

# Northam - Pithara Road Biological Assessment

Ballidu to Pithara



## Northam - Pithara Road Biological Assessment

Ballidu to Pithara

Prepared for

Main Roads Western Australia

Prepared by

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ABN 20 093 846 925

28 August 2012

60248902

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## Quality Information

Document Northam - Pithara Road Biological Assessment

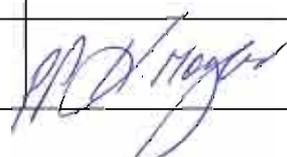
Ref 60248902

Date 28 August 2012

Prepared by Alexandra Sleep and Matthew Cann

Reviewed by Andrew Batty

### Revision History

Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
A	12-Jun-2012	Draft for Internal Review	Andrew Batty Senior Environmental Scientist	
B	02-Jul-2012	Draft Incorporating Review Comments	Andrew Batty Senior Environmental Scientist	
C	03-Jul-2012	Draft for Submission	Andrew Batty Senior Environmental Scientist	
D	30-Jul-2012	Draft Incorporating Client Review Comments	Andrew Batty Senior Environmental Scientist	
0	28-Aug-2012	Final for Client Submission	Andrew Batty Senior Environmental Scientist	

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## Executive Summary

Main Roads Western Australia (MRWA) requires a biological survey for the Northam-Pithara Road from Ballidu to Pithara. The purpose of the biological assessment is to provide an appropriate examination and description of the local environment to ensure that all observable aspects of ecological significance are identified and recorded. The results of the biological assessment will assist MRWA in the preparation of an Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) or other documents as required.

A field assessment of the flora, vegetation and fauna values of the area was carried out by AECOM Australia Pty Ltd (AECOM) during May 2012 with the following objectives:

- conduct a 'Level 2' Flora and Vegetation assessment in accordance with methodologies stated in Environmental Protection Authority (EPA) Guidance Statement 51
- identify any potential floristic matters of conservation significance
- determine the presence or absence of Threatened (T) or Priority Flora
- map and delineate vegetation communities and vegetation condition
- conduct a 'Level 1' Fauna assessment in accordance with methodologies stated in EPA Guidance Statement 56.
- record observable evidence of fauna and fauna activity at the site
- determine potential significant fauna habitats present at the site.
- examine existing rare flora markers on site to determine the status of populations at these locations.

A level 2 flora and vegetation assessment in accordance with EPA Guidance Statement 51 was carried out within the road reserve (up to the fence line or 100 metres (m) each side of the road if no fence present) between Pithara and just south of Ballidu on 22 to 24 May 2012. A targeted survey for Threatened and Priority flora species was carried out at the locations of previously known populations and rare flora markers. Flora and vegetation data was collected at 22 sites. The survey was conducted outside of what is considered the optimal time for survey in the Avon Wheatbelt region (following main rain in winter – EPA, 2004a) therefore the majority of annual and ephemeral taxa would not have been recorded, and some perennial taxa could not be identified to a high degree of certainty due to a lack of flowering and fruiting material.

A Level 1 fauna survey in accordance with EPA Guidance Statement 56 was also carried out and involved the opportunistic observation of fauna and habitats with a focus on threatened and priority species. The fauna survey was carried out in conjunction with the flora and vegetation survey.

A total of 113 species from 58 genera and 27 families were recorded within the survey area during the field assessment. The total includes 111 (98%) locally native species, and 2 (2%) introduced (exotic) or naturalised weed species.

The majority of the vegetation of the survey area is in 'Very Good' condition (23.59%), followed by 'Good to Very Good' (17.31%), it is also of note that 16.05% of the vegetation is considered to be in 'Very Good to Excellent' condition.

Thirty fauna species were recorded during the May 2012 field survey. This included 24 birds, 5 mammals and 1 reptile. No fauna species recorded were considered to be of conservation significance.

The significant ecological findings from the assessment of the survey area are:

- One species of Threatened flora recorded (*Grevillea dryandroides* subsp. *dryandroides*)
- Four species of Priority Flora recorded (*Acacia ?scalena*, *A. lirellata* subsp. *compressa*, *A. ?dissona* var. *indoloria*, *Dampiera ?glabrescens*)
- One Priority Three (P3) Priority Ecological Community (PEC) (*Eucalyptus* Woodlands of the Western Australian Wheatbelt) recorded covering 74.51 hectares (ha) or 29.77% of the total area assessed.
- 99.22 ha or 39.64% of total area surveyed is considered to be in 'Very Good' or better condition.
- 240.06 ha or 95.91% of total area surveyed falls within vegetation associations that have less than 30% pre-European extent remaining.

- All 13 vegetation units can be considered to be regionally significant due to a combination of factors including; presence of rare and priority flora, being within a vegetation association with less than 30% pre-European extent remaining and presence of a PEC.
- Six vegetation units can be considered to be locally significant as they make up less than five percent of the total area surveyed.

Based on the significant findings of this survey the following recommendations are made:

- Minimise impacts to York Gum Woodland as it is potential habitat for the brown form of the Western Spiny-tailed Skink that has the potential to occur in the region.
- Carry out a follow up flora and vegetation survey in spring to capture additional species, ephemerals and annuals and confirm vegetation condition based on weed cover
- Undertake targeted survey for identified Threatened and Priority flora species particularly those which could not be observed during the May 2012 survey (due to dormancy or survey not being during annual growth period).
- Re-collection of *Acacia scalena*, *Acacia dissona* var. *indoloria* and *Dampiera glabrescens* during spring flowering period to confirm identification.
- Re-visit the locations of the nine rare flora markers where no Threatened flora was located during the out of season May 2012 survey to confirm the status of these markers. Undertake consultation with DEC prior to visiting the site again. Potential to meet DEC conservation Officer at site to confirm approach.

## 1.0 Introduction

### 1.1 Background

Main Roads Western Australia (MRWA) requires a biological survey for the Northam-Pithara Road from Ballidu to Pithara. The purpose of the biological assessment is to provide an appropriate examination and description of the local environment to ensure that all aspects of ecological significance are identified and recorded. The results of the biological assessment will assist MRWA in the future preparation of an Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) or other required documents.

### 1.2 Location

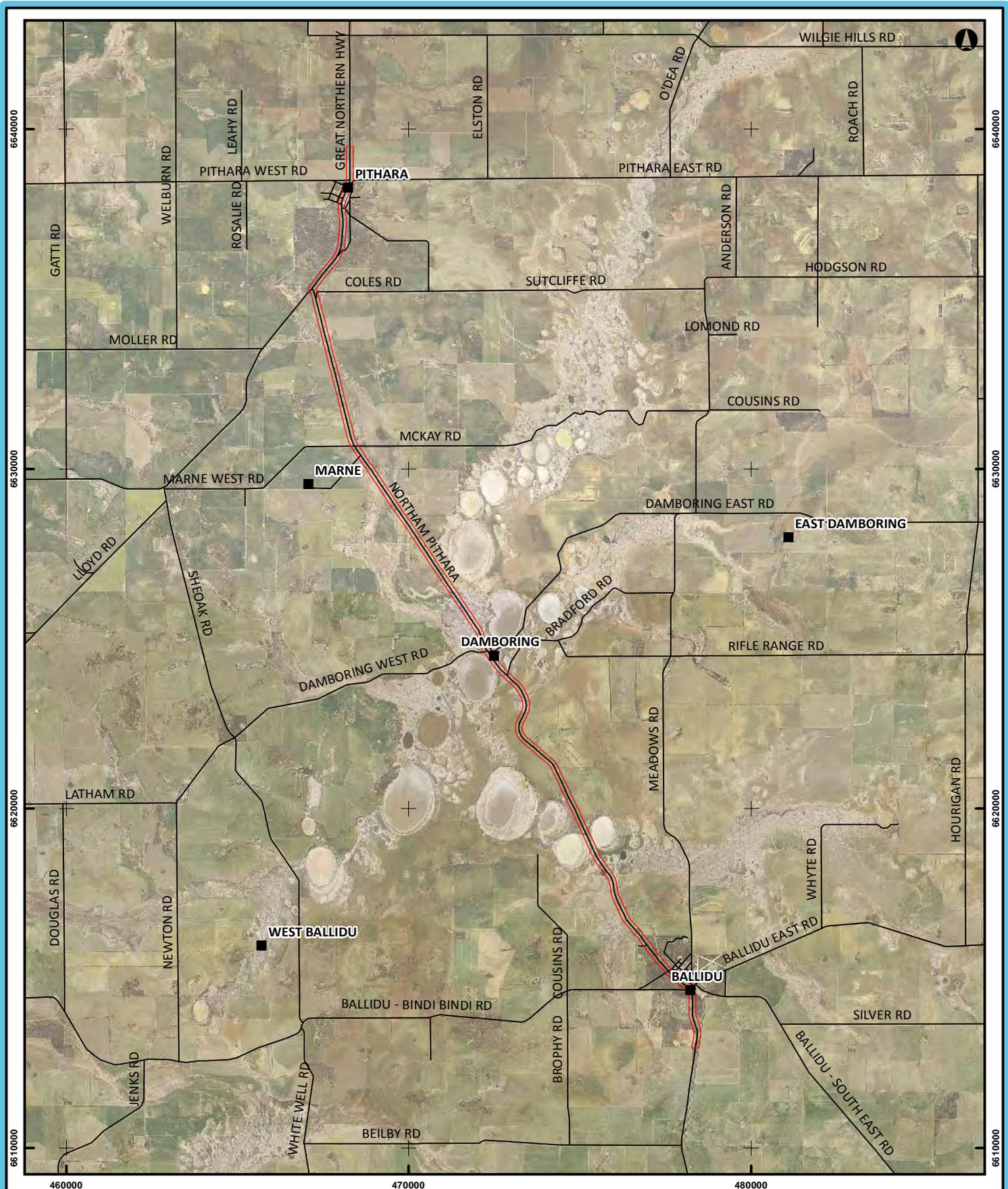
The survey area is located within the road reserve of Northam-Pithara Road between Ballidu and Pithara and occurs within the Shire of Dalwallinu and Shire of Wongan-Ballidu (Figure 1).

### 1.3 Objectives

The primary objective of the flora and fauna assessment of the survey area was to define the values that would enable an assessment against the ten clearing principles, as well as to inform any future approvals, licences or clearances. The assessment accordingly included the collection of information relating to flora, vegetation, fauna and habitats.

The specific objectives of the assessment were to:

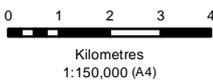
- conduct a 'Level 2' Flora and Vegetation assessment in accordance with methodologies stated in EPA Guidance Statement 51
- identify any potential floristic matters of conservation significance
- determine the presence or absence of Threatened (T) or Priority Flora
- map and delineate vegetation communities and vegetation condition
- conduct a 'Level 1' Fauna assessment in accordance with methodologies stated in EPA Guidance Statement 56.
- record observable evidence of fauna and fauna activity at the site
- determine potential significant fauna habitats present at the site.
- examine existing rare flora markers on site to determine the status of Threatened flora populations at these locations.



**Project Area**

Figure 1

Coordinate System: GDA 1994 MGA Zone 50



**LEGEND**

- Project Area
- Towns
- Roads

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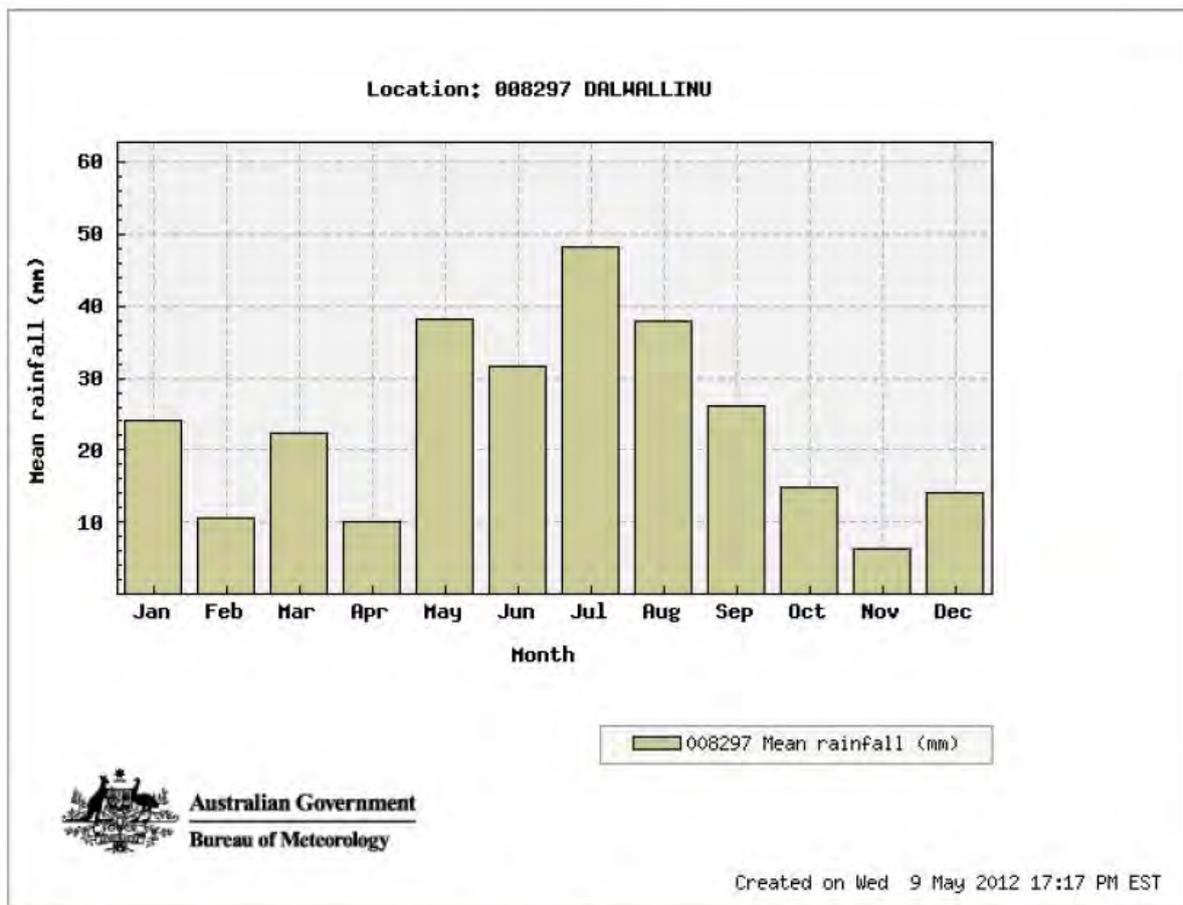


## 1.4 Physical Environment

### 1.4.1 Climate

The climate of the region is described as semi-arid (dry) warm Mediterranean (Beecham, 2001). The nearest Australian Government Bureau of Meteorology (BoM) recording site is at Dalwallinu. This site has recorded an average annual rainfall of 285.6 mm since 1997, with the majority of rainfall occurring between May and September, coinciding with the lowest average temperatures – Figure 2 (BoM, 2012).

Figure 2 Climate Averages from Dalwallinu (BoM, 2012).



Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years
Mean rainfall (mm) for years 1997 to 2012	24.0	10.7	22.4	10.0	38.1	31.7	48.2	37.9	26.2	14.9	6.2	14.1	285.6	15

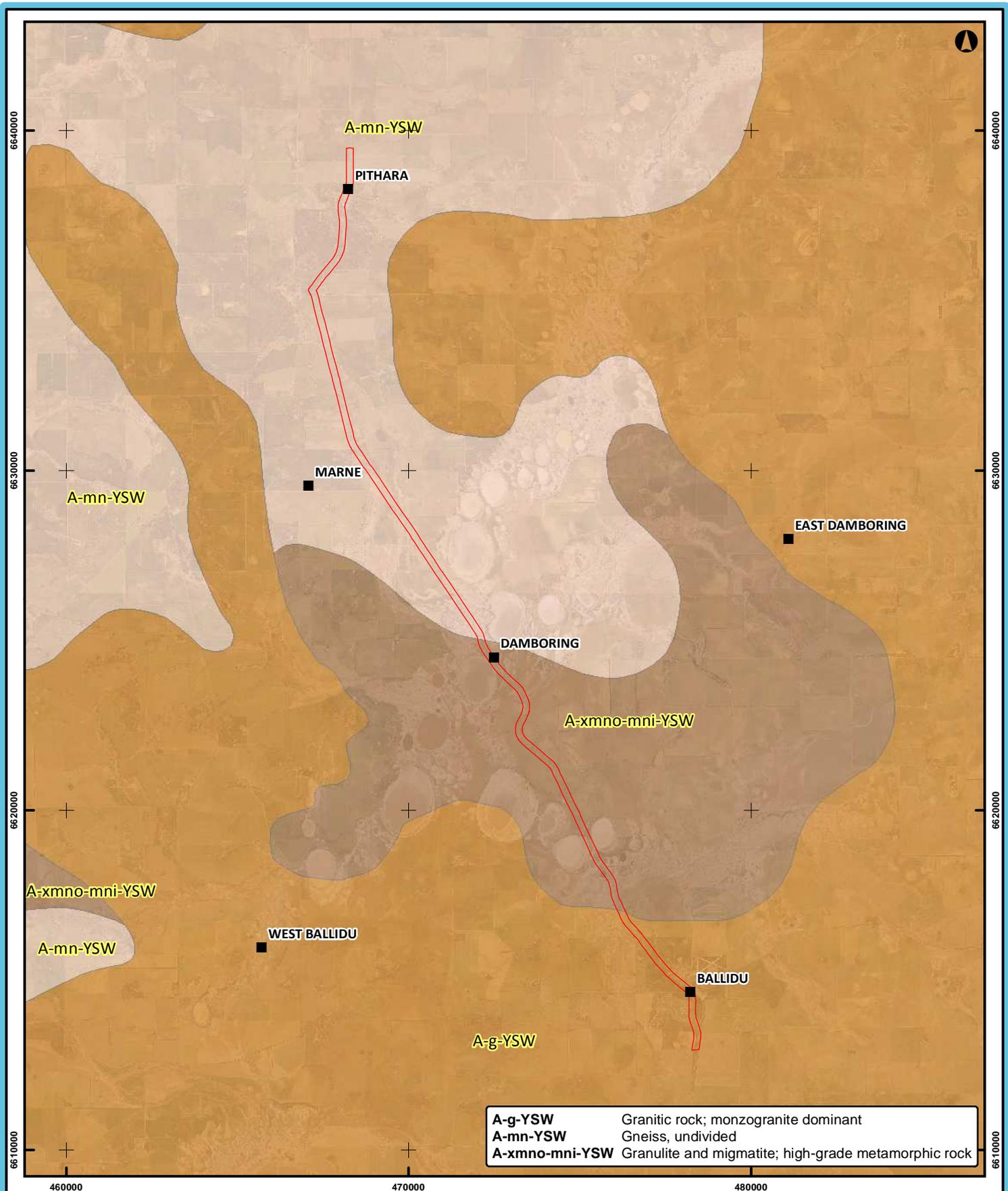
### 1.4.2 Soils and Geology

Beard, (1990) describes the topography and soils of the wheatbelt region as:

“Undulating plateau, mostly with disorganised drainage. Remnants of prior land surface are preserved, giving rise to catenary sequences of soils, typically yellow earths on sandplain with ironstone gravels peripheral to same, hard-setting loam soils on slopes and bottomlands and saline soils in depressions.”

