , <i>Nicotiana simulans</i> , <i>Rhagodia eremaea</i> , <i>Rhodanthe citrina</i> , <i>Senna glutinosa</i> subsp. <i>x luerssenii</i> , <b><i>Sonchus oleraceus</i>*</b> , <i>Tephrosia supina</i> , <i>Thryptomene baeckeacea</i> , <i>Tribulus</i> sp., <i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>					



Quadrat:	Q0 9	Described by:	Scott Hitchcock & Daniel Panickar	Date:	18/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	77325 0	m E	7251151	m N	
<b>Habitat:</b>	Hardpan plain					
<b>Soil:</b>	Red-orange clay-loam loose soil (50%), surface crust (50%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	ASL (1)					
<b>Vegetation Type:</b>	Tussock Grassland of <i>Cenchrus ciliaris</i> *, <i>C. setiger</i> * and <i>Chloris virgata</i> * with a Sparse Mid Shrubland of <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> and <i>Acacia synchronicia</i>					
<b>Vegetation Condition:</b>	3 (Vegetation structure altered)					
<b>Disturbances:</b>	Weeds					
<b>Fire Age:</b>	Moderate (1-5 yrs)					
<b>Species:</b>	<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Acacia synchronicia</i> , <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> , <i>Atriplex amnicola</i> , <i>Atriplex codonocarpa</i> , <i>Atriplex semilunaris</i> , <i>Calandrinia polyandra</i> , <i>Cenchrus ciliaris</i> *, <i>Cenchrus setiger</i> *, <i>Chloris pumilio</i> , <i>Chloris virgata</i> *, <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> , <i>Maireana integra</i> , <i>Pluchea dunlopilii</i> , <i>Ptilotus obovatus</i> , <i>Rhagodia eremaea</i> , <i>Scaevola spinescens</i> , <i>Sclerolaena eurotioides</i> , <i>Sclerolaena recurvicauspis</i> , <i>Sisymbrium erysimoides</i> *, <i>Sonchus oleraceus</i> *					
Quadrat:	Q1 0	Described by:	Scott Hitchcock & Daniel Panickar	Date:	18/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	77303 8	m E	7250772	m N	
<b>Habitat:</b>	Hardpan plain					
<b>Soil:</b>	Red-orange clay-loam surface crust (60%), loose soil (40%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	ASL (2)					
<b>Vegetation Type:</b>	Sparse Tussock Grassland of <i>Chloris virgata</i> *, <i>Cenchrus ciliaris</i> *, <i>Chloris pumilio</i> with Isolated Low Shrubs of <i>Rhagodia eremaea</i>					
<b>Vegetation Condition:</b>	2 (pristine or nearly so)					
<b>Disturbances:</b>	Weeds					
<b>Fire Age:</b>	Old (> 5yrs)					
<b>Species:</b>	<i>Acacia synchronicia</i> , <i>Alternanthera nodiflora</i> , <i>Atriplex amnicola</i> , <i>Atriplex holocarpa</i> , <i>Atriplex semilunaris</i> , <i>Cenchrus ciliaris</i> *, <i>Cenchrus setiger</i> *, <i>Chloris pumilio</i> , <i>Chloris virgata</i> *, <i>Commicarpus australis</i> , <i>Cucumis variabilis</i> (RE), <i>Eucalyptus victrix</i> , <i>Gnephosis arachnoidea</i> , <i>Pluchea dunlopilii</i> , <i>Ptilotus obovatus</i> , <i>Rhagodia eremaea</i> , <i>Sclerolaena eriacantha</i> , <i>Sclerolaena eurotioides</i> , <i>Sisymbrium erysimoides</i> *, <i>Sonchus oleraceus</i> *					

Quadrat:	Q1 1	Described by:	Scott Hitchcock & Rochelle Haycock	Date:	20/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	77373 2	m E	7249909	m N	
<b>Habitat:</b>	Hardpan plain					
<b>Soil:</b>	Orange sandy-loam surface crust (100%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	ASL (1)					
<b>Vegetation Type:</b>	Tussock Grassland of <i>Cenchrus ciliaris</i> * with a Sparse Tall Shrubland of <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> and a Sparse Mid Shrubland of <i>Rhagodia eremaea</i>					
<b>Vegetation Condition:</b>	3 (Vegetation structure altered)					
<b>Disturbances:</b>	Weeds, grazing					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Abutilon oxycarpum</i> subsp. Prostrate (A.A. Mitchell PRP 1266), <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> , <i>Atriplex semilunaris</i> , <i>Cenchrus ciliaris</i> *, <i>Convolvulaceae</i> sp. , <i>Cucumis variabilis</i> (RE), <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> , <i>Eriachne pulchella</i> subsp. <i>dominii</i> , <i>Euphorbia boophthona</i> , <i>Ptilotus macrocephalus</i> , <i>Rhagodia eremaea</i> , <i>Rumex vesicarius</i> *, <i>Scaevola spinescens</i> , <i>Sisymbrium erysimoides</i> *, <i>Sonchus oleraceus</i> *, <i>Tetragonia diptera</i>					
Quadrat:	Q1 2	Described by:	Scott Hitchcock & Daniel Panickar	Date:	18/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	77325 8	m E	7249598	m N	
<b>Habitat:</b>	Hardpan plain					
<b>Soil:</b>	Red-orange clay-loam surface crust (60%), loose soil (40%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	CSL (4)					
<b>Vegetation Type:</b>	Open Low Shrubland of <i>Atriplex amnicola</i> with Isolated Tall Shrubs of <i>Hakea preissii</i> , <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i>					
<b>Vegetation Condition:</b>	3 (Vegetation structure altered)					
<b>Disturbances:</b>	Weeds, grazing					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> , <i>Aristida holathera</i> var. <i>holathera</i> , <i>Atriplex amnicola</i> , <i>Atriplex holocarpa</i> , <i>Atriplex semilunaris</i> , <i>Calandrinia polyandra</i> , <i>Cenchrus ciliaris</i> *, <i>Cenchrus setiger</i> *, <i>Chenopodium gaudichaudianum</i> , <i>Chloris pumilio</i> , <i>Chloris virgata</i> *, <i>Exocarpos aphyllus</i> , <i>Gnephosis arachnoidea</i> , <i>Hakea preissii</i> , <i>Maireana integra</i> , <i>Pogonolepis stricta</i> , <i>Rhagodia eremaea</i> , <i>Rhodanthe stricta</i> , <i>Scaevola spinescens</i> , <i>Setaria dielsii</i> , <i>Sonchus oleraceus</i> *, <i>Threlkeldia diffusa</i>					



Quadrat:	Q1 3	Described by:	Rochelle Haycock & Clare Courtauld	Date:	18/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	77603 4	m E	7251033	m N	
<b>Habitat:</b>	Hardpan plain					
<b>Soil:</b>	Orange sandy-loam surface crust (100%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	ASL (1)					
<b>Vegetation Type:</b>	Open Tussock Grassland of <i>Cenchrus ciliaris</i> * and <i>Chloris pumilio</i> with a Sparse Tall Shrubland of <i>Acacia synchronicia</i> with a Sparse Mid Shrubland of <i>Rhagodia eremaea</i> and a Sparse Low Shrubland of <i>Atriplex amnicola</i>					
<b>Vegetation Condition:</b>	3 (Vegetation structure altered)					
<b>Disturbances:</b>	Weeds					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Acacia synchronicia</i> , <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> , <b><i>Asphodelus fistulosus</i>*</b> , <i>Atriplex amnicola</i> , <i>Atriplex codonocarpa</i> , <i>Atriplex semilunaris</i> , <i>Calandrinia polyandra</i> , <b><i>Cenchrus ciliaris</i>*</b> , <b><i>Cenchrus setiger</i>*</b> , <i>Chloris pumilio</i> , <i>Commicarpus australis</i> , <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> , <i>Rhagodia eremaea</i> , <i>Rhodanthe condensata</i> , <i>Rhodanthe stricta</i> , <i>Sclerolaena recurvicauspis</i> , <b><i>Sisymbrium erysimoides</i>*</b> , <i>Solanum orbiculatum</i> subsp. <i>orbiculatum</i> , <i>Tetragonia diptera</i> , <i>Zygophyllum retinale</i>					
Quadrat:	Q1 4	Described by:	Scott Hitchcock & Daniel Panickar	Date:	19/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	77452 3	m E	7251361	m N	
<b>Habitat:</b>	Creek					
<b>Soil:</b>	Orange clay-loam loose soil (100%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	EWL (3)					
<b>Vegetation Type:</b>	Open Tussock Grassland of <i>Cenchrus ciliaris</i> * and <i>Urochloa piligera</i> with an Open Low Woodland of <i>Eucalyptus victrix</i>					
<b>Vegetation Condition:</b>	3 (Vegetation structure altered)					
<b>Disturbances:</b>	Weeds, grazing, track					
<b>Fire Age:</b>	Old (> 5yrs)					
<b>Species:</b>	<i>Abutilon geranioides</i> , <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> , <i>Alternanthera nodiflora</i> , <i>Atriplex semilunaris</i> , <b><i>Cenchrus ciliaris</i>*</b> , <b><i>Chloris virgata</i>*</b> , <b><i>Cucumis variabilis</i> (RE)</b> , <i>Eucalyptus victrix</i> , <i>Maireana integra</i> , <i>Ptilotus divaricatus</i> , <i>Ptilotus obovatus</i> , <i>Ptilotus polystachyus</i> , <b><i>Sonchus oleraceus</i>*</b> , <i>Streptoglossa macrocephala</i> , <i>Urochloa piligera</i> , <b><i>Vachellia farnesiana</i>*</b>					