Department of Mines and Petroleum (DMP) 1:500 000 interpreted bedrock geology data (2008) shows granite and gneiss based geology within the survey area as follows (Figure 3):

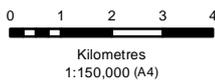
- A-g-YSW                      Granitic rock; monzogranite dominant
- A-mn-YSW                    Gneiss undivided
- A-xmno-mni-YSW            Granulite and migmatite; high grade metamorphic rock.



### Soils of the Project Area

Figure 3

Coordinate System: GDA 1994 MGA Zone 50



#### LEGEND

- Project Area
- Towns

#### 500k Interpreted Bedrock Geology (DOIR)

- A-g-YSW
- A-mn-YSW
- A-xmno-mni-YSW

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## 2.0 Biological context

### 2.1 IBRA Regions

There are 85 recognised Interim Biogeographical Regionalisation of Australia (IBRA) regions across Australia that have been defined based on climate, geology, landforms and characteristic vegetation and fauna (Environment Australia, 2000). Western Australia supports 53 IBRA subregions and the survey area lies within the Avon Wheatbelt IBRA region, and within the Avon Wheatbelt 1 Ancient Drainage Subregion.

The Avon Wheatbelt 1 subregion is described as a gently undulating landscape of low relief (Beecham, 2001). Major vegetation types include Proteaceous scrub-heaths, rich in endemics on residual lateritic uplands and derived sandplains; mixed eucalypt, *Allocasuarina huegeliana* and Jam-York Gum woodland on Quaternary alluvials and eluvials (Beecham, 2001). Salt lake chains occur as remnants of ancient drainage systems that now only function in very wet years (Beecham, 2001).

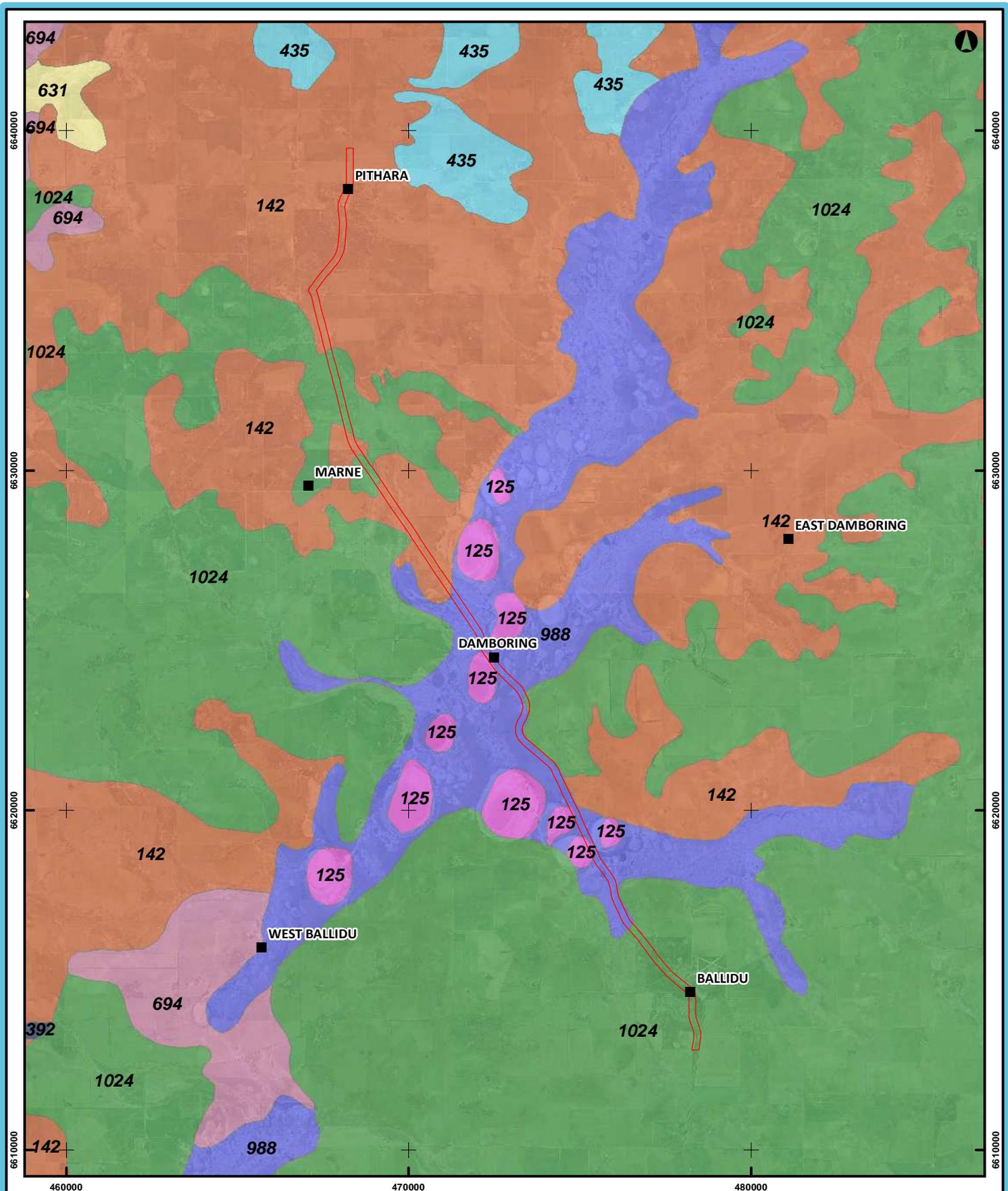
### 2.2 Flora and Vegetation

The Avon Botanical District of the Wheatbelt Region typical comprises of scrub-heath on sandplain, *Acacia-Casuarina* thickets on ironstone gravels, woodlands of York gum (*Eucalyptus loxophleba*), Salmon gum (*E. salmonophloia*) and Wandoo (*E. wandoo*) on loams and halophytes on saline soils.

Beard's (1981) 1:250 000 vegetation series map identifies three broad terrestrial vegetation types that occur within the survey area, plus bare areas comprising of salt lakes. These are described in Table 1.

**Table 1** Beard's (1981) Terrestrial Vegetation Types within the Survey areas

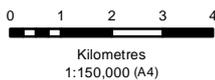
Vegetation Association	Beard Code	Description
142	e6,8Mi	Medium Woodland; York Gum and Salmon Gum
1024	ecSc	Shrublands; Mallee and Casuarina Thickets
125	sl	Bare areas, salt lakes
988	m55c k3Ci	Succulent steppe with thicket, <i>Melaleuca thyoides</i> over samphire.



### Pre-European Vegetation

Figure 4a

Coordinate System: GDA 1994 MGA Zone 50



#### LEGEND

- Project Area
- Towns

#### Pre-European Vegetation Associations

- |  |   |
|--|---|
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| <span style="display: inline-block; width: 15px; height: 15px; background-color: #A0522D; border: 1px solid black; margin-right: 5px;"></span> 142 | <span style="display: inline-block; width: 15px; height: 15px; background-color: #D8BFD8; border: 1px solid black; margin-right: 5px;"></span> 694  |
| <span style="display: inline-block; width: 15px; height: 15px; background-color: #4682B4; border: 1px solid black; margin-right: 5px;"></span> 392 | <span style="display: inline-block; width: 15px; height: 15px; background-color: #6A5ACD; border: 1px solid black; margin-right: 5px;"></span> 988  |
| <span style="display: inline-block; width: 15px; height: 15px; background-color: #00CED1; border: 1px solid black; margin-right: 5px;"></span> 435 | <span style="display: inline-block; width: 15px; height: 15px; background-color: #3CB371; border: 1px solid black; margin-right: 5px;"></span> 1024 |

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## 3.0 Legislative framework

### 3.1 Threatened and Priority Species

The Department of Environment and Conservation (DEC) assigns conservation codes to endemic plant species that are geographically restricted to few known populations or threatened by local processes. Allocating conservation codes to plant species assists in protecting populations and conserving species from potential threats (DEC, 2011a). During April 2011, DEC revised the conservation codes for Western Australian Flora.

Under the *Wildlife Conservation Act 1950 (WC Act)*, 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. Schedule 1 and 2 deal with those species that are threatened and those that are presumed extinct, respectively (DEC, 2011b).

It is an offence to “take” or damage Rare Flora without Ministerial approval. Section 23F of the *WC Act* defines “to take” as “to gather, pick, cut, pull up, destroy, dig up, remove or injure the flora or to cause or permit the same to be done by any means”.

Species designated as Priority Flora are species that have not yet been adequately surveyed and are in urgent need of further survey (Priority 1 to 3), are rare but not threatened (Priority 4) or conservation dependent species (Priority 5). Appendix A presents the updated definitions of Conservation Codes for Western Australian Flora (DEC 2011b).

Species at risk of extinction are recognised at a Commonwealth level and are categorised according to the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* as summarised in Appendix B.

### 3.2 Threatened and Priority Ecological Communities

Threatened Ecological Communities (TECs) are naturally occurring biological assemblages that occur in a particular type of habitat and that are subject to processes that threaten to destroy or significantly modify the assemblage across its range (DEC, 2001).

Vegetation communities in Western Australia are described as TECs if they have been endorsed by the Western Australian Minister for Environment following recommendations made by the TEC Scientific Committee. There are currently four categories for TECs; Presumed Totally Destroyed (PD), Critically Endangered (CR), Endangered (EN) or Vulnerable (VU). For definitions of TEC categories and criteria refer to DEC (2010). DEC maintains a database of state listed TECs which is available for online searches via their website ([www.dec.wa.gov.au](http://www.dec.wa.gov.au)).

TECs on the Commonwealth register are also listed by the Department of Sustainability, Environment, Water, Populations and Communities (DSEWPaC).

There is currently no legislation to directly protect TECs that are only listed to be of State conservation significance in Western Australia except, those that are also listed by DSEWPaC are protected under the Commonwealth *EPBC Act*. The remainder have limited protection under the *WC Act* and the *Environmental Protection Act, 1986 (EP Act)*. For those, the EPA's position on TECs is that proposals resulting in the direct loss of TECs are likely to be formally assessed during the assessment of clearing permit applications whereby the impact on significant communities is a key consideration.

Potential TECs that do not currently meet criteria or that are not adequately defined, are rare but not threatened, have been recently removed from the TEC list or require regular monitoring are regarded as Priority Ecological Communities (PEC) (DEC, 2010) and DEC requires that they are considered during environmental impact assessments.

### 3.3 Communities of Local, Regional and National Significance

Vegetation communities are referred to as locally significant where they:

- support populations of Priority Flora
- extend the geographic range of particular taxa from previously recorded locations
- are restricted to only one or a few locations

- occur as small isolated communities
- exhibit unusually high structural and species diversity (Dr. E.M. Mattiske, pers. comm.).

Vegetation communities are referred to as regionally significant where they:

- are limited to specific landform types
- are uncommon or restricted plant community types within the regional context
- support populations of Threatened Flora (T or X) (Dr. E.M. Mattiske, pers. comm.).

Vegetation communities are referred to as nationally significant where they:

- support populations of Threatened (*EPBC Act*-listed) species
- support populations of TECs listed with national (*EPBC Act*) significance (Dr. E.M. Mattiske, pers. comm.).

EPA Guidance Statement 51 (EPA, 2004a) also states that “vegetation may be significant for a range of reasons, other than a statutory listing as a TEC or because the extent is below threshold level”. Other significant vegetation may include communities that exhibit or support (EPA, 2004a):

- scarcity
- unusual species
- novel combination of species
- a role as a refuge
- a role as a key habitat for threatened species or large populations representing a significant proportion of the local to regional total population of a species
- being representative of the range of a unit, particularly, a good local and/or regional example of a unit in “prime” habitat, at the extremes of a range, recently discovered range extensions, or isolated outliers of a restricted distribution.

### 3.3.1 Significant Species

EPA Guidance Statement 51 (EPA, 2004a) states that “species, subspecies, varieties, hybrids and ecotypes may be significant for a range of reasons, other than as Threatened Flora (T or X) or Priority Flora”. Other significant flora may include taxa that (EPA, 2004a):

- have a keystone role in a particular habitat for threatened species, or supporting large populations representing a significant proportion of the local regional population of a species
- have a relic status
- have anomalous features that indicate a potential new discovery
- are representative of the range of a species (particularly, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range)
- show the presence of restricted subspecies, varieties or naturally occurring hybrids
- have local endemism/a restricted distribution
- are poorly reserved.

### 3.3.2 Vegetation Clearing, Extent and Status

The current extent of vegetation types that remain is important in considering the significance of proposed clearing. That is, vegetation that is poorly represented is of greater significance and proposed impacts to such vegetation types is also considered to be of greater significance in terms of impact assessment.

Where clearing of native vegetation is proposed to occur, from a biodiversity perspective and not taking into account any other land degradation issues present, there are now several key criteria being applied to clearing permits. The criteria, as outlined in the Western Australia Environmental Protection Authority (EPA) Position Statement No. 2, Environmental Protection of Native Vegetation in Western Australia: Clearing of native vegetation, with particular reference to the agricultural area (EPA, 2000). This position statement is used to help reverse the long-term decline in the quality and extent of Australia’s native vegetation cover and applies to all

areas of native remnant vegetation in the state, with particular reference to the agricultural area. The criteria are as follows:

- the “threshold level” below which species loss appears to accelerate exponentially at an ecosystem level is regarded as being at a level of 30% of the pre-clearing extent of the vegetation type
- a level of 10% of the original extent is regarded as being a level representing “endangered”
- clearing which would put the threat level into the class below should be avoided
- from a biodiversity perspective, stream reserves should generally be in the order of at least 200m wide.

The status of remaining vegetation can be delineated into five different classes:

- presumed extinct: Probably no longer present in the bioregion
- \*Endangered: <10% of pre-European extent remains
- \*Vulnerable: 10-30% of pre-European extent exists
- \*Depleted: >30% and up to 50% of pre-European extent exists
- least concern: >50% pre-European extent exists and subject to little or no degradation over a majority of this area.

\* or a combination of depletion, loss of quality, current threats and rarity gives a comparable status.

### 3.4 Threatened, Priority and Migratory Fauna Species

Species of fauna are defined as threatened where their populations are under threat, require protection or are protected under an international agreement between federal governments. DEC recognises these threats of extinction and consequently applies regulations towards population and species protection.

Threatened fauna species are protected under Section 16 of the *WC Act*. Under the Act, it is an offence to “take, destroy or possess” threatened fauna without Ministerial approval. Conservation categories of fauna listed under Schedule 1 to 4 of the *WC Act* are summarised in Appendix C.

Threatened fauna (Schedule 1) are further ranked by DEC according to their threat using International Union for Conservation of Nature (IUCN) Red List criteria that are described as follows:

- 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.

Priority fauna not listed as Threatened (Scheduled) under the *WC Act*, but are poorly known or poorly represented in the conservation estate are regarded as priority and attention is given to their conservation by DEC. The five classifications of Priority fauna are listed in Appendix C.

Threats of extinction of fauna species are also recognised at a Commonwealth level and are categorised according to the EPBC Act, administered by DSEWPaC. Categories of threatened species are summarised in Appendix C.

Migratory species are matters of Commonwealth environmental significance under the *EPBC Act*. Migratory species are defined as animals that migrate to Australia and its external territories, or pass through or over Australian waters during their annual migrations (DSEWPaC, 2012b). Recognised migratory species include any native species identified in an international agreement approved by the Minister and those listed under:

- Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)
- China-Australia Migratory Bird Agreement (CAMBA)
- Japan-Australia Migratory Bird Agreement (JAMBA).

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## 4.0 Methodology

### 4.1 Level 2 Flora and Vegetation Assessment

The Level 2 flora and vegetation assessment of the survey area was conducted in accordance with Environmental Protection Authority (EPA) Guidance Statement No. 51, Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (EPA, 2004a) and EPA Position Statement No.3, Terrestrial Biological Surveys as an Element of Biodiversity Protection (EPA, 2002). Level 2 assessments are required to specifically address the following (EPA, 2004a):

- desktop studies
- reconnaissance field surveys, including:
  - verification of desktop studies
  - delineation and characterisation of flora and vegetation units
  - identification of potential impacts.
- detailed assessment, including:
  - one or more visits in the main flowering season and visit(s) in other seasons
  - establishment of quadrats throughout the target area with replicate sampling of each vegetation unit where possible
  - collection of information from the site, sufficient to put the conservation and functional values of the site into a local and regional context.

#### 4.1.1 Desktop Assessment

A search of the Department of Environment and Conservation (DEC) database for threatened flora and communities was conducted during 2012 prior to the field assessment, to identify flora species and vegetation communities of conservation significance that may have the potential to occur within the survey area.

Results from the following databases were collated:

- DEC Threatened Flora Database
- Western Australian Herbarium records
- DEC Threatened and Priority Flora List
- DEC Threatened Ecological Community (TEC) and Priority Ecological Community (PEC) database
- *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* Protected Matters database
- Nature Map Database Search

#### 4.1.2 Field Assessment

Site flora and vegetation surveys were conducted by Alexandra Sleep (Ecologist) and Matthew Cann (Graduate Ecologist) from AECOM on 22 to 24 May 2012. The area surveyed was the Northam to Pithara road reserve from Ballidu to Pithara up to the fence line or 100 metres both sides of the road if no fences present (herein referred to as the 'survey area').

The field assessment involved mapping of vegetation community and condition combined with recording observable flora within the survey area. The survey area was traversed on foot and by vehicle, with data collected at 22 sites. A total of 16 non-permanent 10 x 10 m quadrats and six vegetation descriptions to supplement data were used throughout the site to assess and characterise each vegetation community type. This method complies with EPA's guidelines for Level 2 flora and vegetation surveys as outlined in the EPA Guidance Statement No. 51 (EPA, 2004a).

Characterisation of the vegetation communities involved identification, describing and spatially mapping the floristic communities based on changes in dominant species composition and landform. Where marked changes in species composition and floristic structure were observed, observable species within the vegetation community were recorded, in order to characterise vegetation units.

The following parameters were recorded for each quadrat:

- location – Australian Map Grid (AMG) coordinates recorded in Geocentric Datum of Australia (GDA) 94 datum using a handheld Global Positioning System (GPS) unit, to an accuracy of 5 m
- photograph – taken from the north-west corner
- habitat, including a description of landform and soils
- a complete inventory of the observed flora species present within each quadrat at the time of the survey, including their height and proportionate cover within the quadrat
- vegetation descriptions, based on the height and cover of dominant species of Keighery's (1994) adaptation of vegetation classification systems of Muir (1977) and Aplin (1979)
- vegetation condition rating of the vegetation within the quadrat, based on an adaptation of the Keighery (1994) Scale (Table 2).

**Table 2** Vegetation Structural Classes (Swan Coastal Plain etc)

Life Form/Height Class	Canopy Cover (%)			
	100 – 70%	70 – 30%	30 – 10%	10-2%
Trees over 30 m	Tall Closed Forest	Tall Open Forest	Tall Woodland	Tall Open Woodland
Trees 10 – 30 m	Closed Forest	Open Forest	Woodland	Open Woodland
Trees under 10 m	Low Closed Forest	Low Open Forest	Low Woodland	Low Open Woodland
Tree Mallee	Closed Tree Mallee	Tree Mallee	Open Tree Mallee	Very Open Tree Mallee
Shrub Mallee	Closed Shrub Mallee	Shrub Mallee	Open Shrub Mallee	Very Open Shrub Mallee
Shrubs over 2 m	Closed Tall Scrub	Tall Open Scrub	Tall Shrubland	Tall Open Shrubland
Shrubs 1-2 m	Closed Heath	Open Heath	Shrubland	Open Shrubland
Shrubs under 1 m	Closed Low Heath	Open Low Heath	Low Shrubland	Low Open Shrubland
Grasses	Closed Grassland	Grassland	Open Grassland	Very Open Grassland
Herbs	Closed Herbland	Herbland	Open Herbland	Very Open Herbland
Sedges	Closed Sedgeland	Sedgeland	Open Sedgeland	Very Open Sedgeland

#### 4.1.3 Vegetation Condition

Vegetation condition is determined in relation to the (perceived) ability of the bushland to maintain itself (Keighery, 1994). This is commonly interpreted primarily on the ratio of visible introduced species to native species; however, disturbance (e.g. grazing, erosion), degree of alteration to community and habitat structure, site ecology and other factors are also considered.

In order to assess and map the vegetation condition of the survey area, the condition was determined at a range of detailed recording sites and in between as necessary, where condition was observed to change. The categories of vegetation condition used were consistent with a combination of methods developed by Keighery (1994) and the Braun-Blanquet Scale (Mueller-Dombois and Ellenberg, 1974), as summarised in Table 2. Given that effective measures of bushland condition are a measure of both the amount of change in community structure and the proportion of weeds present, a quantitative measure is considered to add value to interpretations and results. Accordingly this method incorporates the Keighery (1994) (descriptive and qualitative) and the Braun-Blanquet Scale (Mueller-Dombois and Ellenberg, 1974) (quantitative) methods.

Table 3 Bushland Condition Rating Scale

Descriptor	Explanation
Pristine	Pristine or nearly so, no obvious signs of disturbance. 0% weed cover
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. 1 – 5% weed cover
Very Good	Vegetation structure altered obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing. 5 – 25% weed cover
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing. 25 – 50% weed cover
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance of vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing. 50 – 75% weed cover
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as “parkland cleared” with the flora comprising weed or crop species with isolated native trees or shrubs. 75 – 100% weed cover

#### 4.1.4 Rare Flora Markers and Targeted Searches

A number of rare flora markers occur along the Northam to Pithara Road between Pithara and just south of Ballidu. The areas denoted by these markers were assessed to determine the size and status of previously recorded populations. The markers were located along the road reserve and their locations were recorded. The areas marked out were extensively searched on foot, and in some cases, where suitable habitat existed, areas beyond those marked out were investigated. Where threatened or priority flora was observed, the location was recorded by GPS and the number of individuals at that point was estimated. Typically each individual of *Grevillea dryandroides* subsp. *dryandroides* (T) was recorded and points were recorded for each group of *Dampiera glabrescens* due to its clumping habit.

Records of threatened and priority flora in the survey area and nearby were investigated to determine the size and status of any potential populations. Threatened and Priority flora records within the survey area and nearby were investigated (if the species was likely to be visible at the time of survey) and the surrounds searched on foot. Where a significant species was observed its location was recorded by GPS. Where the identification of a species was unable to be determined in the field, a sample was collected and pressed for identification at the WA Herbarium.

#### 4.1.5 Introduced Species

A search of the Department of Agriculture and Food Western Australia (DAFWA) website was conducted to determine if any of the recorded introduced flora species (weeds) are listed as Declared Plants (pest weeds) pursuant to the *Agriculture and Related Resources Protection Act, 1976*.

#### 4.1.6 Taxonomy and Nomenclature

Species that were unable to be identified in the field were collected and pressed for identification at the WA Herbarium. Plant specimens were identified by Alexandra Sleep (Ecologist) and Gaby Martinez (Senior Botanist) of AECOM using a combination of taxonomic keys and comparison with pressed specimens housed at the WA Herbarium. Nomenclature of the species recorded follows the protocol of the WA Herbarium.

## **4.2 Level 1 Fauna Survey**

### **4.2.1 Desktop Assessment**

A Level 1 Fauna Survey was conducted according to EPA Guidance Statement 56, Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia (EPA, 2004b). Prior to the commencement of the field assessment a number of databases were interrogated for the survey area to determine the presence or potential presence of fauna species within the survey area, particularly threatened species.

### **4.2.2 Field Assessment**

The field assessment for fauna values was conducted in conjunction with the field assessment for flora and vegetation values, as previously discussed, and primarily focused on recording visual observations of fauna or evidence of fauna activity such as scats, tracks and diggings. Conducting the two assessments concurrently also enabled interpretation of the habitat value of each of the vegetation units described and mapped, and determination of each of these as suitable for significant fauna. In particular, attention was given to recording sightings or evidence of species of conservation significance, resulting from the desktop assessment as having the potential to occur in the region. Physical examination of hollows, logs and fallen timber was also conducted to identify fauna usage. Significant trees (if present) were visually examined to determine the presence of nests and hollows. Observations were made along the alignment for key fauna habitats and general observations including species observed. Where species or habitats of significance were observed, site details were recorded using a GPS and the key aspects were recorded. All observations were made between the daylight hours of 0700 and 1730 hours.

### **4.2.3 Taxonomy and nomenclature**

The taxonomy and nomenclature of vertebrate species for mammals, reptiles and amphibians is consistent with the Western Australian Museum's *Checklist of Vertebrates of Western Australia* 2010 and for bird species the Bird's Australia *Checklist of Australian Birds* by Christidis and Boles, (2008).

## 5.0 Survey Limitations

A number of limitations relating to the ecological assessment of the site have been considered and these are described below.

- Certain limitations are inherent in all ecological assessments. Due to the complexity and diversity of natural systems, surveys are necessarily a random and/or limited sampling exercise, and localised populations of flora or variation in communities may not be directly encountered during the field survey process.
- The flora and vegetation assessment results are based on only a single visit, conducted to Level 2 detail. EPA Guidance Statement 51 states that multiple visits to quadrats are preferred to attain a more comprehensive flora species inventory.
- The survey was conducted outside of what is considered the optimal time for survey in the Avon Wheatbelt region (following main rain in winter – EPA, 2004a) therefore the majority of annual and ephemeral taxa would not have been recorded, and some perennial taxa could not be identified to a high degree of certainty due to a lack of flowering and fruiting material.
- Many flora species are dormant for part of the year or only emerge after certain events such as flooding or fire. Additionally, many species do not flower every year whilst a proportion flower in non-peak times and may have been inconspicuous or dormant at the time of the survey. As the seasons change, the flora inventory for each community also changes and if supplementary surveys or surveys during the spring season were undertaken, the suite of flora and potentially also the descriptions of the vegetation units may reflect this.
- The region has had a drier than average lead up to winter (Section 1.4.1), this has resulted in some perennial species being in a senescent state and therefore unable to be identified to a high degree of certainty (note – specimens that could not be identified to a high degree of certainty are denoted with a question mark in front of the name for example *Grevillea ?dryandroides*)
- Due to the dry conditions, it was not possible to assign a completely accurate condition rating to the vegetation in all cases due to an inability to estimate the cover of annual grasses and herbs and whether these annual species are introduced or native.
- Fungi and non-vascular flora (e.g. algae, mosses and liverworts) were not addressed as part of the assessment.
- A preliminary assessment against the 10 clearing principles has been undertaken with consideration for the entire area surveyed as at the time of this report there was no clearing footprint available, it must be noted that this assessment should be done again once the area to be cleared has been determined.
- No assessment of invertebrate fauna, was carried out.

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## 6.0 Results

### 6.1 Flora

#### 6.1.1 Desktop Assessment

A search of DEC flora databases, Nature Map Database and the *EPBC Act* Protected Matters database was conducted for the survey area plus a buffer of five kilometres (km). A total of 31 Threatened and Priority flora species were identified from the database search as potentially occurring within the survey area. Of these species, six are listed as Threatened under the *WC Act* and the *EPBC Act*. The remaining 25 species are listed as Priority Flora. Results from the *EPBC Act* Protected Matters database and Nature Map Database are included in Appendix H and Appendix I, results from the DEC flora database are presented spatially in Figure 5.

Based on desktop assessment of specimen records and preferred habitat, it has been determined that six flora species of conservation significance are likely to occur in the survey area and 20 flora species of conservation significance may occur in the survey area (Table 4). The remaining five species are considered unlikely to occur in the survey area.

Table 4 Records of Threatened and Priority Flora from the vicinity of the survey area (Source: DEC, Florabase)

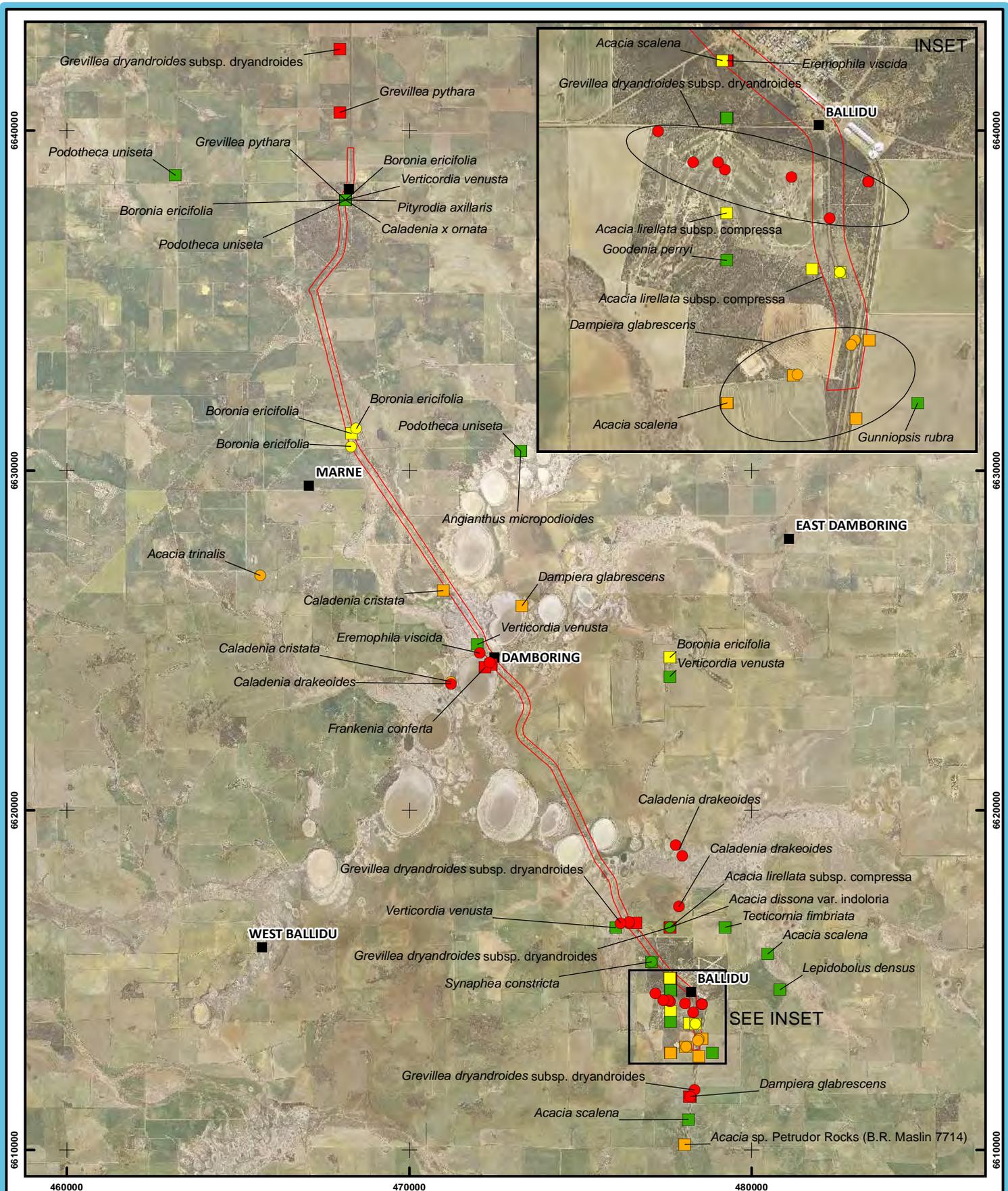
Species	Commonwealth Conservation Code	State Conservation Code	Habitat	Flowering Period	Likelihood of Occurrence in Survey area
<i>Dampiera glabrescens</i>		P1	White or grey/yellow sand. Gravel pits, roadsides.	September	<i>Likely to Occur</i> – There are eight records of this species within the vicinity of the survey area. Six of these records occur at Ballidu, with three within the nearby rail reserve and two within the road reserve. One recorded occurrence of <i>Dampiera glabrescens</i> from within the road reserve, was from 1986 and it was noted to occur on the graded road shoulder, ditches and table drains. It was also recorded nearby in 2007.
<i>Acacia lirellata</i> subsp. <i>compressa</i>		P2	Yellow sand, clayey loam. Sandplains.	Not specified	<i>Likely to Occur</i> – There are five records of this species in the vicinity of Ballidu with three records occurring within the road reserve.
<i>Synaphea constricta</i>		P3	Sand or sandy clay-loam over laterite	June to September	<i>Likely to Occur</i> – There are two records of this species in the vicinity of the survey area, with the most recent record in 1998 from near the road verge.
<i>Frankenia conferta</i>	EN	T (VU)		Not specified	<i>Likely to Occur</i> – There is one population of this species in the vicinity of the road reserve in association with Damboring Lake and the chain of salt lakes which intersect the survey area. In 2008 this population was recorded and was noted to be healthy and comprising of approximately 76 individuals (DEC, 2009).
<i>Caladenia cristata</i>		P1	Sandy clay. Sandy rise above salt flats, freshwater.	August to September	<i>Likely to Occur</i> – There is one record of this species within the road reserve, occurring in association with the chain of salt lakes which intersect the survey area.
<i>Acacia</i> sp. Petrudor Rocks (B.R. Maslin 7714)		P1	Loam or clayey loam over granite. Upper slopes of catchment area, under Eucalyptus low mallee.	July to September	<i>May Occur</i> – The nearest record to the survey area is approximately one kilometre south of Ballidu within the road reserve, this is a population of approximately eight plants which was recorded in 2010. There are two additional populations in the vicinity of Ballidu which were recorded in 2010 and are made up of approximately eight and 17 individuals.
<i>Grevillea dryandroides</i> subsp. <i>dryandroides</i>	EN	T (CR)	Yellow sand & gravel, clay.	September to October or February	<i>Likely to Occur</i> – There are currently five known populations containing approximately 115 individuals (DEC, 2000). Populations 1a and 5a fall within the survey area.

Species	Commonwealth Conservation Code	State Conservation Code	Habitat	Flowering Period	Likelihood of Occurrence in Survey area
<i>Boronia ericifolia</i>		P2	Sandy loam, clay, laterite. Low-lying spots.	April or June or August to September	<i>May Occur</i> – There are four records of this species in the vicinity of the survey area, with three occurring within the road reserve. These occurrences were originally recorded in 1992, therefore the current status of the populations are unknown.
<i>Acacia scalena</i>		P3	Yellow or yellow gravelly sand, loam	June to September	<i>May Occur</i> – There are four records of this species in the vicinity of Ballidu, with one occurring within the road reserve. Several of these records are recent (2009-2010), however the record from within the road reserve was originally recorded in 1958.
<i>Verticordia venusta</i>		P3	Yellow sand, sandy gravel. Sandplains.	September to December or January	<i>May Occur</i> – There are four records of this species in the vicinity of the road reserve between Ballidu and Pithara. The records are from 1962 to 1981 and it is not known whether they still persist at this site. <i>Verticordia venusta</i> is still considered possible to occur as the collections occur from Ballidu to Pithara, not just in one single location and there is remnant vegetation within the survey area that may provide suitable habitat.
<i>Caladenia drakeoides</i>	EN	T	Grey clayey sand, red sandy loam, in damp situations. Margins of salt lakes.		<i>May Occur</i> – There are four records of this species in the vicinity of the road reserve and an additional three records along the nearby Meadows Road. <i>Caladenia drakeoides</i> has a preference for habitats on the margins of salt lakes.
<i>Podotheca unisetata</i>		P3	White/grey sand, sandy loam. Samphire flats.	September to December	<i>May Occur</i> - There are three records of this species in the vicinity of the survey area, one occurs in the vicinity of the railway crossing at Pithara and was recorded in 1989. It is unknown whether this species still persists at this location, however it is likely that there is currently suitable habitat within the survey area as may WA Herbarium records indicate that this species has a preference for habitats associated with salt lakes.
<i>Lepidobolus densus</i>		P3	Yellow lateritic sand, lateritic gravel. Dry kwongan.		<i>May Occur</i> – There are two records of this species in the vicinity of the survey area, with one occurring within the road reserve. The records are both from 1947 and it is unknown whether these populations still persist.

Species	Commonwealth Conservation Code	State Conservation Code	Habitat	Flowering Period	Likelihood of Occurrence in Survey area
<i>Grevillea pythara</i>	EN	T (CR)	Sand or sandy loam with gravel.	May to October	<i>May Occur</i> – There are two records of this species within the road reserve. One (from 1991) is at Pithara and the other (1992) is just north of Pithara, recorded growing in a weedy road verge. The interim recovery plan for this species (Philimore et al, 2001) indicates that only one population of this species was known at the time from south west of Dalwallinu, growing in a shire road reserve.
<i>Eremophila viscida</i>	EN	T (EN)	Granitic soils, sandy loam. Stony gullies, sandplains.	September to November	<i>May Occur</i> – There is one previously recorded population at Ballidu, however this population recorded in 1934 is no longer thought to occur (Philimore et al, 2003). There are three known populations on private land south east of Pithara. This species is thought to prefer areas associated with salt lake systems, so there is likely to be suitable habitat within the survey area.
<i>Chamelaucium</i> sp. Wongan Hills (B.H. Smith 1140)		P3	Sand, sandy loam, low lying flats and margins of salt lakes		<i>May Occur</i> – There is one record of this species approximately 16 kilometres west of Ballidu. There are no records in close proximity to the survey area, however suitable habitat may occur.
<i>Goodenia perryi</i>		P3	Yellow sand.	October to November	<i>May Occur</i> – There is one record of this species approximately 500 metres west of the road reserve at Ballidu. This record is from 1977 and it is unknown whether this population still occurs at this location, however other records indicate that this species may have a preference for disturbed sites and road edges.
<i>Gunniopsis rubra</i>		P3	Sandy loam.	September	<i>May Occur</i> – There is one record of this species approximately 700 metres east of the road reserve, two kilometres south of Ballidu. Although recorded in 1977, this species may still occur in the area as there is still some persisting remnant vegetation in the area.
<i>Angianthus micropodioides</i>		P3	Saline sandy soils. River edges, saline depressions, claypans	November to December or January to February	<i>May Occur</i> – There is one record of this species approximately four kilometres east of the survey area. This species is known to occur in association with salt lakes, which run through the survey area.