Quadrat:	Q1 5	Described by:	Rochelle Haycock & Clare Courtauld	Date:	18/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	77520 0	m E	7247477	m N	
<b>Habitat:</b>	Floodplain					
<b>Soil:</b>	Orange sandy-loam surface crust (100%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	CDSL (6)					
<b>Vegetation Type:</b>	Mid Shrubland of <i>Chenopodium auricomum</i> and <i>Duma florulenta</i> with Isolated Low Trees of <i>Eucalyptus victrix</i>					
<b>Vegetation Condition:</b>	2 (pristine or nearly so)					
<b>Disturbances:</b>	Grazing					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> , <i>Alternanthera nana</i> , <i>Amyema preissii</i> , <i>Atriplex amnicola</i> , <i>Chenopodium auricomum</i> , <i>Duma florulenta</i> , <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> , <i>Eucalyptus victrix</i> , <i>Eulalia aurea</i> , <i>Panicum decompositum</i> , <i>Sporobolus mitchellii</i>					
Quadrat:	Q1 6	Described by:	Rochelle Haycock & Clare Courtauld	Date:	18/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	775439	m E	7247519	m N	
<b>Habitat:</b>	Floodplain					
<b>Soil:</b>	Orange sandy-loam shallow cracking clay (100%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	CDSL (6)					
<b>Vegetation Type:</b>	Mid Shrubland of <i>Chenopodium auricomum</i> and <i>Duma florulenta</i> with a Sparse Low Shrubland of <i>Chenopodium auricomum</i> and <i>Duma florulenta</i> and Isolated Low Trees of <i>Eucalyptus victrix</i>					
<b>Vegetation Condition:</b>	2 (pristine or nearly so)					
<b>Disturbances:</b>	Grazing					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Alternanthera nana</i> , <i>Atriplex semilunaris</i> , <i>Chenopodium auricomum</i> , <i>Duma florulenta</i> , <i>Eucalyptus victrix</i> , <i>Eulalia aurea</i> , <i>Panicum decompositum</i> , <i>Sporobolus mitchellii</i>					



Quadrat:	Q1 7	Described by:	Rochelle Haycock & Clare Courtauld	Date:	18/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	77582 1	m E	7247446	m N	
<b>Habitat:</b>	Depression					
<b>Soil:</b>	Orange sandy-loam deep cracking clay (100%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	CDSL (6)					
<b>Vegetation Type:</b>	Open Tussock Grassland of <i>Panicum decompositum</i> with a Sparse Low Shrubland of <i>Chenopodium auricomum</i> and <i>Duma florulenta</i>					
<b>Vegetation Condition:</b>	2 (pristine or nearly so)					
<b>Disturbances:</b>	Weeds					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Alternanthera nana</i> , <i>Chenopodium auricomum</i> , <i>Chenopodium</i> sp., <i>Duma florulenta</i> , <i>Panicum decompositum</i> , <i>Ptilotus macrocephalus</i> , <b><i>Sisymbrium erysimoides</i>*</b> , <b><i>Sonchus oleraceus</i>*</b> , <i>Sporobolus mitchellii</i> , <i>Stemodia grossa</i>					
Quadrat:	Q1 8	Described by:	Scott Hitchcock & Daniel Panickar	Date:	18/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	77675 9	m E	7247666	m N	
<b>Habitat:</b>	Floodplain					
<b>Soil:</b>	Orange clay-loam surface crust (100%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	ASL (1)					
<b>Vegetation Type:</b>	Open Tall Shrubland of <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> with an Open Mid Shrubland of <i>Rhagodia eremaea</i> and an Open Low Woodland of <i>Eucalyptus victrix</i>					
<b>Vegetation Condition:</b>	2 (pristine or nearly so)					
<b>Disturbances:</b>	Weeds					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Acacia synchronicia</i> , <i>Atriplex amnicola</i> , <i>Capparis lasiantha</i> , <b><i>Cenchrus ciliaris</i>*</b> , <b><i>Cenchrus setiger</i>*</b> , <i>Convolvulaceae</i> sp. , <i>Convolvulus clementii</i> , <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> , <i>Eucalyptus victrix</i> , <i>Euphorbia boophthona</i> , <i>Pimelea microcephala</i> subsp. <i>microcephala</i> , <i>Poaceae</i> sp., <i>Ptilotus obovatus</i> , <i>Rhagodia eremaea</i> , <i>Rhodanthe stricta</i> , <i>Scaevola spinescens</i> , <i>Setaria dielsii</i> , <b><i>Sisymbrium erysimoides</i>*</b> , <b><i>Sonchus oleraceus</i>*</b> , <i>Tetragonia diptera</i>					



Quadrat:	Q1 9	Described by:	Scott Hitchcock & Daniel Panickar	Date:	18/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	77745 9	m E	7247990	m N	
<b>Habitat:</b>	Claypan					
<b>Soil:</b>	Red-orange clay surface crust (90%), loose soil (10%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	ASL (2)					
<b>Vegetation Type:</b>	Open Tussock Grassland of Poaceae sp. indet, <b>Cenchrus ciliaris*</b> with a Sparse Mid Shrubland of <i>Acacia synchronicia</i> and <i>Scaevola spinescens</i>					
<b>Vegetation Condition:</b>	3 (Vegetation structure altered)					
<b>Disturbances:</b>	Weeds, grazing, road					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Acacia synchronicia</i> , <i>Acacia tetragonophylla</i> , <i>Atriplex amnicola</i> , <i>Atriplex holocarpa</i> , <i>Atriplex semilunaris</i> , <i>Calandrinia polyandra</i> , <b>Cenchrus ciliaris*</b> , <i>Chloris pumilio</i> , <i>Convolvulaceae sp.</i> , <i>Convolvulus clementii</i> , <i>Pluchea dunlopii</i> , <i>Poaceae sp.</i> , <i>Rhagodia eremaea</i> , <i>Scaevola spinescens</i> , <b>Sonchus oleraceus*</b> , <i>Tetragonia diptera</i>					
Quadrat:	Q2 0	Described by:	Scott Hitchcock, Daniel Panickar, Rochelle Haycock & Clare Courtauld	Date:	17/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	78028 2	m E	7249885	m N	
<b>Habitat:</b>	Floodplain					
<b>Soil:</b>	Orange sandy-loam loose soil (100%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	ASL (1)					
<b>Vegetation Type:</b>	Tussock Grassland of <i>Cenchrus ciliaris*</i> and <i>Cenchrus setiger*</i> with an Open Mid Shrubland of <i>Acacia tetragonophylla</i> and a Sparse Low Shrubland of <i>Maireana polypterygia</i> and <i>Maireana aphylla</i>					
<b>Vegetation Condition:</b>	3 (Vegetation structure altered)					
<b>Disturbances:</b>	Weeds					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Acacia synchronicia</i> , <i>Acacia tetragonophylla</i> , <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> , <i>Atriplex semilunaris</i> , <b>Cenchrus ciliaris*</b> , <b>Cenchrus setiger*</b> , <b>Chloris virgata*</b> , <i>Convolvulaceae sp.</i> , <i>Convolvulus clementii</i> , <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> , <i>Exocarpos aphyllus</i> , <i>Maireana aphylla</i> , <i>Maireana polypterygia</i> , <i>Nicotiana sp.</i> , <i>Ptilotus obovatus</i> , <i>Rhagodia eremaea</i> , <i>Scaevola spinescens</i> , <b>Sonchus oleraceus*</b> , <i>Streptoglossa macrocephala</i>					







Quadrat:	Q2 1	Described by:	Scott Hitchcock & Rochelle Haycock	Date:	20/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	78030 5	m E	7250173	m N	
<b>Habitat:</b>	Hardpan plain					
<b>Soil:</b>	Orange sandy-loam surface crust (100%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	ASL (1)					
<b>Vegetation Type:</b>	Sparse Tussock Grassland of <i>Cenchrus ciliaris</i> * with Isolated Low Trees of <i>Eucalyptus victrix</i> with Isolated Tall Shrubs of <i>Acacia synchronicia</i> with Isolated Mid Shrubs of <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> and <i>Rhagodia eremaea</i> and Isolated Low Shrubs of <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> and <i>Ptilotus obovatus</i>					
<b>Vegetation Condition:</b>	3 (Vegetation structure altered)					
<b>Disturbances:</b>	Weeds, grazing					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Abutilon oxycarpum</i> subsp. Prostrate (A.A. Mitchell PRP 1266), <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Acacia synchronicia</i> , <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> , <i>Atriplex semilunaris</i> , <i>Cenchrus ciliaris</i> *, <i>Cenchrus setiger</i> *, <i>Convolvulaceae</i> sp. , <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> , <i>Erodium cygnorum</i> , <i>Eucalyptus victrix</i> , <i>Ptilotus obovatus</i> , <i>Rhagodia eremaea</i> , <i>Santalum lanceolatum</i> , <i>Sclerolaena eurotioides</i> , <i>Sclerolaena recurvicaulis</i> , <i>Sisymbrium erysimoides</i> *, <i>Sonchus oleraceus</i> *, <i>Tetragonia diptera</i> , <i>Wahlenbergia tumidifruca</i> , <i>Zygophyllum retivalve</i>					
Quadrat:	Q2 2	Described by:	Scott Hitchcock & Daniel Panickar	Date:	19/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	78133 3	m E	7250635	m N	
<b>Habitat:</b>	Hardpan plain					
<b>Soil:</b>	Orange clay surface crust (80%), loose soil (20%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	EWL (3)					
<b>Vegetation Type:</b>	Open Low Shrubland of <i>Atriplex semilunaris</i> with a Sparse Mid Shrubland of <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Acacia tetragonophylla</i> and <i>Rhagodia eremaea</i> with a Sparse Tussock Grassland of <i>Cenchrus ciliaris</i> *, <i>Eriachne pulchella</i> subsp. <i>dominii</i> with a Sparse Forbland of <i>Tetragonia diptera</i> and Isolated Low Trees of <i>Eucalyptus victrix</i>					
<b>Vegetation Condition:</b>	3 (Vegetation structure altered)					
<b>Disturbances:</b>	Weeds, grazing					
<b>Fire Age:</b>	Moderate (1-5 yrs)					
<b>Species:</b>	<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Acacia tetragonophylla</i> , <i>Atriplex holocarpa</i> , <i>Atriplex semilunaris</i> , <i>Cenchrus ciliaris</i> *, <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> , <i>Eucalyptus victrix</i> , <i>Maireana integra</i> , <i>Malvastrum americanum</i> *, <i>Ptilotus polystachyus</i> , <i>Rhagodia eremaea</i> , <i>Rhodanthe stricta</i> , <i>Scaevola spinescens</i> , <i>Sclerolaena ericantha</i> , <i>Sclerolaena eurotioides</i> , <i>Sonchus oleraceus</i> *, <i>Tetragonia diptera</i> , <i>Vachellia farnesiana</i> *					