Species	Commonwealth Conservation Code	State Conservation Code	Habitat	Flowering Period	Likelihood of Occurrence in Survey area
<i>Tecticornia fimbriata</i>		P3	Clay, loam. Margins of salt & gypsum lakes.		<i>May Occur</i> – There is one record of this species approximately two kilometres east of the road reserve at Ballidu in 1968. Despite the age of this record and distance from the road reserve, this species is still considered a possibility to occur due to the existence of suitable habitat within the survey area.
<i>Grevillea kenneallyi</i>		P2	Gravelly loam, laterite	July to September	<i>May Occur</i> – There is one record of this species from 1963 in the vicinity of the road reserve at Ballidu. It is unknown whether this population still persists.
<i>Acacia trinalis</i>		P1	Brown sand, clay loam. Salt lakes & flats, swampy areas.	September	<i>May Occur</i> – There is one record of this species from 1987 approximately four kilometres west of the road reserve. <i>Acacia trinalis</i> is considered possible to occur due to its preference for salt lakes and salt flats.
<i>Gompholobium wonganense</i>		P3	Sand, laterite. Among hills.	September to November	<i>May Occur</i> - There is one record of this species in the vicinity of the road reserve at Ballidu. It is unknown whether this population still persists as the original collection was made in 1934. There are six records of <i>Gompholobium wonganense</i> at the WA Herbarium, the majority of these are from Wongan Hills and surrounds occurring in lateritic soils.
<i>Acacia dissona</i> var. <i>indoloria</i>		P3	Sand, sandy loam. Undulating plains.	August to September	<i>May Occur</i> – There is one record of this species within approximately 500 metres of the road verge. This is close to an area where the road is adjacent to what appears to be a larger area remnant vegetation. There are 18 records of this species at the WA herbarium and these records indicate that several have been found in areas of disturbed soil on road verges.
<i>Caladenia x ornata</i>		P1	Sandy clay. Margins salt lakes, slight rises, under <i>Melaleuca</i> and <i>Acacia acuminata</i> .		<i>May Occur</i> – There is one record of this species within the road reserve in the vicinity of Pithara. This record (originally recorded in 1988) is the only known record of <i>Caladenia x ornata</i> .

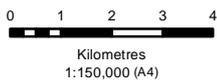
Species	Commonwealth Conservation Code	State Conservation Code	Habitat	Flowering Period	Likelihood of Occurrence in Survey area
<i>Urodon capitatus</i>		P3	Sandy gravelly soils. Plains.	September to October	<i>May Occur</i> - There are three records of this species in the vicinity of the road reserve at Ballidu. They are historical records from 1934 – 1942 and it is unknown what the current status of this population is, however this species is still considered a possibility to occur as there is persisting remnant vegetation in this area.
<i>Petrophile globifera</i>		P3	Deep sand		<i>Unlikely to Occur</i> - There are no records in the immediate vicinity of the survey area. The nearest record is approximately 10 km west of Pithara. There are no specific habitat preferences to suggest that this species would occur in the survey area.
<i>Bossiaea concinna</i>		P3	White or red sand, gravel.	June to September	<i>Unlikely to Occur</i> – There are no records in the vicinity of the survey area. The nearest record is north east of Pithara.
<i>Dicrastylis reticulata</i>		P3	Sandy soils, often over granite. Amongst granite rock, hills, flats.	September to December	<i>Unlikely to Occur</i> – There are two records of this species between Kalannie and Pithara from 1938. There are no records in close proximity to the survey area.
<i>Petrophile trifurcata</i>		P2	Sand	September	<i>Unlikely to Occur</i> – There is one record of this species 10 km west of Pithara.
<i>Pityrodia axillaris</i>	CR	T (CR)	Sandy soils.	July to December	<i>Unlikely to Occur</i> – There is one record of this species from the vicinity of the railway crossing at Pithara. This record was from 1963. Recent conservation advice (DSEWPAC, 2010) indicates that this species is only known from eight populations in the Morawa area (approximately 150 kilometres north of Pithara).



### Records of Threatened and Priority Flora in the Vicinity of the Project Area

Figure 5

Coordinate System: GDA 1994 MGA Zone 50



#### LEGEND

- Project Area
- Towns

#### Threatened and Priority Flora Records

DEC	WA Herbarium
T	<span style="color: red;">●</span> <span style="color: red;">■</span>
P1	<span style="color: orange;">●</span> <span style="color: orange;">■</span>
P2	<span style="color: yellow;">●</span> <span style="color: yellow;">■</span>
P3	<span style="color: green;">●</span> <span style="color: green;">■</span>

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### 6.1.2 Field Assessment

A total of 113 species from 58 genera and 27 families were recorded within the survey area during the field assessment. The total includes 111 (98%) locally native species, and 2 (2%) introduced (exotic) or naturalised weed species.

Families with the highest representation are Myrtaceae (27 taxa, all of which are native), Fabaceae (17 taxa, all of which are native) and Proteaceae (14 taxa, all of which are native).

The full list of vascular flora species recorded and representative communities in which they occur in are presented in Appendix D and Appendix E, respectively. Qualitative data recorded from individual quadrats is presented in Appendix F.

### 6.1.3 Threatened and Priority Flora

One species listed as Declared Rare Flora or Threatened (T or X) under the WC Act or as Threatened under the EPBC Act was recorded from within the survey area.

- *Grevillea dryandroides* subsp. *dryandroides* (T)

*Grevillea dryandroides* subsp. *dryandroides* (T) is a root suckering shrub to 50 cm (Plate 1), it usually forms colonies of less than five plants or can be found scattered singly amongst associated vegetation (DEC, 2000). There are currently five known populations containing approximately 115 individuals (DEC, 2000). Populations 1a and 5a fall within the survey area. The area surrounding population 1a was searched on foot, however no individuals were recorded. Four individuals were recorded at population 5a, with a further five recorded approximately 400 metres north of 5a. Locations of recorded *Grevillea dryandroides* subsp. *dryandroides* are shown in Figure 8.

Four Priority Flora species were recorded from the survey area

- *Acacia ?dissona* var. *indoloria* (P3)
- *Acacia ?scalena* (P3)
- *Acacia lirellata* subsp. *compressa* (P2)
- *Dampiera ?glabrescens* (P1)

The locations from which these species have been recorded are included in Appendix J and Figure 8.

#### 6.1.3.1 Summary of Rare Flora Markers within the Survey area

Eleven rare flora markers were recorded within the survey area (Table 5). These areas were investigated for populations of threatened flora as described in Section 4.1.4 and it was found that two markers (WP99 and WP103) demarcated a population of *Grevillea dryandroides* subsp. *dryandroides* along the road reserve. Locations, direction facing (markers are typically in pairs to mark out the location of a population) and side of road of each rare flora marker located are listed in Appendix K.

**Table 5 Summary of Rare Flora Markers within the Survey area**

ID	Target species (based on DEC database results)	Recorded during May 2012 field survey
WP98	Unknown	No threatened or priority species observed.
WP99	<i>Grevillea dryandroides</i> subsp. <i>dryandroides</i> (T)	Four individuals recorded
WP103	<i>Grevillea dryandroides</i> subsp. <i>dryandroides</i> (T)	Five individuals recorded
WP89	<i>Grevillea dryandroides</i> subsp. <i>dryandroides</i> (T) ?	No Threatened flora recorded
WP91	Unknown	No Threatened flora recorded
WP22	<i>Boronia ericifolia</i> (P2)	No Threatened flora recorded No <i>Boronia ericifolia</i> recorded
WP32	<i>Boronia ericifolia</i> (P2)	No Threatened flora recorded No <i>Boronia ericifolia</i> recorded

ID	Target species (based on DEC database results)	Recorded during May 2012 field survey
WP43	<i>Grevillea dryandroides</i> subsp. <i>dryandroides</i> (T)	No <i>Grevillea dryandroides</i> subsp. <i>dryandroides</i> <i>Dampiera ?glabrescens</i> (P1) recorded
WP68	<i>Grevillea dryandroides</i> subsp. <i>dryandroides</i> (T)	No <i>Grevillea dryandroides</i> subsp. <i>dryandroides</i> <i>Dampiera ?glabrescens</i> (P1) recorded
WP69	<i>Grevillea dryandroides</i> subsp. <i>dryandroides</i> (T) ?	No <i>Grevillea dryandroides</i> subsp. <i>dryandroides</i> <i>Dampiera ?glabrescens</i> (P1) recorded
WP82	<i>Dampiera glabrescens</i> (P1) ?	No significant flora recorded at this location

#### 6.1.4 Introduced Species

##### 6.1.4.1 Desktop Assessment

Desktop assessment of the survey area was carried out and the Naturemap database indicates that 72 introduced flora species are known from the area (see Appendix I for full list) including one declared weed – Skeleton Weed (*Chondrilla juncea*).

Under the *Agriculture and Related Resources Protection Act, 1976*, 93 weed species occurring within Western Australia are listed as Declared Plants. Pursuant to the Act, these species are subject to restrictions on movement or sale and landholders are obliged to carry out control measures to prevent their spread. Weeds effectively colonise areas where the soil has been disturbed or cleared, enabling these species to further invade surrounding natural sites. DAFWA recommended control measures for Skeleton Weed are presented in Appendix G.

**Table 6** Introduced flora species known to have a high ecological impact identified by desktop assessment as potentially occurring in the survey area

Species	Notes
<i>Arctotheca calendula</i> Cape Weed	Colonises bare soil and disturbed areas, is likely to impact on soil moisture and nutrient availability, however does not seem to compete well in natural undisturbed ecosystems. Seed bank persistence of up to eight years.
<i>Briza maxima</i> Blowfly Grass	A widespread weed of wasteland, granite rocks, wetlands and woodlands. Seed bank persistence of up to three years. Fire promotes germination of soil stored seed
<i>Bromus diandrus</i> Great Brome	Highly competitive for water, nutrients and space. Produces prolific seed, seed bank persistence is short from days up to 2 years.
<i>Bromus madritensis</i> Madrid Brome	Will only invade areas of bare soil with sufficient available light. May increase fire frequency, fire response is mass seed germination. Short seed bank persistence (less than a year), but produces prolific seed.
<i>Bromus rubens</i> Red Brome	Highly competitive with other grasses and capable of displacing native species. May increase fire frequency, fire response is mass seed germination. Short seed bank persistence (less than a year), but produces prolific seed.
<i>Crassula natans</i> Pond Stonecrop	An aquatic annual and common weed of ephemeral wetlands.
<i>Freesia alba x leichtlinii</i> Freesia	A garden escape that grows amongst grasses in woodland or in disturbed areas. It is a cormous perennial which reproduces primarily by seed and occasionally by offsets/stem-cormels.
<i>Gazania linearis</i> Gazania	Produces abundant windblown seed and spreads rapidly.
<i>Juncus acutus</i> subsp. <i>acutus</i> Sharp Rush	Once established, completely covers area and eliminates all other vegetation. Can restrict flow of water and cause flooding, has allelopathic anti-algae properties.
<i>Mesembryanthemum crystallinum</i> Iceplant	Ability to accumulate salt has enabled it to establish in saline areas. Forms dense groundcover and outcompetes native species. Seed bank persistence is 20 + years.

Species	Notes
<i>Mesembryanthemum nodiflorum</i> Slender Iceplant	Similar to common iceplant ( <i>M. crystallinum</i> ) able to establish in saline areas.
<i>Oxalis pes-caprae</i> Soursob	Prefers disturbed sites, reproduces by bulbis, rarely setting seed.

#### 6.1.4.2 Field Assessment

Two introduced species were recorded from the survey area. Of these, both are considered to have a high ecological impact (DEC, 2009).

Weeds considered to have high ecological impact in the region based on DEC (2009) which were recorded from the survey area, or recorded from desktop assessment are included in Table 7.

**Table 7 Introduced Flora Species Recorded from the Survey which are regarded as having a high ecological impact according to DEC (2009).**

Species	Notes	Sites Recorded At	Vegetation Community Recorded In
<i>Avena barbata</i> Bearded Oat	Able to out-compete native grasses. Is allelopathic and forms an extensive, fibrous root system. Prolific seed producer, often buried seed remains dormant until disturbed.	14 & 19	EILOWAMTOS EhTMATS
<i>Eragrostis curvula</i> African Lovegrass	A weed of disturbed areas but may also invade heathlands, woodlands, forests, grasslands and riverine environments. Forms dense monocultures, creating large fuel loads and a fire hazard. Is thought to be allelopathic. Seed bank persistence up to 5 years.	6	SH

## 6.2 Vegetation

### 6.2.1 Desktop Assessment

#### 6.2.1.1 Extent of Vegetation Associations

Beard's (1981) 1:250 000 vegetation series map identifies three broad terrestrial vegetation types that occur within the survey area, plus bare areas comprising of salt lakes (Section 2.2). The pre-European and current extent, including within the Shires of Wongan-Ballidu and Dalwallinu are listed in Table 8.

**Table 8 Pre-European and Current Extent of Vegetation Associations that occur within the survey area (Beeston *et al* 2002).**

Vegetation Association	Pre-European Extent (Ha)	Current Extent (Ha)	Percentage Remaining (%)	Percentage Current Extent in DEC Managed Lands	Current Extent within Shire of Wongan-Ballidu	Current Extent within Shire of Dallwallinu
142	967,983	266,619	27.54	3.97	1,294.51 (3.45%)	8,492.77 (6.90%)
1024	732,522	67,054	9.15	8.17	14,271.13 (5.93%)	12,203.60 (8.55%)
125	3,578,590	3,237,158	90.46	7.31	45.24 (1.74)	43,851.09 (71.17%)
988	99,139	22,230	22.42	16.20	2,420.84 (7.29%)	1,219.03 (20.85%)

### 6.2.1.2 Threatened and Priority Ecological Communities

A search was undertaken on the DEC Threatened Ecological Community Database and there are no previously recorded occurrences of TECs or PECs within the survey area. There is the occurrence of the following PEC within five kilometres of the survey area:

- The Priority 1 ecological community – ‘Red Morrell Woodlands of the Wheatbelt’
  - Tall open woodlands of *Eucalyptus longicornis* (red morrell) found in the Wheatbelt on lateritic, ironstone or granitic soil types. Sometimes found with *Eucalyptus salmonophloia* (Salmon Gum), or *E. loxophleba* (York Gum) woodlands and has very little understorey. It is also found directly above lake systems in the central and eastern Wheatbelt. The landscape unit in which it is found is valley floors, usually adjacent to saline areas.

### 6.2.1.3 Wetlands and Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are areas that have been identified for protection due to their environmental significance as outlined in the Western Australian Environmental Protection (Environmentally Sensitive Areas) Notice 2005, which was gazetted on 8 April 2005.

Exceptions offered for clearing under Regulation 5 of the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 do not apply within ESAs. ESAs gazetted due to supporting environmental values of State or Commonwealth importance and, in this situation, include:

- Declared World Heritage properties (EPBC Act)
- areas included on the National Estate Register
- defined wetlands and associated buffers
- vegetation within 50 m of rare flora
- TECs.

There are five ESAs within the survey area, these are associated locations of rare flora with a 50 metre buffer. (Figure 8).

There are two chains of saline lakes that intersect the survey area, the largest of which is Damboring Lake. Figure 8 shows the location of these lakes in relation to the survey area.

### 6.2.1.4 Conservation Reserves

Damboring Nature Reserve is located approximately 500 metres west of the road reserve in the vicinity of Damboring Lake (Figure 8).

## 6.2.2 Field Assessment

### 6.2.2.1 Vegetation Units

A total of 13 vegetation units were described and mapped from 22 sites within the survey area during the field assessment in May 2012 (Table 9). This includes:

- *Allocasuarina-Melaleuca* Scrub (one)
- *Acacia-Santalum* Shrubland (one)
- *Darwinia* Heath (one)
- *Eucalyptus* Tree Mallee (three)
- *Eucalyptus loxophleba* Woodland (three)
- *Grevillea-Santalum* Scrub (one)
- *Grevillea-Melaleuca* Shrubland (one)
- *Melaleuca* Scrub (one)
- *Tecticornia* Heath (one).

The *Allocasuarina Melaleuca* Scrub community (AcSaCTS) was the most diverse community in terms of species richness (average across sites and total for the unit), the saline communities MITOS and SH recorded the lowest species richness as an average across sites (Table 10).

**Table 9** Vegetation Units of the Survey area

Vegetation Unit Code	Type	Description	Sites Recorded
AeSaTSMhS	<i>Acacia</i> , <i>Santalum</i> Shrubland	Tall Shrubland of <i>Acacia eremaea</i> and <i>Santalum acuminatum</i> over a Shrubland of <i>Melaleuca hamata</i> over a Low Shrubland of <i>Leptospermum erubescens</i> , <i>Calytrix</i> sp. and <i>Cryptandra</i> sp. over a Very Open Grassland of <i>Austrostipa ?nitida</i> on pale brown sand.	10
AcSaCTS	<i>Allocasuarina</i> , <i>Melaleuca</i> Scrub	Scattered Open Tree Mallee of <i>Eucalyptus horistes</i> over a Tall Open Shrubland to Tall Closed Scrub of <i>Allocasuarina campestris</i> and <i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i> with <i>Santalum acuminatum</i> with occasional dominance by <i>Melaleuca atroviridis</i> over a Low Open Shrubland to Low Open Heath of <i>Melaleuca cordata</i> , <i>Astroloma serratifolium</i> and <i>Myrtaceae</i> spp. over a Sedgeland of <i>Gahnia drummondii</i> , <i>Ecdiocola monostachya</i> and <i>Lepidobolus preissianus</i> over scattered <i>Borya constricta</i> on light brown sandy loam.	1, 2, 4,16
ATSDdCLH	<i>Darwinia</i> Heath (Saline)	Tall Shrubland of <i>Acacia</i> sp. with scattered <i>Acacia acuminata</i> and <i>Melaleuca thyoides</i> over a Closed Low Heath of <i>Darwinia diosmoides</i> over scattered <i>Gunniopsis ?quadrifida</i> on pale brown sand in association with salt lake.	22
EILOWAMTOS	<i>Eucalyptus loxophleba</i> subsp. <i>supralaevis</i> Low Woodland	Low Woodland to Low Open Woodland of <i>Eucalyptus loxophleba</i> subsp. <i>supralaevis</i> with occasional <i>Eucalyptus erythronema</i> var. <i>marginata</i> over a scattered Tall Shrubland of <i>Acacia eremaea</i> and <i>Melaleuca</i> spp. over a Low Shrubland to Low Open Heath of <i>Sarcocornia quinqueflora</i> , <i>Tecticornia indica</i> subsp. <i>bidens</i> and <i>Rhagodia drummondii</i> on light brown sandy loam in association with salt lakes.	9, 19
EILOWATOS	<i>Eucalyptus loxophleba</i> subsp. <i>supralaevis</i> Low Woodland	Low Open Woodland of <i>Eucalyptus loxophleba</i> subsp. <i>supralaevis</i> over a Tall Open Shrubland of <i>Acacia acuminata</i> over Scattered Shrubs to a Low Shrubland of <i>Rhagodia drummondii</i> and <i>?Maireana brevifolia</i> over a Very Open Grassland of <i>Austrostipa ?nitida</i> and <i>Amphipogon caricinus</i> var. <i>caricinus</i> on light brown sandy loam.	5, 7
EWAIS	<i>Eucalyptus loxophleba</i> subsp. <i>supralaevis</i> Low Woodland	Low Open Woodland of <i>Eucalyptus loxophleba</i> subsp. <i>supralaevis</i> over a Tall Shrubland of <i>Acacia ?ligustrina</i> with occasional <i>Acacia acuminata</i> over an Open Shrubland of <i>Dodonaea ?inaequifolia</i> over a Low Open Shrubland of <i>Sclaerolena ?diacantha</i> on light brown clay loam with surface concretions and lichens.	12
EcTMMS	<i>Eucalyptus</i> Tree Mallee	Tree Mallee of <i>Eucalyptus ?celastroides</i> subsp. <i>virella</i> over a Tall Shrubland of <i>Melaleuca acuminata</i> subsp. <i>websteri</i> over an Open Shrubland of <i>Melaleuca coroncarpa</i> over a Low Open Shrubland of <i>Olearia muelleri</i> over a Very Open Herbland of <i>Borya constricta</i> on pale brown sandy clay with surface concretion and lichens.	17
EhTMATS	<i>Eucalyptus</i> Tree Mallee	Tree Mallee of <i>Eucalyptus horistes</i> over scattered patches of tall shrubs of <i>Acacia ?coolgardiensis</i> over an Open Heath of <i>Acacia ?dissona</i> var. <i>indoloria</i> (P3) and <i>Melaleuca laxiflora</i> over a Very Open Sedgeland of <i>Dianella revoluta</i> and <i>Gahnia drummondii</i> on pale brown sandy loam.	14