Quadrat:	Q2 3	Described by:	Scott Hitchcock & Daniel Panickar	Date:	18/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	77710 4	m E	7247785	m N	
<b>Habitat:</b>	Hardpan plain					
<b>Soil:</b>	Red-orange clay-loam shallow cracking clay (90%), loose soil (10%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	CSL (4)					
<b>Vegetation Type:</b>	Sparse Low Shrubland of <i>Atriplex amnicola</i> and <i>Maireana aphylla</i>					
<b>Vegetation Condition:</b>	3 (Vegetation structure altered)					
<b>Disturbances:</b>	Weeds					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Atriplex amnicola</i> , <i>Atriplex holocarpa</i> , <b><i>Cenchrus ciliaris</i>*</b> , <b><i>Cenchrus setiger</i>*</b> , <i>Chloris pumilio</i> , <b><i>Chloris virgata</i>*</b> , <i>Erodium cygnorum</i> , <i>Gunnopsia septifraga</i> , <i>Maireana aphylla</i> , Poaceae sp., <i>Sclerolaena eriantha</i> , <b><i>Sonchus oleraceus</i>*</b> , <i>Sporobolus caroli</i> , <i>Threlkeldia diffusa</i> , <i>Urochloa piligera</i>					
Quadrat:	Q2 4	Described by:	Scott Hitchcock & Rochelle Haycock	Date:	20/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	78123 9	m E	7251523	m N	
<b>Habitat:</b>	Floodplain					
<b>Soil:</b>	Orange sandy-loam surface crust (100%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	EWL (3)					
<b>Vegetation Type:</b>	Tussock Grassland of <b><i>Cenchrus ciliaris</i>*</b> and <b><i>Cenchrus setiger</i>*</b> with a Low Woodland of <i>Eucalyptus victrix</i> with a Sparse Tall Shrubland of <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> and <i>Acacia tetragonophylla</i> with Isolated Mid Shrubs of <i>Rhagodia eremaea</i> and Isolated Low Shrubs of <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> and <i>Ptilotus divaricatus</i>					
<b>Vegetation Condition:</b>	3 (Vegetation structure altered)					
<b>Disturbances:</b>	Weeds, grazing					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Abutilon geranioides</i> , <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Acacia tetragonophylla</i> , <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> , <i>Atriplex semilunaris</i> , <i>Calocephalus knappii</i> , <b><i>Cenchrus ciliaris</i>*</b> , <b><i>Cenchrus setiger</i>*</b> , <b><i>Chenopodium murale</i>*</b> , <i>Convolvulaceae</i> sp., <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> , <i>Eucalyptus victrix</i> , <b><i>Malvastrum americanum</i>*</b> , <i>Ptilotus divaricatus</i> , <i>Ptilotus macrocephalus</i> , <i>Rhagodia eremaea</i> , <i>Santalum lanceolatum</i> , <i>Scaevola spinescens</i> , <i>Sclerolaena eurotioides</i> , <i>Senna glutinosa</i> subsp. <i>x luerssenii</i> , <b><i>Sisymbrium erysimoides</i>*</b> , <b><i>Sonchus oleraceus</i>*</b> , <i>Tetragonia diptera</i>					



Quadrat:	Q2 5	Described by:	Rochelle Haycock & Clare Courtauld	Date:	18/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	77635 9	m E	7247716	m N	
<b>Habitat:</b>	Floodplain					
<b>Soil:</b>	Orange Sandy-loam surface crust (100%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	ASL (1)					
<b>Vegetation Type:</b>	Open Mid Shrubland of <i>Scaevola spinescens</i> and <i>Rhagodia eremaea</i> with a Sparse Low Shrubland of <i>Scaevola spinescens</i> and Isolated Low Trees of <i>Eucalyptus victrix</i>					
<b>Vegetation Condition:</b>	2 (pristine or nearly so)					
<b>Disturbances:</b>	Weeds					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Acacia synchronicia</i> , <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> , <b><i>Asphodelus fistulosus</i>*</b> , <i>Atriplex amnicola</i> , <i>Atriplex codonocarpa</i> , <i>Atriplex semilunaris</i> , <b><i>Cenchrus ciliaris</i>*</b> , <b><i>Cenchrus setiger</i>*</b> , <i>Chloris pumilio</i> , <i>Cratystylis subspinescens</i> , <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> , <i>Eucalyptus victrix</i> , <i>Eulalia aurea</i> , <i>Hakea preissii</i> , <i>Maireana aphylla</i> , <i>Ptilotus macrocephalus</i> , <i>Rhagodia eremaea</i> , <i>Rhodanthe</i> sp., <i>Roebuckiella oncocarpa</i> , <i>Scaevola spinescens</i> , <i>Sclerolaena eurotioides</i> , <b><i>Sonchus oleraceus</i>*</b> , <i>Tetragonia diptera</i> , <i>Zygophyllum retivalve</i>					
Quadrat:	Q2 6	Described by:	Rochelle Haycock & Clare Courtauld	Date:	19/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	78128 3	m E	7253379	m N	
<b>Habitat:</b>	Hardpan plain					
<b>Soil:</b>	Orange sandy-loam surface crust (100%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	ASL (1)					
<b>Vegetation Type:</b>	Open Tussock Grassland of <b><i>Cenchrus ciliaris</i>*</b> with a Sparse Tall Shrubland of <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Acacia synchronicia</i> and <i>Hakea preissii</i> and a Sparse Mid Shrubland of <i>Rhagodia eremaea</i>					
<b>Vegetation Condition:</b>	3 (Vegetation structure altered)					
<b>Disturbances:</b>	Weeds					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Acacia synchronicia</i> , <i>Acacia tetragonophylla</i> , <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> , <i>Atriplex semilunaris</i> , <b><i>Cenchrus ciliaris</i>*</b> , <b><i>Cenchrus setiger</i>*</b> , <i>Chloris pumilio</i> , <i>Commicarpus australis</i> , <i>Convolvulaceae</i> sp., <i>Hakea preissii</i> , <i>Ptilotus macrocephalus</i> , <i>Ptilotus obovatus</i> , <i>Rhagodia eremaea</i> , <b><i>Sisymbrium erysimoides</i>*</b> , <b><i>Sonchus oleraceus</i>*</b> , <i>Tetragonia diptera</i>					

Quadrat:	Q2 7	Described by:	Rochelle Haycock & Clare Courtauld	Date:	19/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	78045 8	m E	7253200	m N	
<b>Habitat:</b>	Hardpan plain					
<b>Soil:</b>	Orange sandy-loam surface crust (100%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	ASL (1)					
<b>Vegetation Type:</b>	Sparse Tall Shrubland of <i>Acacia synchronicia</i> and <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> with Isolated Mid Shrubs of <i>Rhagodia eremaea</i>					
<b>Vegetation Condition:</b>	3 (Vegetation structure altered)					
<b>Disturbances:</b>	Weeds, grazing					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Acacia synchronicia</i> , <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> , <i>Atriplex codonocarpa</i> , <i>Calocephalus knappii</i> , <b><i>Cenchrus ciliaris</i>*</b> , <i>Chloris pumilio</i> , <i>Erodium cygnorum</i> , <i>Euphorbia boophthona</i> , <i>Gnephosis arachnoidea</i> , <i>Ptilotus macrocephalus</i> , <i>Ptilotus obovatus</i> , <i>Rhagodia eremaea</i> , <i>Sclerolaena eurotioides</i> , <b><i>Sisymbrium erysimoides</i>*</b> , <b><i>Sonchus oleraceus</i>*</b> , <i>Tetragonia diptera</i> , <i>Zygophyllum retivalve</i>					
Quadrat:	Q2 8	Described by:	Rochelle Haycock & Clare Courtauld	Date:	19/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	78083 4	m E	7253554	m N	
<b>Habitat:</b>	Hardpan plain					
<b>Soil:</b>	Orange sandy-loam surface crust (100%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	CSL (5)					
<b>Vegetation Type:</b>	Open Chenopod Shrubland of <i>Maireana polypterygia</i>					
<b>Vegetation Condition:</b>	2 (pristine or nearly so)					
<b>Disturbances:</b>	Weeds, grazing					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<b><i>Asphodelus fistulosus</i>*</b> , <i>Atriplex codonocarpa</i> , <i>Atriplex semilunaris</i> , <b><i>Cenchrus ciliaris</i>*</b> , <i>Eriachne pulchella</i> subsp. <i>dominii</i> , <i>Helipterum craspedioides</i> , <i>Maireana polypterygia</i> , <i>Roebuckiella oncocarpa</i> , <i>Sclerolaena eurotioides</i> , <i>Tetragonia diptera</i> , <i>Zygophyllum retivalve</i>					

Quadrat:	Q29	Described by:	Rochelle Haycock & Clare Courtauld	Date:	19/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	78136 8	m E	7254079	m N	
<b>Habitat:</b>	Hardpan plain					
<b>Soil:</b>	Orange sandy-loam surface crust (100%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	ASL (1)					
<b>Vegetation Type:</b>	Sparse Tall Shrubland of <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> with a Sparse Mid Shrubland of <i>Rhagodia eremaea</i> with a Sparse Low Shrubland of <i>Atriplex amnicola</i> and <i>Rhagodia eremaea</i> and a Sparse Tussock Grassland of <b><i>Cenchrus ciliaris</i>*</b>					
<b>Vegetation Condition:</b>	3 (Vegetation structure altered)					
<b>Disturbances:</b>	Weeds, grazing					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Acacia synchronicia</i> , <i>Acacia tetragonophylla</i> , <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> , <i>Atriplex amnicola</i> , <i>Atriplex codonocarpa</i> , <b><i>Cenchrus ciliaris</i>*</b> , <i>Chloris pumilio</i> , <i>Convolvulaceae</i> sp. , <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> , <i>Exocarpos aphyllus</i> , <i>Maireana aphylla</i> , <b><i>Malvastrum americanum</i>*</b> , <i>Ptilotus macrocephalus</i> , <i>Ptilotus obovatus</i> , <i>Rhagodia eremaea</i> , <i>Rhodanthe stricta</i> , <i>Sclerolaena eurotioides</i> , <b><i>Sisymbrium ersimoides</i>*</b> , <i>Solanum lasiophyllum</i> , <b><i>Sonchus oleraceus</i>*</b> , <i>Tetragonia diptera</i> , <i>Zygophyllum retivalve</i>					
Quadrat:	Q30	Described by:	Scott Hitchcock & Daniel Panickar	Date:	19/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	77982 7	m E	7252411	m N	
<b>Habitat:</b>	Floodplain					
<b>Soil:</b>	Red-orange clay-loam surface crust (20%), loose soil (80%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	ASL (1)					
<b>Vegetation Type:</b>	Tussock Grassland of <b><i>Cenchrus ciliaris</i>*</b> and <b><i>Cenchrus setiger</i>*</b> with an Open Tall Shrubland of <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , Open Mid Shrubland of <i>Rhagodia eremaea</i> and an Open Low Woodland of <i>Eucalyptus victrix</i>					
<b>Vegetation Condition:</b>	3 (Vegetation structure altered)					
<b>Disturbances:</b>	Weeds, grazing					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Acacia synchronicia</i> , <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> , <i>Amyema preissii</i> , <i>Atriplex holocarpa</i> , <b><i>Brassica rapa</i>*</b> (RE), <i>Capparis lasiantha</i> , <b><i>Cenchrus ciliaris</i>*</b> , <b><i>Cenchrus setiger</i>*</b> , <b><i>Chloris virgata</i>*</b> , <i>Commicarpus australis</i> , <i>Convolvulaceae</i> sp. , <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> , <i>Eucalyptus victrix</i> , <i>Euphorbia boophthona</i> , <i>Exocarpos aphyllus</i> , <i>Rhagodia eremaea</i> , <i>Setaria dielsii</i> , <b><i>Sonchus oleraceus</i>*</b> , <i>Tetragonia diptera</i>					

Quadrat:	Q31	Described by:	Scott Hitchcock & Daniel Panickar	Date:	19/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	77933 5	m E	7252897	m N	
<b>Habitat:</b>	Depression					
<b>Soil:</b>	Orange clay-loam surface crust (60%), loose soil (40%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	CSL (4)					
<b>Vegetation Type:</b>	Open Low Shrubland of <i>Maireana tomentosa</i> subsp. <i>tomentosa</i> and <i>Maireana polypterygia</i> with a Sparse Tall Shrubland of <i>Acacia synchronicia</i>					
<b>Vegetation Condition:</b>	2 (pristine or nearly so)					
<b>Disturbances:</b>	Weeds					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Acacia synchronicia</i> , <b><i>Asphodelus fistulosus</i>*</b> , <i>Atriplex amnicola</i> , <i>Atriplex holocarpa</i> , <b><i>Cenchrus ciliaris</i>*</b> , <i>Convolvulaceae</i> sp. , <i>Euphorbia boophthona</i> , <i>Hakea preissii</i> , <i>Maireana polypterygia</i> , <i>Maireana tomentosa</i> subsp. <i>tomentosa</i> , <i>Poaceae</i> sp., <i>Rhagodia eremaea</i> , <b><i>Sonchus oleraceus</i>*</b> , <i>Tetragonia diptera</i> , <i>Threlkeldia diffusa</i>					
Quadrat:	Q32	Described by:	Scott Hitchcock & Daniel Panickar	Date:	19/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	77954 8	m E	7252698	m N	
<b>Habitat:</b>	Depression					
<b>Soil:</b>	Orange sandy-clay loose soil (60%), surface crust (40%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	ASL (1)					
<b>Vegetation Type:</b>	Sparse Tall Shrubland of <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Acacia synchronicia</i> with a Sparse Low Shrubland of <i>Rhagodia eremaea</i> , a Sparse Tussock Grassland of <b><i>Cenchrus setiger</i>*</b> , <b><i>Cenchrus ciliaris</i>*</b> and Isolated Mid Shrubs of <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i>					
<b>Vegetation Condition:</b>	3 (Vegetation structure altered)					
<b>Disturbances:</b>	Weeds, grazing					
<b>Fire Age:</b>	Old (> 5yrs)					
<b>Species:</b>	<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Acacia synchronicia</i> , <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> , <i>Atriplex semilunaris</i> , <b><i>Cenchrus ciliaris</i>*</b> , <b><i>Cenchrus setiger</i>*</b> , <b><i>Chloris virgata</i>*</b> , <i>Convolvulaceae</i> sp. , <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> , <i>Exocarpos aphyllus</i> , <i>Poaceae</i> sp., <i>Rhagodia eremaea</i> , <i>Rhodanthe stricta</i> , <b><i>Sonchus oleraceus</i>*</b> , <i>Tetragonia diptera</i>					

Quadrat:	Q33	Described by:	Scott Hitchcock & Daniel Panickar	Date:	19/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	780043	m E	7252646	m N	
<b>Habitat:</b>	Saline plain					
<b>Soil:</b>	Red-orange sandy-loam loose soil (90%), surface crust (10%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	ASL (1)					
<b>Vegetation Type:</b>	Open Tall Shrubland of <i>Acacia synchronicia</i> , <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> with an Open Tussock Grassland of <i>Cenchrus ciliaris</i> * and a Sparse Low Shrubland of <i>Rhagodia eremaea</i>					
<b>Vegetation Condition:</b>	3 (Vegetation structure altered)					
<b>Disturbances:</b>	Weeds, grazing					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Acacia synchronicia</i> , <i>Alternanthera nana</i> , <b><i>Brassica rapa</i></b> * (RE), <i>Capparis lasiantha</i> , <b><i>Cenchrus ciliaris</i></b> *, <b><i>Cenchrus setiger</i></b> *, <b><i>Chloris virgata</i></b> *, <i>Convolvulaceae</i> sp., <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> , <i>Euphorbia boophthona</i> , <i>Pimelea microcephala</i> subsp. <i>microcephala</i> , <i>Ptilotus obovatus</i> , <i>Ptilotus polystachyus</i> , <i>Rhagodia eremaea</i> , <i>Setaria dielsii</i> , <b><i>Sonchus oleraceus</i></b> *, <i>Tetragonia diptera</i>					
Quadrat:	Q34	Described by:	Scott Hitchcock & Rochelle Haycock	Date:	19/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	780917	m E	7254178	m N	
<b>Habitat:</b>	Floodplain					
<b>Soil:</b>	Orange sandy-loam surface crust (100%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	CSL (5)					
<b>Vegetation Type:</b>	Sparse Low Shrubland of <i>Maireana polypterygia</i>					
<b>Vegetation Condition:</b>	2 (pristine or nearly so)					
<b>Disturbances:</b>	Weeds					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<b><i>Asphodelus fistulosus</i></b> *, <i>Atriplex codonocarpa</i> , <i>Calocephalus multiflorus</i> , <i>Chloris pumilio</i> , <i>Dactyloctenium radulans</i> , <i>Eragrostis dielsii</i> , <i>Eriachne pulchella</i> subsp. <i>dominii</i> , <i>Erodium cygnorum</i> , <i>Gunniiopsis septifraga</i> , <i>Helipterus craspedioides</i> , <i>Maireana carnosae</i> , <i>Maireana polypterygia</i> , <i>Pogonolepis stricta</i> , <i>Roebuckiella oncocarpa</i> , <i>Sclerolaena eurotioides</i> , <i>Sclerolaena recurvicauspis</i> , <b><i>Sonchus oleraceus</i></b> *, <i>Sporobolus caroli</i> , <i>Tetragonia diptera</i>					