Vegetation Unit Code	Type	Description	Sites Recorded
EIOTMMcLOS	<i>Eucalyptus</i> Tree Mallee	Open Tree Mallee of <i>Eucalyptus leptopoda</i> subsp. <i>arctata</i> over Low Open Shrubland of <i>Melaleuca cordata</i> over an Open Sedgeland of <i>Ecdeiocolea monostachya</i> and <i>Lepidobolus preissianus</i> on pale brown sandy loam.	3
GTSaCOH	<i>Grevillea</i> , <i>Melaleuca</i> Shrubland	Tall Shrubland of <i>Grevillea</i> sp. with scattered <i>Melaleuca acuminata</i> subsp. <i>websteri</i> over an Open Heath of <i>Allocasuarina campestris</i> , <i>Grevillea ?levis</i> and <i>Hakea scoparia</i> subsp. <i>scoparia</i> over an Open Grassland of <i>Austrostipa ?nitida</i> with scattered <i>Ecdeiocolea monostachya</i> on pale brown sandy clay with ironstone and quartz mantle and surface concretions.	18
GSTOS	<i>Grevillea</i> , <i>Santalum</i> Scrub	Tall Open Scrub of <i>Grevillea ?armigera</i> and <i>Santalum acuminatum</i> over a Low Open Shrubland of <i>?Aluta aspera</i> over a Very Open Grassland of <i>Austrostipa ?nitida</i> on light brown-orange clay loam.	11
MITOS	<i>Melaleuca</i> Scrub (saline)	Tall Shrubland to Tall Open Scrub of <i>Melaleuca lateriflora</i> with <i>Acacia ermaea</i> and patches where <i>Melaleuca hamata</i> becomes co-dominant over a scattered Low Shrubland of <i>Sclerolaena ?diacantha</i> , <i>Atriplex bunburyana</i> and <i>Rhagodia drummondii</i> over a Low Succulent Shrubland to Low Open Heath of <i>Tecticornia indica</i> subsp. <i>bidens</i> , <i>Tecticornia pergranulata</i> subsp. <i>pergranulata</i> and <i>Tecticornia ?halocnemoides</i> over brown sandy loam with surface salt crusting.	20, 8, 15, 21
SH	<i>Tecticornia</i> Heath (saline)	Closed Low Succulent Heath of <i>Tecticornia indica</i> subsp. <i>bidens</i> , <i>Tecticornia ?halocnemoides</i> and <i>Tecticornia pergranulata</i> subsp. <i>pergranulata</i> with occasional scattered tall shrubs of <i>Acacia ermaea</i> on pale brown sandy loam with surface salt crusting on fringes of salt lakes.	6, 13

Table 10 Species richness of vegetation units recorded within the survey area

Vegetation Unit	Vegetation Type	Average Species Richness of Sites within Vegetation Unit recorded in May 2012	Species Richness of Vegetation Unit (total of all species recorded within vegetation unit) May 2012
AcSaCTS	<i>Allocasuarina</i> , <i>Melaleuca</i> Scrub	19.5	48
AeSaTSMhS	<i>Acacia</i> , <i>Santalum</i> Shrubland	12	12
ATSDdCLH	<i>Darwinia</i> Heath (Saline)	9	9
EcTMMS	<i>Eucalyptus</i> Tree Mallee	7	7
EhTMATS	<i>Eucalyptus</i> Tree Mallee	11	11
EILOWAMTOS	<i>Eucalyptus loxophleba</i> subsp. <i>supralaevis</i> Low Woodland	13	21
EILOWATOS	<i>Eucalyptus loxophleba</i> subsp. <i>supralaevis</i> Low Woodland	11.5	17
EIOTMMcLOS	<i>Eucalyptus</i> Tree Mallee	9	9

Vegetation Unit	Vegetation Type	Average Species Richness of Sites within Vegetation Unit recorded in May 2012	Species Richness of Vegetation Unit (total of all species recorded within vegetation unit) May 2012
EWAIS	<i>Eucalyptus loxophleba</i> subsp. <i>supralaevis</i> Low Woodland	7	7
GSTOS	<i>Grevillea, Santalum</i> Scrub	9	9
GTSaCOH	<i>Grevillea, Melaleuca</i> Shrubland	19	19
MITOS	<i>Melaleuca</i> Scrub (saline)	5.5	16
SH	<i>Tecticornia</i> Heath (saline)	6	11

### 6.2.2.2 Vegetation Condition

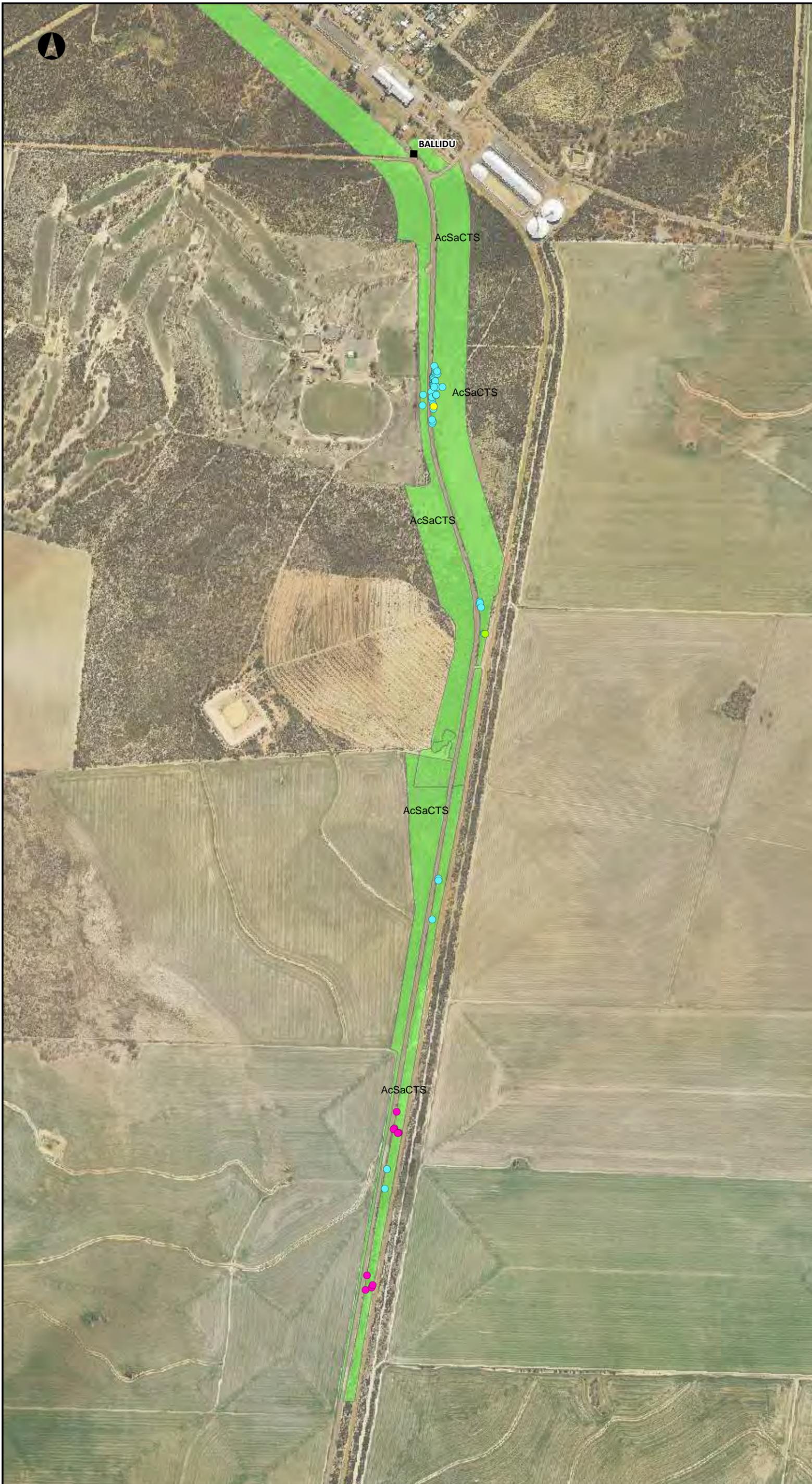
The condition of the vegetation within the survey area ranges from 'Completely Degraded' to 'Very Good to Excellent'. Bare areas associated with the salt lakes have been mapped as either salt lakes (6.62% of the survey area) or salt pans (1.1% of the survey area). The road has not been included in the mapping or total area, neither have any areas of farmland.

The majority of the vegetation of the survey area is in 'Very Good' condition (23.59%), followed by Good to Very Good (17.31%), it is also of note that 16.05% of the vegetation is considered to be in 'Very Good to Excellent' condition.

The proportion of varying vegetation condition is presented in Table 11 and Figure 7.

**Table 11 Varying Vegetation Condition within the Survey area**

Condition Rating	Area (ha)	Percentage of Survey area (%)
Bare Area – Salt Lake	16.57	6.62
Bare Area – Salt Pan	2.75	1.10
Completely Degraded	0.79	0.32
Completely Degraded (planted trees)	1.49	0.60
Degraded to Completely Degraded	8.20	3.28
Degraded	24.25	9.69
Degraded to Good	14.21	5.68
Good	39.49	15.78
Good to Very Good	43.31	17.31
Very Good	59.04	23.59
Very Good to Excellent	40.18	16.05
<b>Total</b>	<b>250.28</b>	<b>100.00</b>



### Vegetation Units of the Project Area

Figure 6

0 100 200 300 400

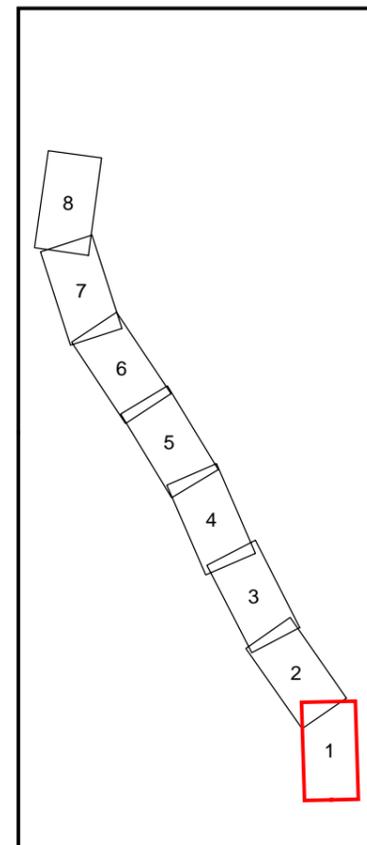
Metres

1:10,000 (A3)

Coordinate System: GDA 1994 MGA Zone 50

LEGEND

- Quadrats
- Vegetation Units**
- ATSDdCLH
- AcSaCTS
- AeSaTSMh
- Bare Areas - Salt Lake
- Bare Areas - Salt Pan
- EWAIS
- EcTMMS
- EhTMATS
- ELOWAMTOS
- ELOWATOS
- EIOTMMcLOS
- GSTOS
- GTSaCOH
- MITOS
- Planted
- SH
- Observed Significant Flora (AECOM)**
- *Acacia ?dissona* var. *indoloria* (P3)
- *Acacia ?scalena* (P3)
- *Acacia lirellata* subsp. *compressa* (P2)
- *Dampiera ?glabrescens* (P1)
- *Grevillea dryandroides* subsp. *dryandroides*

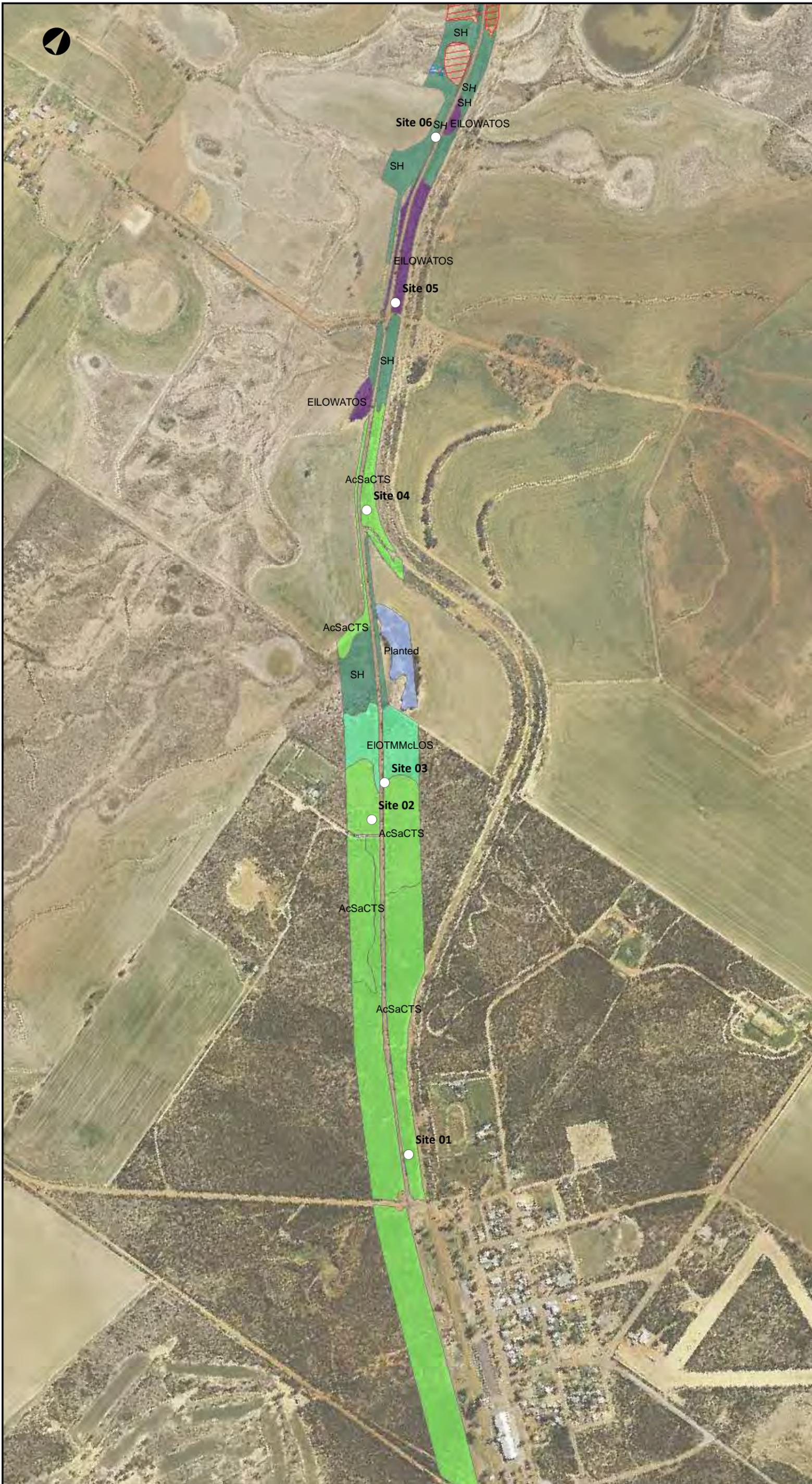


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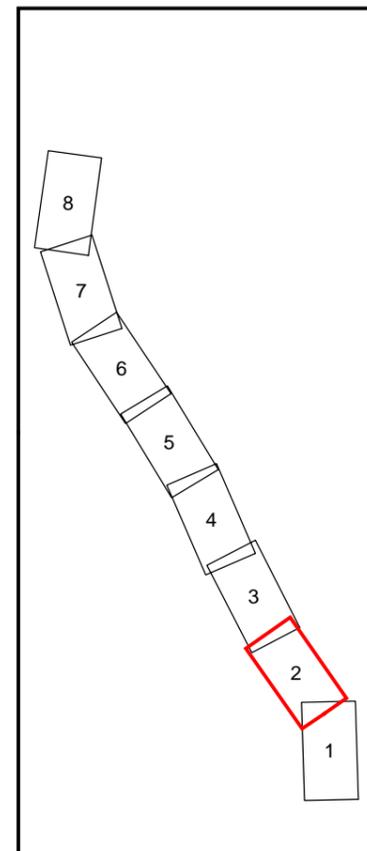
### Vegetation Units of the Project Area

Figure 6

0 100 200 300 400  
Metres  
1:10,000 (A3)  
Coordinate System: GDA 1994 MGA Zone 50

#### LEGEND

- Quadrats
- Vegetation Units**
- ATSDdCLH
- AcSaCTS
- AeSaTSMh
- ▨ Bare Areas - Salt Lake
- ▨ Bare Areas - Salt Pan
- EWAIS
- EcTMMS
- EhTMATS
- ELOWAMTOS
- ELOWATOS
- EIOTMMcLOS
- GSTOS
- GTSaCOH
- MITOS
- Planted
- SH
- Observed Significant Flora (AECOM)**
- *Acacia ?dissona* var. *indoloria* (P3)
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- *Acacia lirellata* subsp. *compressa* (P2)
- *Dampiera ?glabrescens* (P1)
- *Grevillea dryandroides* subsp. *dryandroides*



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### Vegetation Units of the Project Area

Figure 6

0 100 200 300 400

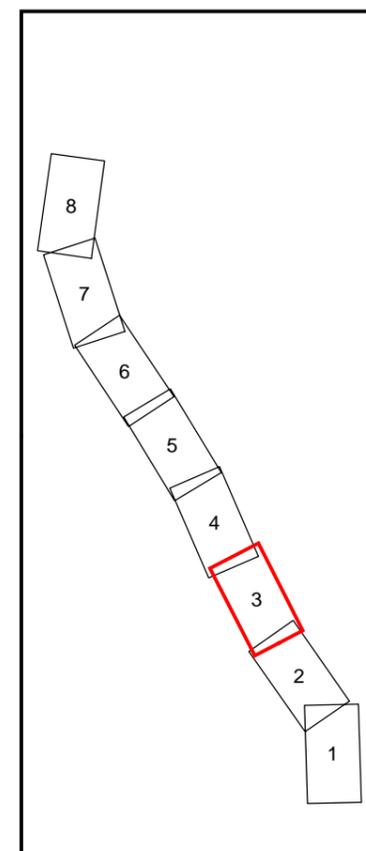
Metres

1:10,000 (A3)

Coordinate System: GDA 1994 MGA Zone 50

#### LEGEND

- Quadrats
- Vegetation Units**
- ATSDdCLH
- AcSaCTS
- AeSaTSMh
- Bare Areas - Salt Lake
- Bare Areas - Salt Pan
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- EcTMMS
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- *Acacia ?dissona* var. *indoloria* (P3)
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- *Grevillea dryandroides* subsp. *dryandroides*

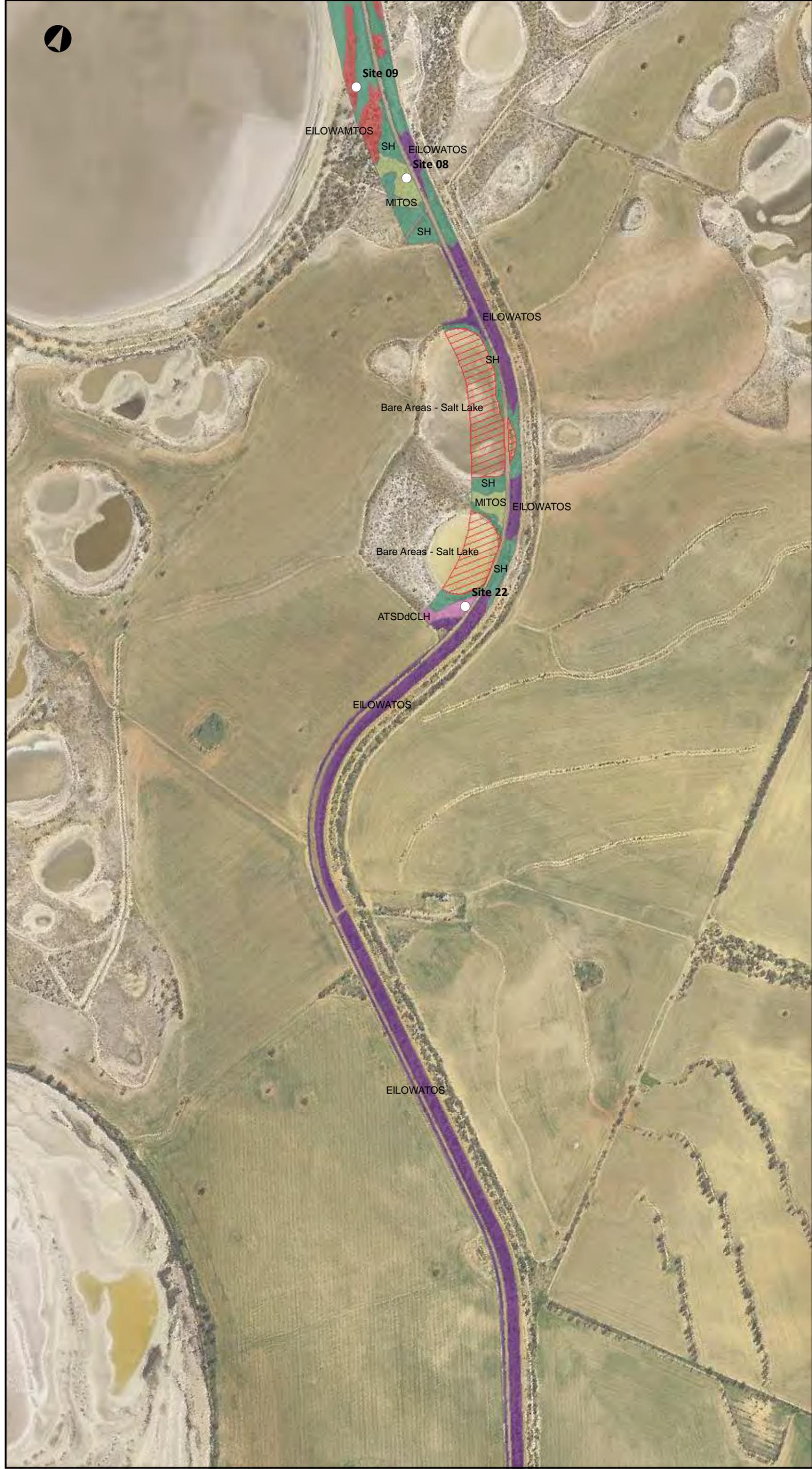


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### Vegetation Units of the Project Area

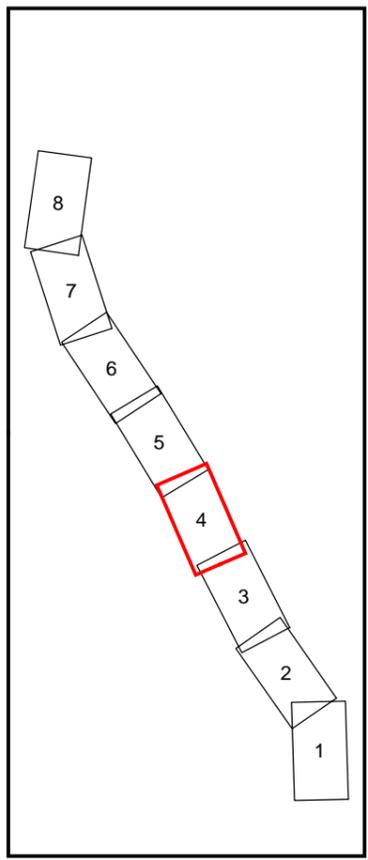
Figure 6



1:10,000 (A3)  
Coordinate System: GDA 1994 MGA Zone 50

**LEGEND**

- Quadrats
- Vegetation Units**
- ATSDdCLH
- AcSaCTS
- AeSaTSMh
- Bare Areas - Salt Lake
- Bare Areas - Salt Pan
- EWAIS
- EcTMMS
- EhTMATS
- EILOWAMTOS
- EILOWATOS
- EIOTMMcLOS
- GSTOS
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- MITOS
- Planted
- SH
- Observed Significant Flora (AECOM)**
- *Acacia ?dissona* var. *indoloria* (P3)
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- *Dampiera ?glabrescens* (P1)
- *Grevillea dryandroides* subsp. *dryandroides*



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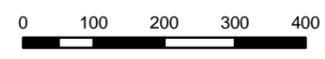
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### Vegetation Units of the Project Area

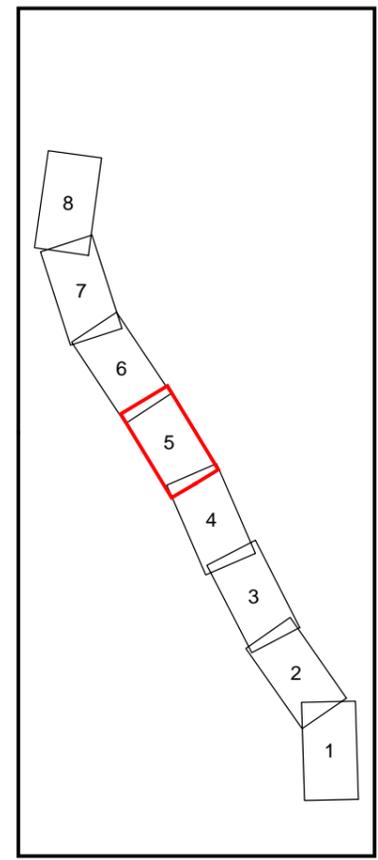
Figure 6



1:10,000 (A3)  
Coordinate System: GDA 1994 MGA Zone 50

LEGEND

- Quadrats
- Vegetation Units**
- ATSDdCLH
- AcSaCTS
- AeSaTSMh
- Bare Areas - Salt Lake
- Bare Areas - Salt Pan
- EWAIS
- EcTMMS
- EhTMATS
- EILOWAMTOS
- EILOWATOS
- EIOTMMcLOS
- GSTOS
- GTSaCOH
- MITOS
- Planted
- SH
- Observed Significant Flora (AECOM)**
- *Acacia ?dissona* var. *indoloria* (P3)
- *Acacia ?scalena* (P3)
- *Acacia lillata* subsp. *compressa* (P2)
- *Dampiera ?glabrescens* (P1)
- *Grevillea dryandroides* subsp. *dryandroides*



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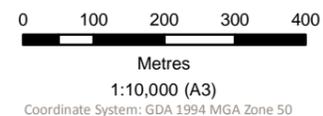
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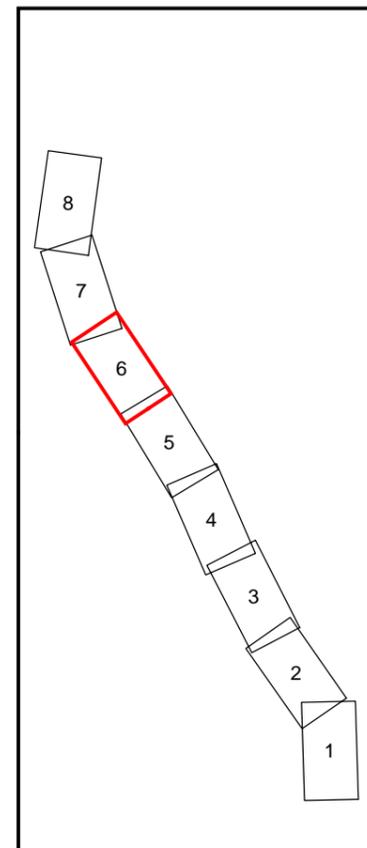
### Vegetation Units of the Project Area

Figure 6



#### LEGEND

- Quadrats
- Vegetation Units**
- ATSDdCLH
- AcSaCTS
- AeSaTSMh
- Bare Areas - Salt Lake
- Bare Areas - Salt Pan
- EWAIS
- EcTMMS
- EhTMATS
- ELOWAMTOS
- ELOWATOS
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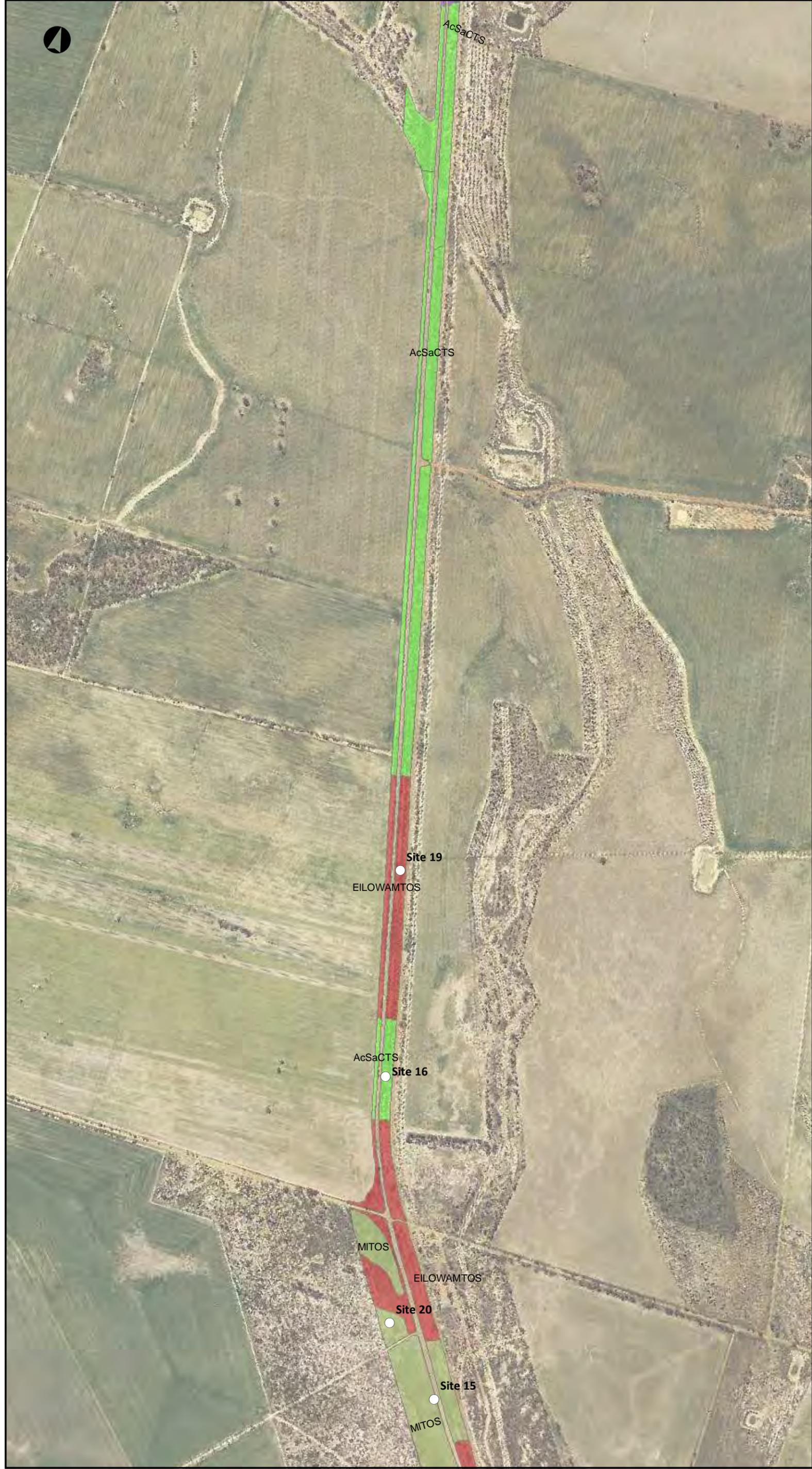


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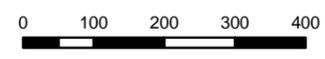
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### Vegetation Units of the Project Area

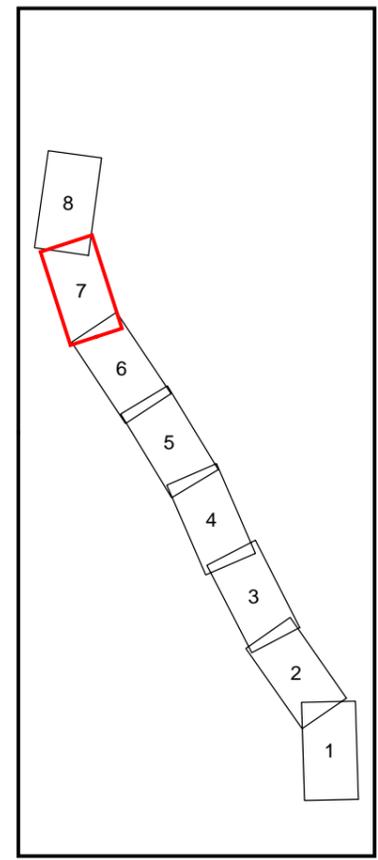
Figure 6



1:10,000 (A3)  
Coordinate System: GDA 1994 MGA Zone 50

LEGEND

- Quadrats
- Vegetation Units**
- ATSDdCLH
- AcSaCTS
- AeSaTSMh
- Bare Areas - Salt Lake
- Bare Areas - Salt Pan
- EWAIS
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### Vegetation Units of the Project Area

Figure 6

0 100 200 300 400

Metres

1:10,000 (A3)

Coordinate System: GDA 1994 MGA Zone 50

#### LEGEND

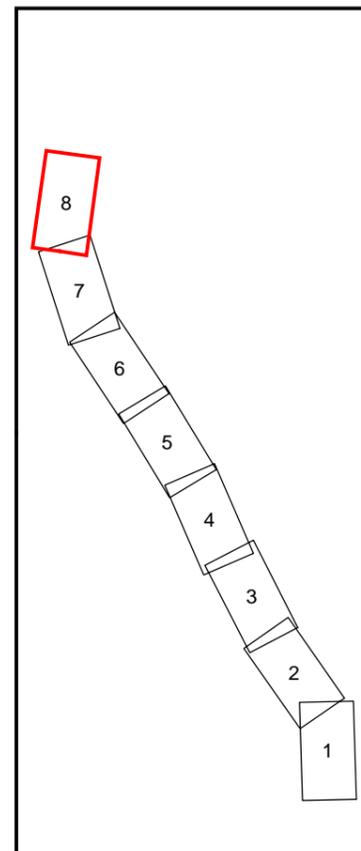
○ Quadrats

#### Vegetation Units

- ATSDdCLH
- AcSaCTS
- AeSaTSMh
- Bare Areas - Salt Lake
- Bare Areas - Salt Pan
- EWAIS
- EcTMMS
- EHTMATS
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# Vegetation Condition of the Project Area

Figure 7

0 100 200 300 400

Metres

1:10,000 (A3)

Coordinate System: GDA 1994 MGA Zone 50

## LEGEND

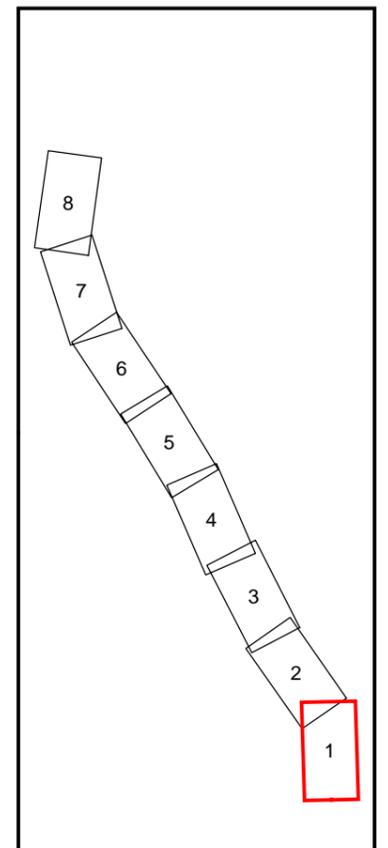
○ Quadrats

### Condition

- Bare Area - Salt Lake
- Bare Area - Salt Pan
- Completely Degraded
- Completely Degraded (Planted Trees)
- Degraded to Completely Degraded
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### Vegetation Condition of the Project Area

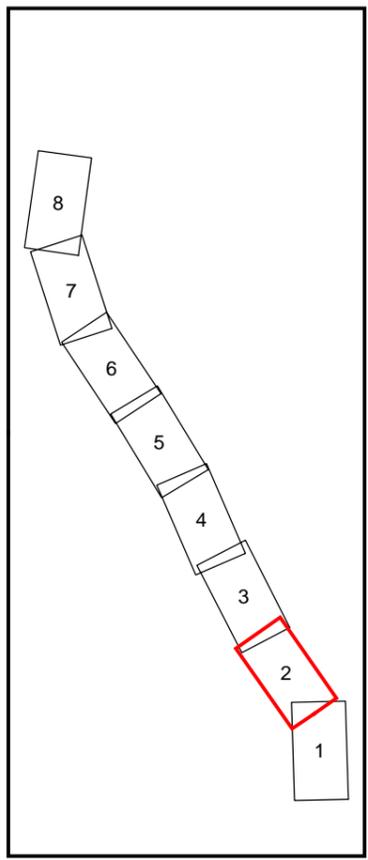
Figure 7



Metres  
1:10,000 (A3)  
Coordinate System: GDA 1994 MGA Zone 50

LEGEND

- Quadrats
- Condition**
- Bare Area - Salt Lake
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# Vegetation Condition of the Project Area

Figure 7

0 100 200 300 400  
Metres  
1:10,000 (A3)  
Coordinate System: GDA 1994 MGA Zone 50