Quadrat:	Q3 5	Described by:	Scott Hitchcock & Daniel Panickar	Date:	19/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	781390	m E	7253778	m N	
<b>Habitat:</b>	Hardpan plain					
<b>Soil:</b>	Orange clay-loam loose soil (60%), surface crust (40%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>	ASL (1)					
<b>Vegetation Type:</b>	Open Tall Shrubland of <i>Acacia synchronicia</i> with a Sparse Low Shrubland of <i>Rhagodia eremaea</i> and a Sparse Forbland of <i>Tetragonia diptera</i>					
<b>Vegetation Condition:</b>	3 (Vegetation structure altered)					
<b>Disturbances:</b>	Weeds, grazing					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Acacia synchronicia</i> , <i>Acacia tetragonophylla</i> , <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> , <i>Atriplex amnicola</i> , <i>Atriplex holocarpa</i> , <b><i>Brassica rapa</i></b> (RE), <i>Calandrinia polyandra</i> , <i>Capparis lasiantha</i> , <b><i>Cenchrus ciliaris</i></b> *, <b><i>Chloris virgata</i></b> *, <i>Dactyloctenium radulans</i> , <i>Ptilotus obovatus</i> , <i>Rhagodia eremaea</i> , <i>Sclerolaena eurotioides</i> , <i>Tetragonia diptera</i>					
Relevé:	R0 1	Described by:	Rochelle Haycock & Clare Courtauld	Date:	18/10/2016	Photograph
<b>Location (GDA94):</b>	MGA49	77581 1	m E	7250804	m N	
<b>Habitat:</b>	Low rise					
<b>Soil:</b>	Orange sandy-loam surface crust (100%)					
<b>Rocks:</b>	No rocks					
<b>Mapped as:</b>						
<b>Vegetation Type:</b>	Tussock Grassland of <b><i>Cenchrus ciliaris</i></b> * with Isolated Tall Shrubs of <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> and <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> and Isolated Mid Shrubs of <i>Rhagodia eremaea</i>					
<b>Vegetation Condition:</b>	3 (Vegetation structure altered)					
<b>Disturbances:</b>	Weeds					
<b>Fire Age:</b>	None evident					
<b>Species:</b>	<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i> , <b><i>Asphodelus fistulosus</i></b> *, <i>Calandrinia polyandra</i> , <b><i>Cenchrus ciliaris</i></b> *, <b><i>Cenchrus setiger</i></b> *, <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> , <i>Rhagodia eremaea</i> , <i>Rhodanthe</i> sp., <b><i>Sisymbrium erysimoides</i></b> *, <b><i>Sonchus oleraceus</i></b> *, <i>Zygophyllum fruticulosum</i>					

Note: In this table, GDA94 = Geocentric Datum of Australia 1994, MGA = Map Grid of Australia zone 49, \* = environmental weed, ?P3 = potential Priority 3 species, RE = range extension species.



**Appendix 4**  
**Statistical analysis inputs and outputs**





Table A 3: Site by species matrix used for pattern analysis

Taxa	Q01	Q02	Q03	Q04	Q05	Q06	Q07	Q08	Q09	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	
	ASL (1)	ASL (1)	ASL (1)	ASL (1)	ASL (1)	CSL (4)	CSL (4)	ASL (2)	ASL (1)	ASL (2)	ASL (1)	CSL (4)	ASL (1)	EWL (3)	CSL (5)	CDSL (6)	CDSL (6)	ASL (1)	ASL (2)	ASL (1)	ASL (1)	EWL (3)	CSL (4)	EWL (3)	ASL (1)	
<i>Abutilon fraseri</i>	1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Abutilon geranioides</i>	0	0	0	1	0	0.1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.1	0
<i>Abutilon oxycarpum</i> subsp. <i>prostrate</i>	0	0.1	0.1	1	0.1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0
<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i>	3	2	1	1	1	1	0	0.1	2	0	2	1	1	0.1	1	0	0	2	0	0	1	1	0	1	1	
<i>Acacia synchronicia</i>	0	2	2	0	2	1	0	0	1	1	0	0	2	0	0	0	0	1	1	1	1	0	0	0	1	
<i>Acacia tetragonophylla</i>	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	1	0	2	0	
<i>Alectryon oleifolius</i> subsp. <i>oleifolius</i>	1	1	1	2	1	0.1	0	0	1	0	1	1	1	1	1	0	0	0	0	1	1	0	0	2	1	
<i>Alternanthera nana</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	
<i>Amyema preissii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	
<i>Aristida holathera</i> var. <i>holathera</i>	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Atriplex amnicola</i>	2	2	2	1	1	1	1	0.1	1	1	0	3	2	0	1	0	0	1	1	0	0	0	1	0	1	
<i>Atriplex codonocarpa</i>	0.1	1	0	1	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	
<i>Atriplex holocarpa</i>	0	0	0	0	0	1	1	0	0	1	0	1	0	0	0	0	0	0	1	0	0	1	2	0	0	
<i>Atriplex semilunaris</i>	0	1	1	0	0	1	1	1	1	1	1	1	1	1	0	0.1	0	0	1	0.1	1	1	0	1	1	
<i>Capparis lasiantha</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
<i>Chenopodium auricomum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	2	0	0	0	0	0	0	0	0	
<i>Commicarpus australis</i>	0	0	1	0	0	0	0	1	0	1	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Cucumis variabilis</i>	0	0	0	0	0	0.1	0	0	0	1	1	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	
<i>Duma florulenta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	1	0	0	0	0	0	0	0	0	
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	2	1	0.1	1	0	1	0	0	1	0	1	0	1	0	1	0	0	1	0	0.1	1	1	0	1	1	
<i>Eucalyptus victrix</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	2	1	1	0	2	0	0	1	1	0	3	1	
<i>Eulalia aurea</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	
<i>Euphorbia boophthona</i>	0	0.1	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	
<i>Exocarpos aphyllus</i>	1	1	0	1	1	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1	0	0	0	0	0	
<i>Hakea preissii</i>	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	
<i>Maireana aphylla</i>	0	0	0	1	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	1	
<i>Maireana integra</i>	0.1	1	0	0	0	1	1	0	1	0	0	0.1	0	1	0	0	0	0	0	0	0	1	0	0	0	
<i>Maireana polypterygia</i>	0	1	0.1	0	2	1	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	
<i>Panicum decompositum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	0	0	0	0	0	0	0	0	
<i>Pimelea microcephala</i> subsp. <i>microcephala</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
<i>Pluchea dunlopii</i>	1	1	0	0	0.1	3	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
Poaceae sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	1	0	0	
<i>Ptilotus divaricatus</i>	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	
<i>Ptilotus obovatus</i>	0	0	0.1	1	1	0	0	0	1	1	0	0	0	1	0	0	0	0.1	0	2	1	0	0	0	0	
<i>Rhagodia eremaea</i>	3	1	2	2	1	1	0	1	1	1	2	1	2	0	0	0	0	1	1	1	1	1	0	1	2	
<i>Santalum lanceolatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.1	0	
<i>Senna glutinosa</i> subsp. <i>x. luerssenii</i>	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
<i>Scaevola spinescens</i>	0	0	0	2	1	0.1	0	0	1	0	1	1	0	0	0	0	0	1	1	2	0	1	0	0.1	3	
<i>Sclerolaena eriacantha</i>	0	0	0	0	0	1	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	
<i>Sclerolaena eurotioides</i>	0	0	0	0	1	1	1	0	0.1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	
<i>Sclerolaena recurvicaulis</i>	0	1	1	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0.1	0	0	0	0	
<i>Sporobolus caroli</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
<i>Sporobolus mitchellii</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.1	1	1	0	0	0	0	0	0	0	0	
<i>Streptoglossa macrocephala</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	
<i>Tetragonia diptera</i>	1	2	2	1	3	0	1	0	0	0	1	0	1	0	0	0	0	2	2	0	2	1	0	1	1	
<i>Threlkeldia diffusa</i>	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	
<i>Zygophyllum retivalve</i>	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	

Taxa	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34	Q35
	ASL (1)	ASL (1)	CSL (5)	ASL (1)	ASL (1)	CSL (4)	ASL (1)	ASL (1)	CSL (5)	ASL (1)
<i>Abutilon fraseri</i>	0	0	0	0	0	0	0	0	0	0
<i>Abutilon geranioides</i>	0	0	0	0	0	0	0	0	0	0
<i>Abutilon oxycarpum</i> subsp. <i>prostrate</i>	0	0	0	0	0	0	0	0	0	0
<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i>	2	0	0	2	3	1	1	2	0	1
<i>Acacia synchronicia</i>	2	2	0	2	1	2	1	2	0	3
<i>Acacia tetragonophylla</i>	1	0	0	1	0	0	0	0	0	1
<i>Alectryon oleifolius</i> subsp. <i>oleifolius</i>	1	1	0	1	1	0	1	0	0	1
<i>Amyema preissii</i>	0	0	0	0	0.1	0	0	0	0	0
<i>Alternanthera nana</i>	0	0	0	0	0	0	0	1	0	0
<i>Aristida holathera</i> var. <i>holathera</i>	0	0	0	0	0	0	0	0	0	0
<i>Atriplex amnicola</i>	0	0	0	1	0	1	0	0	0	1
<i>Atriplex codonocarpa</i>	0	1	1	2	0	0	0	0	2	0
<i>Atriplex holocarpa</i>	0	0	0	0	1	1	0	0	0	1
<i>Atriplex semilunaris</i>	1	0	1	0	0	0	1	0	0	0
<i>Capparis lasiantha</i>	0	0	0	0	1	0	0	0.1	0	1
<i>Chenopodium auricomum</i>	0	0	0	0	0	0	0	0	0	0
<i>Commicarpus australis</i>	0.1	0	0	0	1	0	0	0	0	0
<i>Cucumis variabilis</i>	0	0	0	0	0	0	0	0	0	0
<i>Duma florulenta</i>	0	0	0	0	0	0	0	0	0	0
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	0	0	0	1	1	0	1	1	0	0
<i>Eucalyptus victrix</i>	0	0	0	0	2	0	0	0	0	0
<i>Eulalia aurea</i>	0	0	0	0	0	0	0	0	0	0
<i>Euphorbia boophthona</i>	0	0.1	0	0	0.1	0.1	0	1	0	0
<i>Exocarpos aphyllus</i>	0	0	0	1	1	0	1	0	0	0
<i>Hakea preissii</i>	1	0	0	0	0	1	0	0	0	0
<i>Maireana aphylla</i>	0	0	0	1	0	0	0	0	0	0
<i>Maireana integra</i>	0	0	0	0	0	0	0	0	0	0
<i>Maireana polypterygia</i>	0	0	2	0	0	2	0	0	2	0
<i>Panicum decomositum</i>	0	0	0	0	0	0	0	0	0	0
<i>Pimelea microcephala</i> subsp. <i>microcephala</i>	0	0	0	0	0	0	0	1	0	0
<i>Pluchea dunlopii</i>	0	0	0	0	0	0	0	0	0	0
Poaceae sp.	0	0	0	0	0	1	1	0	0	0
<i>Ptilotus divaricatus</i>	0	0	0	0	0	0	0	0	0	0
<i>Ptilotus obovatus</i>	1	1	0	1	0	0	0	1	0	1
<i>Rhagodia eremaea</i>	2	1	0	2	2	1	1	2	0	2
<i>Santalum lanceolatum</i>	0	0	0	0	0	0	0	0	0	0
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	0	0	0	0	0	0	0	0	0	0
<i>Scaevola spinescens</i>	0	0	0	0	0	0	0	0	0	0
<i>Sclerolaena eriacantha</i>	0	0	0	0	0	0	0	0	0	0
<i>Sclerolaena eurotioides</i>	0	1	1	1	0	0	0	0	2	0.1
<i>Sclerolaena recurvicauspis</i>	0	0	0	0	0	0	0	0	1	0
<i>Sporobolus caroli</i>	0	0	0	0	0	0	0	0	0.1	0
<i>Sporobolus mitchellii</i>	0	0	0	0	0	0	0	0	0	0
<i>Streptoglossa macrocephala</i>	0	0	0	0	0	0	0	0	0	0
<i>Tetragonia diptera</i>	2	2	3	2	2	1	1	1	1	2
<i>Threlkeldia diffusa</i>	0	0	0	0	0	1	0	0	0	0
<i>Zygophyllum retivalve</i>	0	2	2	0.1	0	0	0	0	0	0

Note: The numbers in the cells refer to a cover class e.g 0.1 = <2 (isolated clump), 1 = <2 (isolated), 2 = 2-10, 3 = 10-30, 4 = 30-70