LEGEND

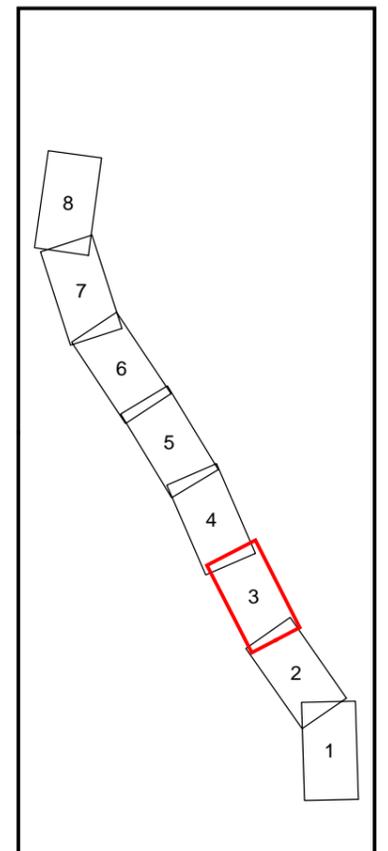
○ Quadrats

Condition

- Bare Area - Salt Lake
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- Completely Degraded
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### Vegetation Condition of the Project Area

Figure 7

0 100 200 300 400

Metres

1:10,000 (A3)

Coordinate System: GDA 1994 MGA Zone 50

**LEGEND**

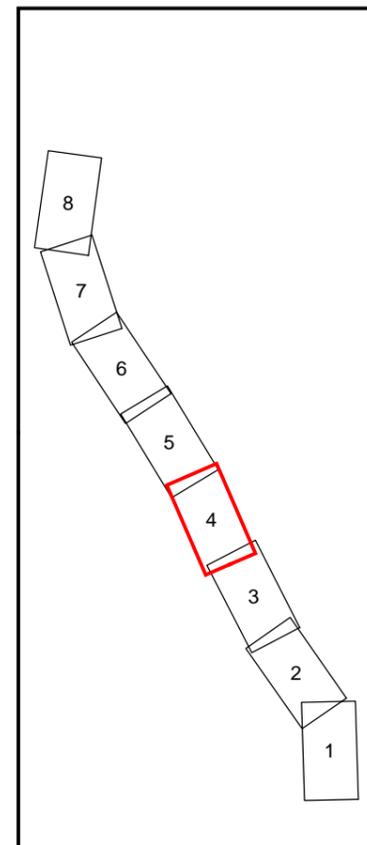
○ Quadrats

**Condition**

- Bare Area - Salt Lake
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### Vegetation Condition of the Project Area

Figure 7



Metres  
1:10,000 (A3)  
Coordinate System: GDA 1994 MGA Zone 50

LEGEND

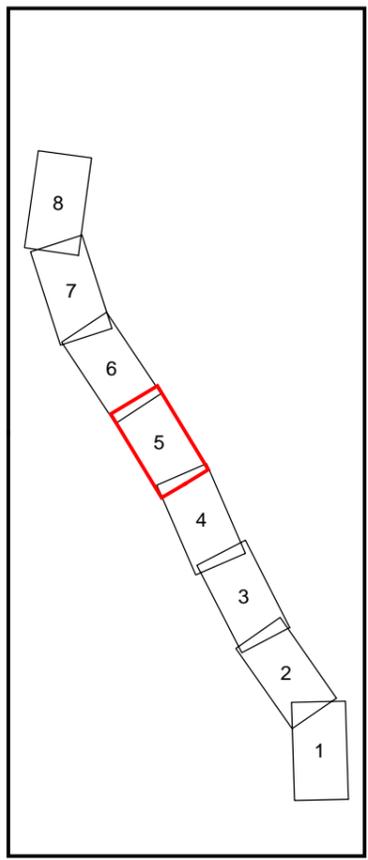
○ Quadrats

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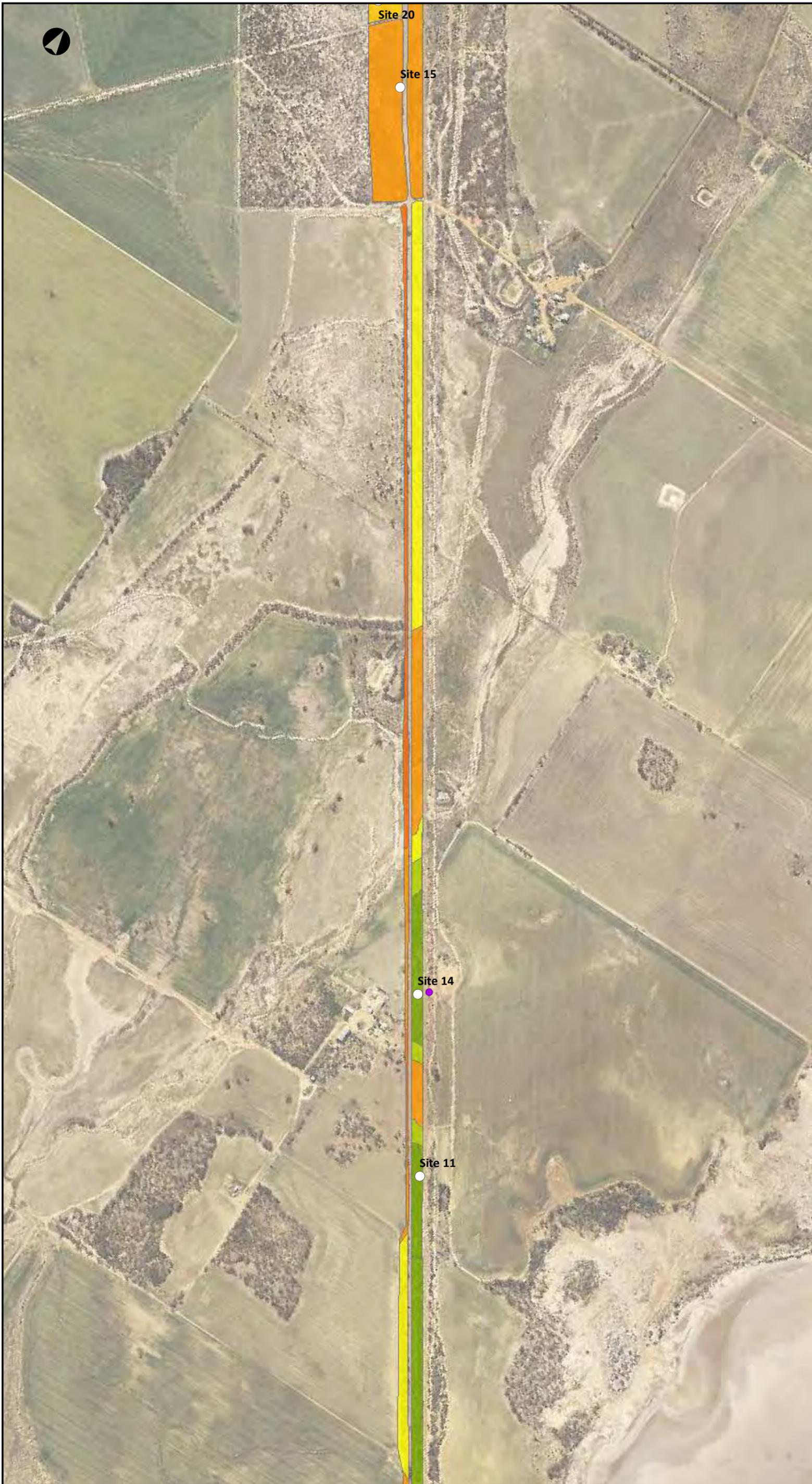


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### Vegetation Condition of the Project Area

Figure 7

0 100 200 300 400  
Metres  
1:10,000 (A3)  
Coordinate System: GDA 1994 MGA Zone 50

**LEGEND**

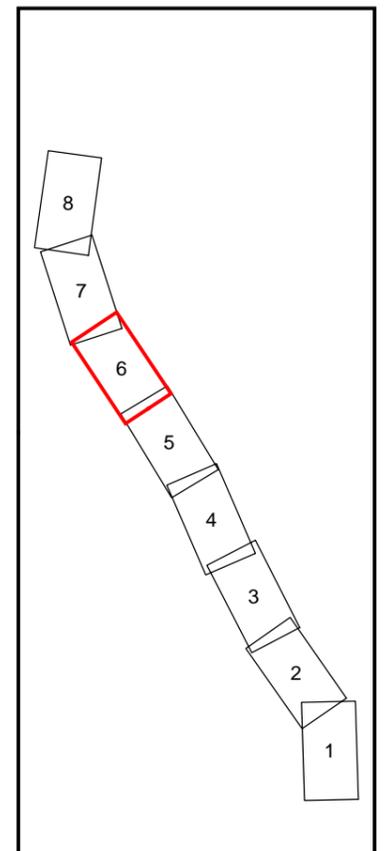
○ Quadrats

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# Vegetation Condition of the Project Area

Figure 7

0 100 200 300 400

Metres  
1:10,000 (A3)  
Coordinate System: GDA 1994 MGA Zone 50

LEGEND

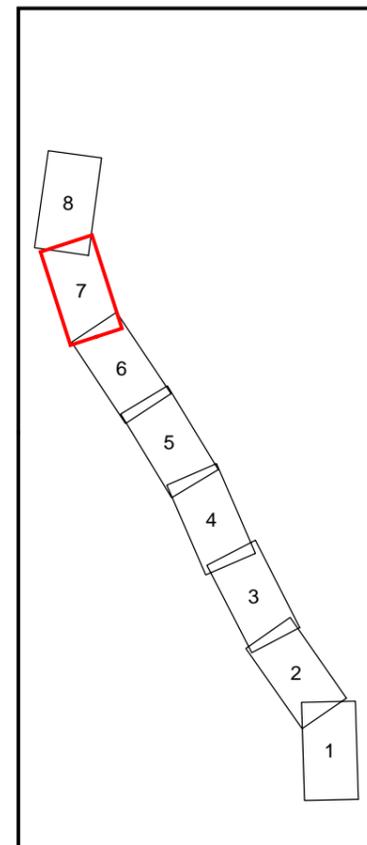
○ Quadrats

Condition

- Bare Area - Salt Lake
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# Vegetation Condition of the Project Area

Figure 7

0 100 200 300 400  
Metres  
1:10,000 (A3)  
Coordinate System: GDA 1994 MGA Zone 50

### LEGEND

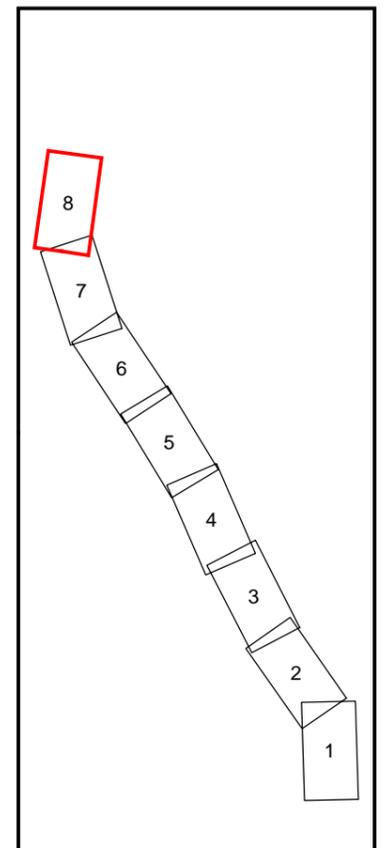
○ Quadrats

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### 6.2.2.3 Threatened and Priority Ecological Communities

One PEC is known to occur within five kilometres of the survey area (The Priority 1 ecological community – ‘Red Morrell Woodlands of the Wheatbelt’). The assessment of vegetation within the survey area (based on the presence of Red Morrell) indicates that this PEC does not occur within the survey area.

All *Eucalyptus loxophleba* woodlands within the survey area (ELOWAMTOS, ELOWATOS and EWAIS) are considered to be equivalent to the P3 PEC ‘*Eucalyptus* woodlands of the Western Australian Wheatbelt’. This PEC is described as follows:

‘*Eucalypt*-dominated woodlands in the Western Australian Wheatbelt region as defined by the IBRA Avon Wheatbelt 1 and 2 and Western Mallee subregions with the specific exceptions of: woodlands and forests dominated by Jarrah (*E. marginata*) or Marri (*Corymbia calophylla*) where they occur without York Gum present; and non-woodland communities dominated by eucalypts, specifically those dominated by eucalypts with a mallee growth form. Community is defined primarily by its structure as a woodland. The presence in the canopy layer of eucalypt trees - most commonly salmon gum (*Eucalyptus salmonophloia*), York gum (*Eucalyptus loxophleba*), red morrell (*Eucalyptus longicornis*) or gimlet (*Eucalyptus salubris*) defines the Wheatbelt woodlands. Several of the other emergent eucalypt species which may be present as a defining species (e.g. Kondinin blackbutt (*E. kondinensis*), *E. myriadena*, salt river gum (*E. sargentii*), silver mallet (*E. ornata*) and mallet (*E. singularis*) are found only in the Western Australian Wheatbelt.’ (DEC, 2012).

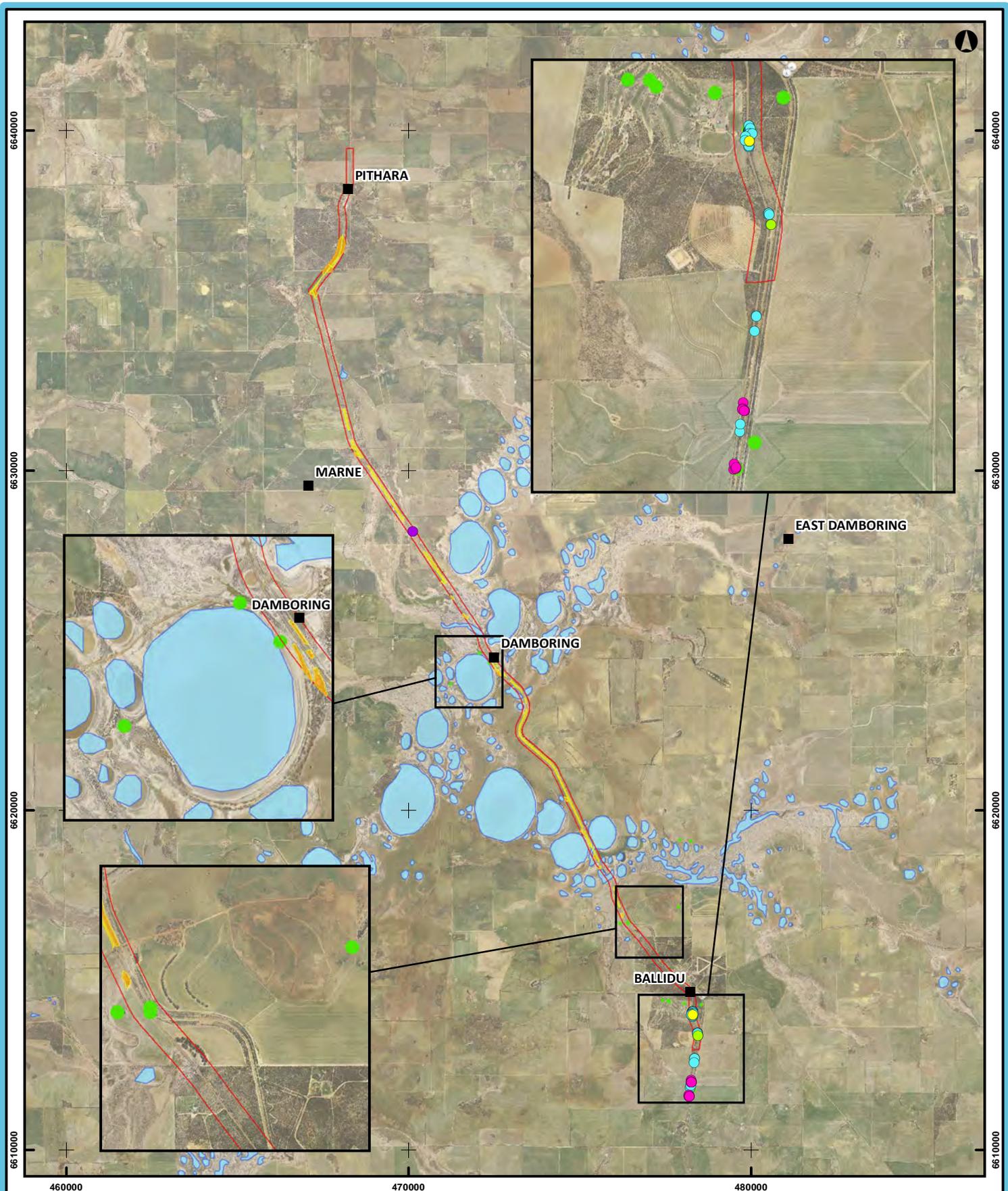
### 6.2.2.4 Conservation Significance of Vegetation Units

Based on the location of Threatened and Priority flora, current extent of vegetation associations and location of the P3 PEC ‘*Eucalyptus* woodlands of the Western Australian Wheatbelt’ the conservation value of each mapped vegetation unit is listed in Table 12.

Table 12 Conservation significance of vegetation units

Mapped Vegetation Unit	Area (Ha)	Percentage of Total Area (%)	Conservation Values	Significance
AcSaCTS	72.07	28.80	<ul style="list-style-type: none"> <li>- Threatened and Priority Flora present (Grevillea dryandroides subsp. dryandroides, Acacia ?scalena, Acacia lirellata subsp. compressa and Dampiera ?glabrescens</li> <li>- Mapped within areas of vegetation association with &lt;30% pre-European extent remaining</li> </ul>	Regional
AeSaTSMh	2.97	1.19	<ul style="list-style-type: none"> <li>- Mapped within areas of vegetation association with &lt;30% pre-European extent remaining</li> <li>- Less than 5% of total area assessed</li> </ul>	Regional and Local
ATSDdCLH	0.48	0.19	<ul style="list-style-type: none"> <li>- Less than 5% of total area assessed</li> <li>- Mapped within areas of vegetation association with &lt;30% pre-European extent remaining</li> </ul>	Regional and Local
Bare Areas - Salt Lake	16.57	6.62		
Bare Areas - Salt Pan	2.75	1.10		
EcTMMS	6.62	2.64	<ul style="list-style-type: none"> <li>- Mapped within areas of vegetation association with &lt;30% pre-European extent remaining</li> </ul>	Regional
EhTMATS	3.00	1.20	<ul style="list-style-type: none"> <li>- Priority Flora likely to be present (Acacia ?dissona var. indoloria)</li> <li>- Mapped within areas of vegetation association with &lt;30% pre-European extent remaining</li> <li>- Less than 5% of total area assessed</li> </ul>	Regional and Local
ELOWAMTOS	18.26	7.29	<ul style="list-style-type: none"> <li>- Priority 3 PEC</li> <li>- Mapped within areas of vegetation association with &lt;30% pre-European extent remaining</li> </ul>	Regional

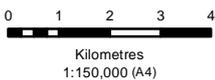
Mapped Vegetation Unit	Area (Ha)	Percentage of Total Area (%)	Conservation Values	Significance
EILOWATOS	33.62	13.43	- Priority 3 PEC - Mapped within areas of vegetation association with <30% pre-European extent remaining	Regional
EIOTMMcLOS	3.15	1.26	- Mapped within areas of vegetation association with <30% pre-European extent remaining - Less than 5% of total area assessed	Regional and Local
EWAIS	22.63	9.04	- Priority 3 PEC - Mapped within areas of vegetation association with <30% pre-European extent remaining	Regional
GSTOS	1.31	0.52	- Less than 5% of total area assessed - Mapped within areas of vegetation association with <30% pre-European extent remaining	Regional and Local
GTSACOH	7.21	2.88	- Priority Flora likely to be present (Acacia ?dissona var. indoloria) - Mapped within areas of vegetation association with <30% pre-European extent remaining - Less than 5% of total area assessed	Regional and Local
MITOS	12.53	5.01	- Mapped within areas of vegetation association with <30% pre-European extent remaining	Regional
Planted	1.49	0.60	- n/a	Not Assessed
SH	45.61	18.22	- Mapped within areas of vegetation association with <30% pre-European extent remaining	Regional
<b>Total</b>	<b>250.28</b>	<b>100.00</b>		-



## TECs, PECs, Wetlands and Environmentally Sensitive Areas

Figure 8

Coordinate System: GDA 1994 MGA Zone 50



### LEGEND

- Project Area
- ✱ ESAs
- ☁ Lakes
- ✱ Priority 3 Ecological Community - Eucalyptus Woodlands of the Western Australian Wheatbelt
- Towns

### Observed Significant Flora (AECOM)

- *Acacia ?dissona* var. *indoloria* (P3)
- *Acacia ?scalena* (P3)
- *Acacia lirellata* subsp. *compressa* (P2)
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# AECOM

## **6.3 Fauna**

### **6.3.1 Desktop Assessment**

Database searches were undertaken prior to the field assessment. A search of the following databases and internet tools were undertaken for the survey area and surrounds:

- Department of Environment and Conservation (DEC) Threatened and Priority Fauna Database
- The Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Act Protected Matters Database
- Department of Environment and Conservation (DEC) Naturemap
- Birds Australia Birdata.