Figure A 1: Dendrogram produced by PATN analysis

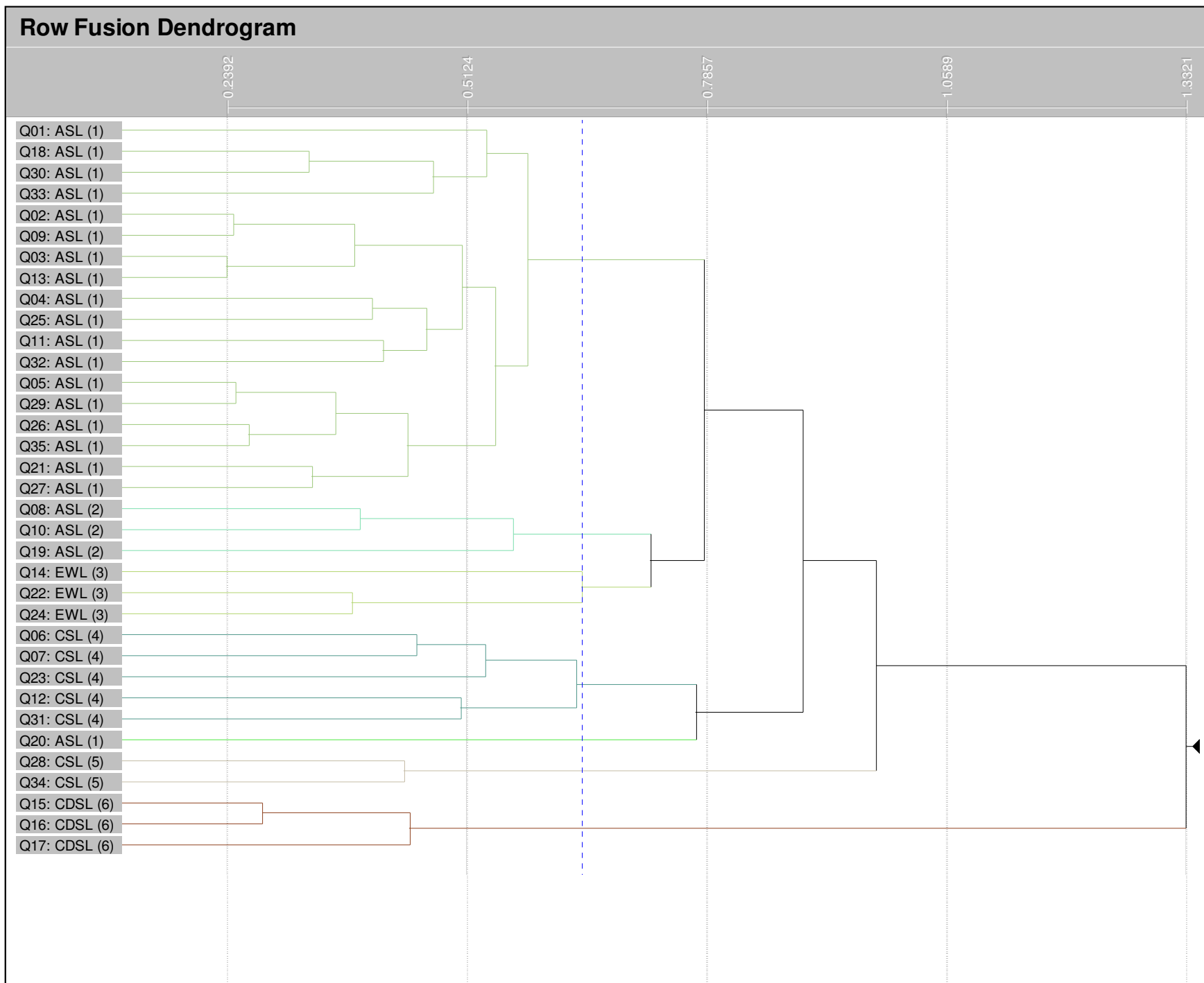


Figure A 2: Group dendrogram produced by PATN analysis

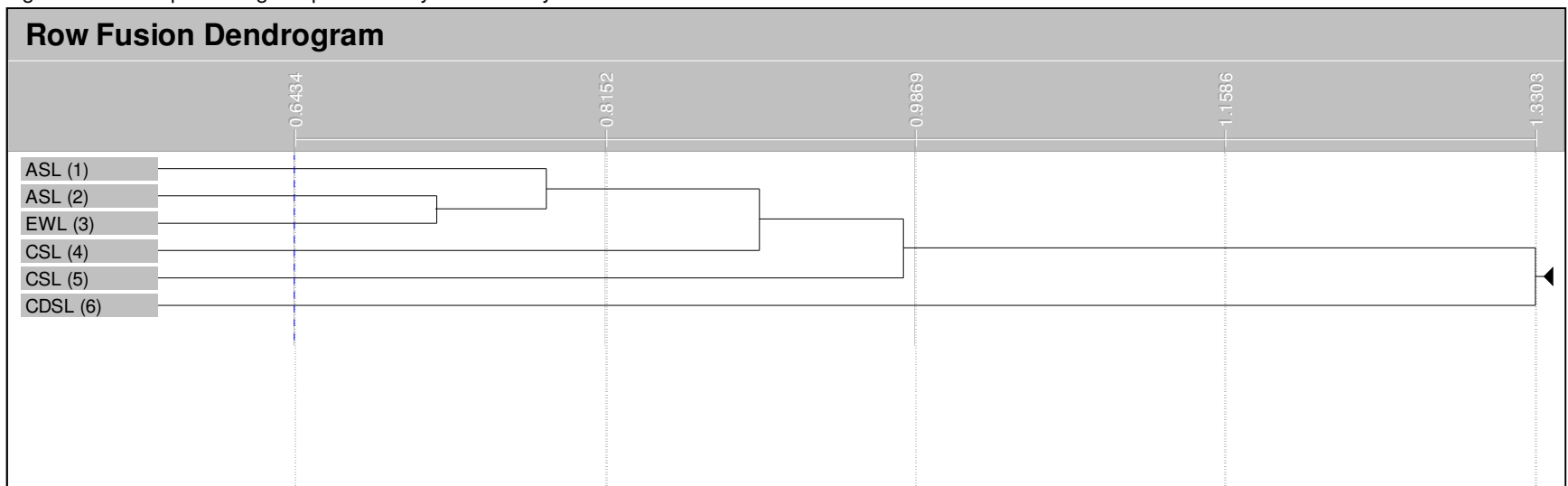


Figure A 3: PATN recipe used in the PATN analysis

**Recipe of analysis to be performed on at 09:40:50, December 10, 2016**

**Analysis based on rows -**

**Association Measure: Kulczynski**

**Classification Strategy: Agglomerative Hierarchical Fusion**

**Technique: Flexible UPGMA**

**Beta: -0.1000**

**Number of groups to produce: 6**

**Ordination Method: SSH**

**CutOff = 0.900**

**3 Dimensions**

**Number of random starts: 10**

**Max iterations: 50**

**Random Seed Value: 1235**

**Analysis based on columns -**

**Association Measure: Kulczynski**

**Classification Strategy: Agglomerative Hierarchical Fusion**

**Technique: Flexible UPGMA**

**Beta: -0.1000**

**Number of groups to produce: 7**

Table A 4: Indicator species for vegetation types of the survey area

Species	p Value	Group / Observed Indicator Value						Indicator Level
		ASL (1)	ASL (2)	EWL (3)	CSL (4)	CSL (5)	CDSL (6)	
<i>Acacia synchronicia</i>	0.006	37.2						Low
<i>Alectryon oleifolius</i> subsp. <i>oleifolius</i>	0.003	34.9						Low
<i>Abutilon oxycarpum</i> subsp. <i>prostrata</i>	0.206	31.6						Not indicator
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	0.165	31.3						Not indicator
<i>Ptilotus obovatus</i>	0.295	30.7						Not indicator
<i>Rhagodia eremaea</i>	0.000	30.6						Low
<i>Exocarpos aphyllus</i>	0.253	28.5						Not indicator
<i>Capparis lasiantha</i>	0.280	26.3						Not indicator
<i>Abutilon fraseri</i>	1.000	10.5						Not indicator
<i>Pimelea microcephala</i> subsp. <i>microcephala</i>	1.000	10.5						Not indicator
<i>Commicarpus australis</i>	0.057		50.7					Not indicator
<i>Pluchea dunlopilii</i>	0.094		41.3					Not indicator
<i>Atriplex semilunaris</i>	0.536		25.3					Not indicator
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	0.549		16.7					Not indicator
<i>Cucumis variabilis</i>	0.893		12.1					Not indicator
<i>Ptilotus divaricatus</i>	0.033			61.8				Moderate
<i>Abutilon geranioides</i>	0.061			48.3				Not indicator
<i>Eucalyptus victrix</i>	0.075			45.2				Not indicator
<i>Acacia tetragonophylla</i>	0.177			32.5				Not indicator
<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i>	0.001			31.6				Low
<i>Maireana integra</i>	0.220			31.2				Not indicator
<i>Santalum lanceolatum</i>	0.431			28.8				Not indicator
<i>Streptoglossa macrocephala</i>	0.432			28.8				Not indicator



Species	p Value	Group / Observed Indicator Value						Indicator Level
		ASL (1)	ASL (2)	EWL (3)	CSL (4)	CSL (5)	CDSL (6)	
<i>Scaevola spinescens</i>	0.346			25.1				Not indicator
<i>Threlkeldia diffusa</i>	0.008				75.1			Moderate
<i>Aristida holathera</i> var. <i>holathera</i>	0.031				60			Moderate
<i>Atriplex holocarpa</i>	0.054				47.5			Low
<i>Maireana aphylla</i>	0.092				41.7			Not indicator
<i>Atriplex amnicola</i>	0.030				34.3			Low
<i>Hakea preissii</i>	0.239				28.7			Not indicator
<i>Euphorbia boophthona</i>	0.508				20.8			Not indicator
POACEAE sp.	0.595				19.1			Not indicator
<i>Sclerolaena eriacantha</i>	0.755				15			Not indicator
<i>Atriplex codonocarpa</i>	0.001					67.9		Moderate
<i>Maireana polypterygia</i>	0.032					55.2		Moderate
<i>Sclerolaena eurotioides</i>	0.180					36.1		Not indicator
<i>Zygophyllum retivalve</i>	0.222					30.6		Not indicator
<i>Tetragonia diptera</i>	0.010					30.4		Not indicator
<i>Sporobolus caroli</i>	0.216					27.8		Not indicator
<i>Sclerolaena recurvicauspis</i>	0.330					26		Not indicator
<i>Chenopodium auricomum</i>	0.000						100	Perfect indicator species
<i>Duma florulenta</i>	0.000						100	Perfect indicator species
<i>Panicum decomositum</i>	0.000						100	Perfect indicator species
<i>Alternanthera nana</i>	0.001						95	High
<i>Sporobolus mitchellii</i>	0.005						83.3	High
<i>Eulalia aurea</i>	0.030						61.8	Moderate
<i>Amyema preissii</i>	0.441						28.8	Not indicator



**Appendix 5**  
**Conservation significance of vegetation**  
**within the survey area – attributes and**  
**scores**



Notes for Appendix 5, Table A 1 to Appendix 5, Table A 10.

- Local Area = Survey Area
- VA = Beard vegetation association
- CSF = conservation significant flora
- CSR = conservation significance rating
- GDE = groundwater dependent ecosystem
- ha = hectare, % = percentage, # = number, > = greater than, ≤ = less than or equal to
- IDE = inflow dependent ecosystem
- IUCN = International Union for Conservation of Nature
- LS = land system
- VT = Maia vegetation type
- Q = quadrat
- RP = reservation priority (Desmond & Chant, 2001)
- STCS = Subtropical and Temperate Coastal Saltmarsh TEC
- Veg. = vegetation
- CAR02 = Wooramel subregion
- GsB = *Gnephosis* sp. Billabong (B. Nordenstam & A. Anderberg 203) (P1), C?c = *Corchorus ?congener* (P3)
- TEC = threatened ecological community
- PEC = priority ecological community



Appendix 5, Table A 1: VAs, regional significance – attributes, scores and ratings

Number of subregions (GoWA, 2015)		Spread in CAR02 subregion (DAFWA, 2012a; DotEE, 2016)		Pre-European extent remaining in CAR02 subregion (DAFWA, 2012a; DotEE, 2016)		Current extent protected (IUCN I-IV) for conservation (proportion of pre-European extent) in CAR02 subregion (GoWA, 2015; DAFWA, 2012b)		Current extent in all DPaW – Managed Land (proportion of current extent) in CAR02 subregion (GoWA, 2015)		Additional attributes (DPaW, 2007 - )		Regional CSR	Total score
Number	Score	Spread	Score	%	Score	%	Score	%	Score	Attribute	Score	Rating	Range
1	3	Limited	3	≤ 30	4	≤ 10	4	≤ 10	4	VA is mapped within a TEC / PEC	1	High	16 to 20
2 to 10	2	Moderate	2	> 30 - 50	3	> 10 - 30	3	> 10 - 30	3	High reservation priority (Desmond & Chant, 2001)	1	Moderate	11 to 15
11+	1	Widespread	1	> 50 - 70	2	> 30 - 70	2	> 30 - 70	2	None of these attributes	0	Low	5 to 10
				> 70 - 100	1	> 70 - 100	1	> 70 - 100	1				

Appendix 5, Table A 2: Regional significance of VAs recorded in the Local Area

VA	Number of subregions (GoWA, 2015)		Spread in CAR02 subregion (DAFWA, 2012a; DotEE, 2016)		Current extent remaining in CAR02 subregion (proportion of pre-European extent)(%) (DAFWA, 2012a; DotEE, 2016)		Current extent protected (IUCN I-IV) for conservation in CAR02 subregion (proportion of pre-European extent)(%) (GoWA, 2015; DAFWA, 2012b)		Current extent in DPaW-Managed Lands in CAR02 subregion (proportion of current extent)(%) (GoWA, 2015)		Additional attributes (DPaW, 2007 - )		Total score	CSR - regional
	#	Score	Spread	Score	%	Score	%	Score	%	Score	Attribute	Score		
129	13	1	Limited	3	94.73	1	0.13	4	0.97	4	STCS TEC	1	14	Moderate
308	1	3	Limited	3	99.22	1	0.10	4	0.87	4	STCS TEC, High RP	2	17	High
1271	11	1	Limited	3	99.97	1	0	4	0	4	ESA	1	14	Moderate

Appendix 5, Table A 3: Beard's vegetation associations, local significance – attributes, scores and ratings

Current spread in the Local Area		Current extent remaining in Local Area (%) (DAFWA, 2012b; GoWA, 2015)		Mapped within IUCN (I-IV) conservation protected lands in the Local Area (GoWA, 2015)		# of Conservation Significant Flora located on the VA		Additional attributes (DPaW, 2007 - )		CSR - local	Total score range
Code	Score	Code	Score	Code	Score	Code	Score	Code	Score	Code	Range
Limited	3	≤ 30%	4	No	1	> 10 species	3	VA is mapped within a TEC / PEC / ESA	1	High	10 to 13
Moderate	2	> 30 - 50%	3	Yes	0	6 - 10 species	2	High reservation priority (Desmond & Chant, 2001)	1	Moderate	6 to 9
Widespread	1	> 50 - 70%	2			1 to 5 species	1	None of these attributes	0	Low	2 to 5
		> 70 - 100%	1			None	0				

Appendix 5, Table A 4: Local significance of VAs recorded in the Local Area

VA	Spread in the Local Area (current extent) (DAFWA, 2012a)		Current extent remaining in Local Area (DAFWA, 2012b)		Mapped within IUCN (I-IV) conservation protected lands in the Local Area? (DPaW, 2017; DAFWA 2012a)		# of CSF species located in the Local Area within VA		Reservation priority (Desmond & Chant, 2001)		VA is mapped within a TEC/PEC/ESA (DPaW, 2007 - )		Total score	Local CSR
	Spread	Score	%	Score		Score	#	Score		Score		Score		
129	Limited	3	100	1	No	1	None	0	Low	0	No	0	5	Low
308	Widespread	1	94.82	1	No	1	2 – GsB, C?C	1	High	1	No	0	5	Low
1271	Limited	3	100	1	No	1	None	0	Low	0	Yes	1	6	Moderate



Appendix 5, Table A 5: Land system regional significance – attributes, scores and ratings

Number of subregions		Spread in CAR02 subregion (DAFWA, 2014; DotEE, 2012)		Current extent remaining in CAR02 subregion (proportion of originally mapped extent)(%) (DAFWA, 2014; DotEE, 2012)		Current extent protected (IUCN I-IV) for conservation in CAR02 subregion (proportion of the originally mapped extent)(%) (DAFWA, 2012; DPaW 2007 - )		Current extent in DPaW-Managed Lands in CAR02 subregion (proportion of current extent)(%) (DAFWA, 2012; DPaW, 2017)		Additional attributes (DPAW, 2007 - )		Regional CSR	Total score
Number	Score	Spread	Score	%	Score	%	Score	%	Score	Attribute	Score	Rating	Range
1	3	Limited	3	≤ 30	4	≤ 10	4	≤ 10	4	LS is mapped within a TEC / PEC / ESA	1	High	16 to 19
2 to 10	2	Moderate	2	> 30 - 50	3	> 10 - 30	3	> 10 - 30	3	None of these attributes	0	Moderate	11 to 15
11+	1	Widespread	1	> 50 - 70	2	> 30 - 70	2	> 30 - 70	2			Low	5 to 10
				> 70 - 100	1	> 70 - 100	1	> 70 - 100	1				

Appendix 5, Table A 6: Regional significance of land systems of the Local Area

LS	Number of subregions		Spread in CAR02 subregion (DAFWA, 2014; DotEE, 2012)		Current extent remaining in CAR02 subregion (proportion of originally mapped extent)(%) (DAFWA, 2014; DotEE, 2012)		Current extent protected (IUCN I-IV) for conservation in CAR02 subregion (proportion of the originally mapped extent)(%) (DAFWA, 2012; DPaW 2007 - )		Current extent in DPaW-Managed Lands in CAR02 subregion (proportion of current extent)(%) (DAFWA, 2012; DPaW, 2017)		Additional attributes (DPAW, 2007 - )		Total score	Regional CSR
	#	Score	Spread	Score	%	Score	%	Score	%	Score		Score		
Chargoo	2	2	Limited	3	99.96	1	0	4	0	4	ESA	1	15	Moderate
Delta	1	3	Limited	3	99.40	1	0.13	4	0.13	4	STCS TEC, ESA	1	16	High
River	11	1	Limited	3	89.36	1	0.76	4	0.76	4	STCS TEC, ESA	1	13	Moderate

Appendix 5, Table A 7: Land system local significance – attributes, scores and ratings

Current spread in the Local Area (DAFWA, 2014)		Current extent remaining in Local Area (%) (DAFWA, 2014)		Mapped within IUCN (I-IV) conservation protected lands in the Local Area? (DAFWA, 2014; DPAW, 2007 - )		# of conservation significant flora species in the LS (DAFWA, 2014)		Additional attributes (DPAW, 2007 - )		CSR - local	Total score range
Code	Score	Code	Score	Code	Score	Code	Score	Code	Score	Code	Range
Limited	3	≤ 30%	4	No	1	> 10 species	3	LS is mapped within a TEC / PEC / ESA	1	High	10 to 12
Moderate	2	> 30 - 50%	3	Yes	0	6 - 10 species	2	None of these attributes	0	Moderate	6 to 9
Widespread	1	> 50 - 70%	2			1 to 5 species	1			Low	2 to 5
		> 70 - 100%	1			None	0				

Appendix 5, Table A 8: Local significance of land systems of the Local Area

LS	Spread in the Local Area (current extent) (DAFWA, 2014)		Current extent of remaining in Local Area (DAFWA, 2014)		Mapped within IUCN (I-IV) conservation protected lands in the Local Area (DAFWA, 2014; DPAW, 2007 - )		# of CSF species located in the Local Area within LS (DAFWA, 2014)		LS is mapped within a TEC/PEC/ ESA (DPAW, 2007 - )		Total score	CSR - local
	Spread	Score	%	Score		Score	#	Score		Score		
Chargoo	Limited	3	100	1	No	1	None	0	Yes	1	6	Moderate
Delta	Widespread	1	95.38	1	No	1	1 – C?C	1	Yes	1	5	Low
River	Widespread	1	94.46	1	No	1	1 - GsB	1	Yes	1	5	Low

Appendix 5, Table A 9: Vegetation type significance - attributes, scores and ratings

Cover in area assessed		# of Qs per ha		Proportion of VT assessed		Highest ranked CSF recorded in VT		Proportion of Qs with CSF		# of CSF species in quadrats		# of CSF species located in VT		Proportion of Qs with weeds		# of weed species located in Qs	
%	Score	#	Score	%	Score	Rank	Score	%	Score	#	Score	#	Score	%	Score	#	Score
0.1 to 10	6	0 to 0.5	5	0.1 to 10	6	T	6	81-100	5	5 or >	5	5 or >	5	0	5	none	5
11 to 20	5	>0.5 to 1.0	4	11 to 20	5	P1	5	61-80	4	4	4	4	4	1 to 20	4	1 to 5	4
21 to 40	4	>1.0 to 1.5	3	21 to 40	4	P2	4	41-60	3	3	3	3	3	21-40	3	6 to 10	3
41 to 60	3	>1.5 to 2.0	2	41 to 60	3	P3	3	21-40	2	2	2	2	2	41-60	2	11 to 15	2
61 to 80	2	>2.0	1	61 to 80	2	P4	2	1 to 20	1	1	1	1	1	61-80	1	16 to 20	1
81 to 100	1			81 to 100	1	P5	1	0	0	None	0	None	0	81-100	0	>20	0
						None	0										
# of weed species in VT		Vegetation condition		Evident outside Study Area?		Other attributes re local area (BoM, 2016; DPAW, 2007 - )											
#	Score	Rating	Score	Yes/No	Score	Attribute	Score										
none	5	2	5	Yes	0	ESA, IDE, GDE	1										
1 to 5	4	3	4	No	1	No	0										
6 to 10	3	4	3														
11 to 15	2	5	2														
16 to 20	1	6	1														
>20	0	7	0														
CSR			Total Score														
Rating			Range														
High			42 to 60														
Moderate			23 to 41														
Low			4 to 22														

Appendix 5, Table A 10: Local significance of mapped vegetation types – scores

VT	Cover		Score	# of Qs assessed in VT	# of Qs assessed per ha	Score	% of VT assessed	Score	Highest ranked CSF recorded in Qs	Score	# of Qs with CSF species	% of Qs with CSF species	Score
	ha	%											
ASL (1)	486.06	55.33	3	19	0.04	5	13.67	5	P1	5	0	0.00	0
ASL (2)	78.35	8.92	6	3	0.04	5	12.51	5	?P3	3	0	0.00	0
EWL (3)	188.25	21.43	4	3	0.02	5	10.63	6	P1	5	0	0.00	0
CSL (4)	35.92	4.09	6	5	0.14	5	16.11	5		0	0	0.00	0
CSL (5)	25.30	2.88	6	2	0.08	5	17.22	5		0	0	0.00	0
CDSL (6)	19.20	2.19	6	3	0.16	5	17.91	5		0	0	0.00	0
VT	# of CSF species in Qs	Score	# of CSF species in VT	Score	# of Qs with weed species	% of Qs with weed species	Score	# of weed species in Qs	Score	# of weed species in VT	Score	Dominant veg condition	Score
ASL (1)		0	1	1	19	100	0	6	3	12	2	3	4
ASL (2)	1	1	1	1	3	100	0	5	4	8	3	3	4
EWL (3)		0	1	1	3	100	0	6	3	8	3	3	4
CSL (4)		0		0	5	100	0	5	4	7	3	3	4
CSL (5)		0		0	2	100	0	2	4	4	4	2	5
CDSL (6)		0		0	3	100	0	2	4	3	4	2	5
VT	Occurs outside Local Area?	Score	Any other attributes? (BoM, 2016; DPAW, 2007 - )		Score	Total score	CSR						
ASL (1)	Yes	4	Yes (GDE, IDE)		1	27	Moderate						
ASL (2)	Yes	4	Yes (GDE, IDE)		1	40	Moderate						
EWL (3)	Yes	4	Yes (GDE, IDE)		1	35	Moderate						
CSL (4)	Yes	4	Yes (GDE, ESA, IDE)		1	32	Moderate						
CSL (5)	Yes	5	Yes (GDE, IDE)		1	35	Moderate						
CDSL (6)	Yes	5	Yes (ESA, GDE, IDE)		1	35	Moderate						