A total of 16 Threatened, Priority and Migratory fauna species were identified from the database searches. Database search results and the analysis of these are provided in Table 13. The EPBC Act Protected Matters reports are presented in Appendix H.

Based on desktop assessment of specimen records and preferred habitat, it has been determined that the following species may occur in the survey area:

Table 13 Records of Threatened and Priority Fauna from the vicinity of the survey area

Species	Common name	Conservation status			Likelihood of occurrence in Survey area
		National EPBC Act	State Wildlife Conservation Act 1950	Regional DEC Threatened and Priority	
<b>Mammals</b>					
<i>Isoodon obesulus fusciventer</i>	Southern Brown Bandicoot			P5	<i>May Occur</i> –Previously recorded at West Ballidu in 1980. This species can occur in remnant bushland areas and is often associated with wetlands inhabiting densely-covered scrub and swampy vegetation. Will also occupy disturbed areas, such as recently burnt sites, open paddocks or cleared areas that provide an adequate food supply
<b>Birds</b>					
<i>Calyptorhynchus latirostris</i>	Carnaby's Cockatoo	EN	S1		<i>Likely to Occur</i> –Recorded in Dalwallinu, south of Walebing in 2003. This species has been known to occupy the wheatbelt area during the breeding and non-breeding season and may nest in hollows of Salmon and York gum and feed on proteaceous species within the survey area
<i>Psophodes nigrogularis nigrogularis</i>	Western Whipbird (western heath subsp)	EN	S1		<i>Unlikely to Occur</i> – Historically, this species has been recorded in West Ballidu in 1842. It inhabits dense mallee heath shrubs and is unlikely to occur within the survey area due to the lack of suitable habitat
<i>Leipoa ocellata</i>	Malleefowl	VU	S1		<i>Unlikely to Occur</i> – Historically, this species has been recorded in West Ballidu in 1842 and 1902. Due to the lack of large connected remnant woodlands areas this species is unlikely to occur in the survey area
<i>Rostratula australis</i>	Australian Painted Snipe	VU			<i>Unlikely to occur</i> – This species inhabits shallow terrestrial freshwater and occasionally brackish wetlands, temporary and permanent lakes, swamps and claypans. Other habitats include emergent tussocks of grass, sedges, rushes or reeds, or samphire; with scattered clumps of lignum <i>Muehlenbeckia</i> or canegrass or sometimes tea-tree ( <i>Melaleuca</i> ). They may also occupy areas lined with trees, or those that have scattered fallen or washed-up timber.

Species	Common name	Conservation status			Likelihood of occurrence in Survey area
		National EPBC Act	State Wildlife Conservation Act 1950	Regional DEC Threatened and Priority	
<i>Falco peregrinus</i>	Peregrine Falcon		S4		<i>May Occur</i> – Recorded in Dalwallinu in 2008. This species inhabits a range of habitats including cliffs, along coasts, rivers and ranges, wooded water courses and lakes and may occur along woodland habitats within the survey area
<i>Ardeotis australis</i>	Australian Bustard			P4	<i>May Occur</i> – Recorded near Watheroo National Park in 1986. It is known to inhabit a range of different habitats including open dry woodlands of mulga, arid shrublands and tussock grasslands supporting spinifex species along with grasslands and drainage areas, particularly after a series of years of above average rainfall. This species may occur within woodland areas within the survey area.
<i>Burhinus grallarius</i>	Bush Stone-curlew			P4	<i>May Occur</i> – Recorded near Pithara in 2004. This species is known to occur in open woodlands of Mallee and Mulga, grasslands and sandplains supporting Spinifex. Mallee woodland within the survey area may provide suitable habitat for this species.
<i>Pomatostomus superciliosus ashbyi</i>	White-browed Babbler			P4	<i>May Occur</i> – This species has been recorded in the vicinity of the survey area. The White-browed occurs in south-western Australia in arid and semi-arid zones in mulga and Acacia thickets and scrub, and the shrubland understorey (Gannet and Crowley, 2000) of Eucalyptus forests, Casuarina woodlands and mallee (Johnstone and Storr, 2004).
<i>Apus pacificus</i>	Fork-tailed Swift	M			<i>May Occur</i> – This species has been recorded in the vicinity of the survey area. The Fork-tailed Swift is a regular summer migrant to Australia, arriving in October and leaving by mid-April It is generally observed flying high overhead, over open country, semi-arid deserts to coasts and forests (Pizzey & Knight 2007).

Species	Common name	Conservation status			Likelihood of occurrence in Survey area
		National EPBC Act	State Wildlife Conservation Act 1950	Regional DEC Threatened and Priority	
<i>Ardea alba</i>	Great Egret	M			<i>Unlikely to occur</i> - Occupies a wide variety of wet habitats including freshwater wetlands, dams, flooded pastures, estuarine mudflats, mangroves and reefs (Morcombe 2003). The species is also known to visit shallows of rivers, sewage ponds and irrigation areas (Pizzev & Knight 2007).
<i>Ardea ibis</i>	Cattle Egret	M			<i>Unlikely to occur</i> - The Cattle Egret typically occupies moist pastures with tall grass, shallow wetlands and margins (Morcombe 2003). The species has also been observed in garbage tips, tidal mudflats and drains (Pizzev & Knight 2007).
<i>Merops ornatus</i>	Rainbow Bee-eater	M			<i>May Occur</i> – This species has been recorded in the vicinity of the survey area. It is known to occupy numerous habitats including open woodlands with sandy loamy soil, sand ridges, sandpits, riverbanks, road cuttings, beaches, dunes, cliffs, mangroves and rainforests. It is likely that this species will occupy open woodland areas within the survey area.
<b>Reptiles</b>					
<i>Aspidites ramsayi</i>	Woma		S4		<i>May Occur</i> – This species has been previously recorded in Dalwallinu, Pithara and Damboring and may occur in woodlands, heath and shrublands in abandoned burrows and soil cracks.

Species	Common name	Conservation status			Likelihood of occurrence in Survey area
		National EPBC Act	State Wildlife Conservation Act 1950	Regional DEC Threatened and Priority	
<i>Egernia stokesii badia</i>	Western Spiny-tailed Skink	EN	S1		<i>May Occur</i> –Has been recorded in Damboring, East Damboring, West Ballidu, Pithara and Ballidu with the most recent records in 2004 in West Ballidu. There are two forms of Western Spiny-tailed Skink (brown form and black form). The brown form typically occupies York Gum ( <i>Eucalyptus loxophleba</i> ) woodland however some occupied sites have been found in Gimlet ( <i>E. salubris</i> ) and Salmon Gum ( <i>E. salmonophloia</i> ) woodland (DSEWPaC 2013) which may occur within the survey area. The black form of Western Spiny-tailed Skink occupies rock crevices in large, isolated rocky outcrops, typically granite (Duffield and Bull, 2002) which may lie within the survey area.
<b>Invertebrates</b>					
<i>Idiosoma nigrum</i>	Shield-backed Trapdoor Spider	VU	S1		<i>May Occur</i> –Recorded in 2008 near Marne. It can be found in burrows of heavy clay soils in areas of open York Gum ( <i>Eucalyptus loxophleba</i> ), Salmon Gum ( <i>E. salmonophloia</i> ) and Wandoo <i>E. wandoo</i> ) woodland, where <i>Acacia acuminata</i> forms a sparse understorey.
<b>Crustaceans</b>					
<i>Parartemia contracta</i>				P1	<i>May Occur</i> –Recorded in 1999 in Roach's Lake (near Pithara). This species may occur within salt lake habitats of the survey area
<i>Daphnia jollyi</i>				P1	<i>May Occur</i> – This species has been previously recorded in the vicinity of the survey area. This species may occur within salt lake habitats of the survey area

EPBC Act Commonwealth Environment Protection and Biodiversity Conservation Act, 1999: EX Extinct, E Endangered, VU Vulnerable M Migratory

WC Act Western Australia Wildlife Conservation Act, 1950: Schedule 1, S2, S3, S4

Priority Species Department of Environment and Conservation's Priority Species List: Priority 1, P2, P3, P4, P5

### 6.3.2 Field Assessment

Thirty fauna species were recorded during the May 2012 field survey. This included 24 birds, 5 mammals and 1 reptile (Table 14). No species were considered to be of conservation significance.

**Table 14 Fauna Species recorded within the survey area May 2012**

Species
<b>Birds</b>
<i>Artamus cinereus</i> (Black-faced Woodswallow)
<i>Platycercus zonarius</i> ((Australian Ringneck (Twenty-eight Parrot))
<i>Cacatua roseicapilla</i> (Galah)
<i>Cacatua sanguinea</i> (Little Corella)
<i>Cheramoeca leucosternus</i> (White-backed Swallow)
<i>Colluricincla harmonica</i> (Grey Shrike-thrush)
<i>Corvus coronoides</i> (possible <i>orru</i> )( Crow/Raven)
<i>Elanus axillaris</i> (Australian Black-shouldered Kite)
<i>Epthianura tricolor</i> (Crimson Chat)
<i>Gerygone fusca</i> (Western Gerygone)
<i>Grallina cyanoleuca</i> (Magpie Lark)
<i>Cracticus tibicen</i> (Australian Magpie)
<i>Lichenostomus virescens</i> (Singing Honeyeater)
<i>Lichenostomus leucotis</i> (White-eared honeyeater)
<i>Lichenostomus</i> sp. (Honeyeater sp.)
<i>Manorina flavigula</i> (Yellow-throated Miner)
<i>Ocyphaps lophotes</i> (Crested Pigeon)
<i>Petroica goodenovii</i> (Red-capped Robin)
<i>Pomatostomus superciliosus</i> (White-browed Babbler)
<i>Platycercus varius</i> (Mulga Parrot)
<i>Rhipidura fuliginosa</i> (Grey Fantail)
<i>Rhipidura leucophrys</i> (Willy wagtail)
<i>Tadorna tadornoides</i> (Australian Shelduck)
<i>Acanthagenys rufogularis</i> (Spiny-cheeked Honeyeater)
<b>Mammals</b>
<i>Felis catus</i> (Cat)
<i>Macropus</i> sp. (Kangaroo)

Species
<i>Oryctolagus cuniculus</i> (European Rabbit)
<i>Tachyglossus aculeatus</i> (Short-beaked Echidna)
<i>Vulpes vulpes</i> (Fox)
Reptiles
<i>Tiliqua rugosa</i> (Bobtail)

### 6.3.2.1 Fauna Habitat

Six fauna habitats have been defined and mapped for the survey area based on the results of the field assessment. (Figure 9). These habitats are;

- Shrublands and Scrub (*Allocasuarina*, *Melaleuca*, *Acacia* and *Santalum*)
- York Gum Woodland
- Succulent Heath
- Salt Lake
- *Eucalyptus* Tree Mallee
- *Melaleuca* Thicket over Succulent Heath.

The habitats listed above occupy areas as shown in Table 15.

Table 15 Fauna habitat areas of the survey area

Fauna Habitat	Description	Area (ha)	% of Survey area
Shrublands and Scrub ( <i>Allocasuarina</i> , <i>Melaleuca</i> , <i>Acacia</i> and <i>Santalum</i> )	Shrubland of <i>Allocasuarina</i> spp, <i>Melaleuca</i> spp, <i>Acacia</i> spp and <i>Santalum</i> spp.	83.91	33.53
York Gum Woodland	Woodland of <i>Eucalyptus loxophleba</i> subsp. <i>supralaevis</i> over Shrubland of <i>Acacia acuminata</i> and scattered <i>Rhagodia drummondii</i> over grassland on light brown sandy loam with an open mantle of lateritic pebbles	74.51	29.77
Succulent Heath	Closed low succulent Heath of <i>Tecticornia</i> spp on pale brown-orange sandy loam on fringes of salt lake	45.61	18.22
Salt Lake	Ephemeral salt lakes	19.32	7.72
<i>Eucalyptus</i> Tree Mallee	Tree Mallee of <i>Eucalyptus</i> spp over shrubland of <i>Acacia</i> spp and <i>Melaleuca</i> spp	12.77	5.10
<i>Melaleuca</i> Thicket Over Succulent Heath	Shrubland <i>Melaleuca</i> spp. over succulent Heath of <i>Tecticornia</i> spp. On pale brown sandy loam with surface salt crusting	12.53	5.01
Planted vegetation	Planted trees of <i>Eucalyptus</i> spp.	1.63	0.65
Total Area	-	250.28	100



# Fauna Habitats of the Project Area

Figure 9

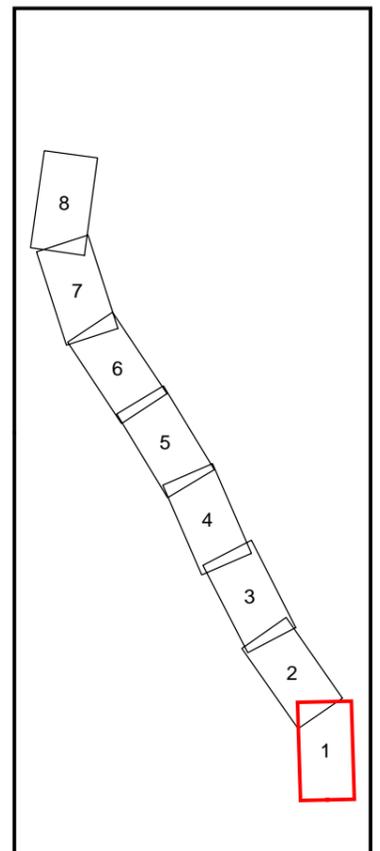
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Metres  
1:10,000 (A3)  
Coordinate System: GDA 1994 MGA Zone 50

**LEGEND**

○ Quadrats

**Fauna Habitats**

- Eucalyptus Tree Mallee
- Melaleuca Thicket Over Succulent Heath
- Salt Lake
- Shrublands and Scrub (Allocasuarina, Melaleuca, Acacia and Santalum)
- Succulent Heath
- York Gum Woodland

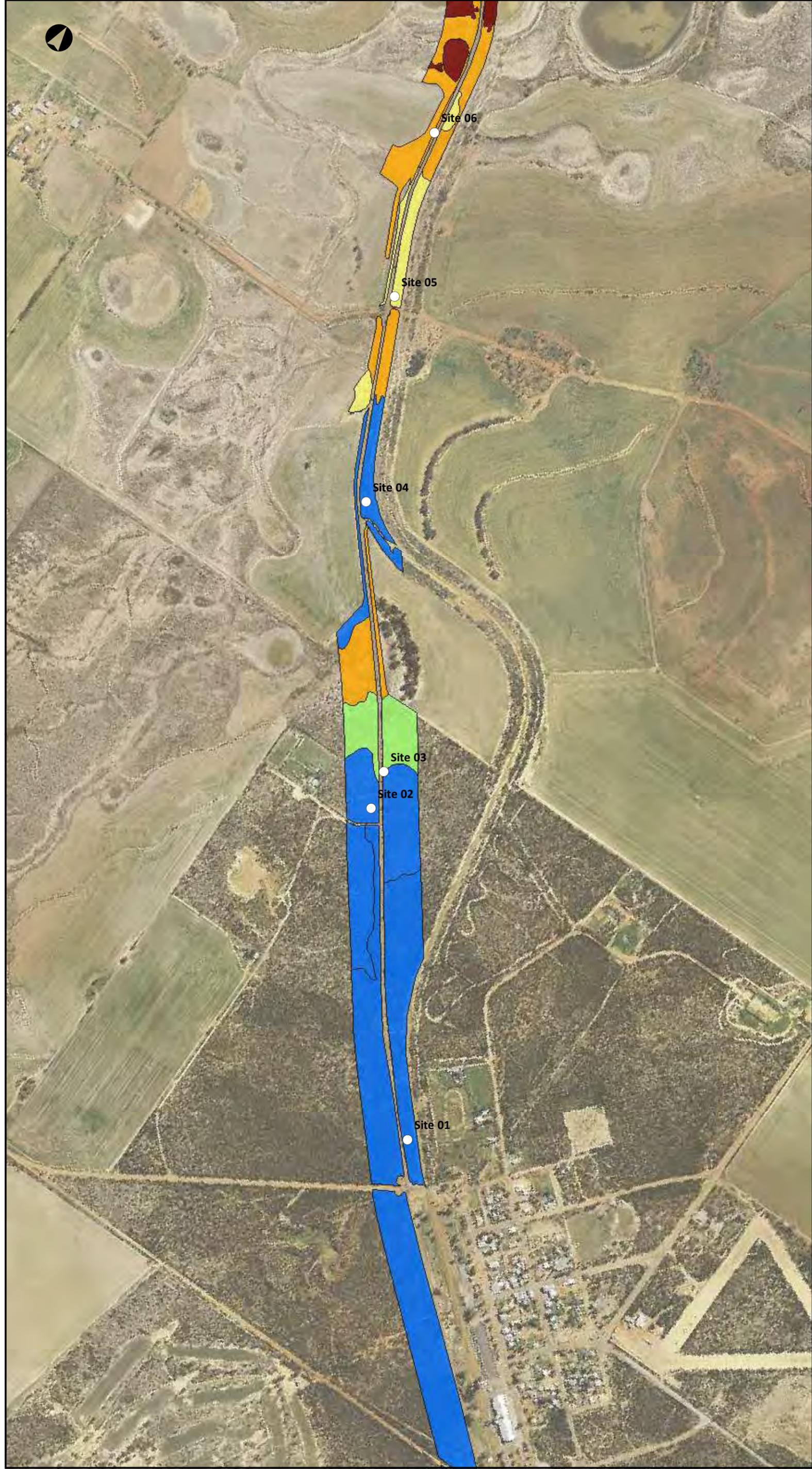


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# Fauna Habitats of the Project Area

Figure 9

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Metres

1:10,000 (A3)

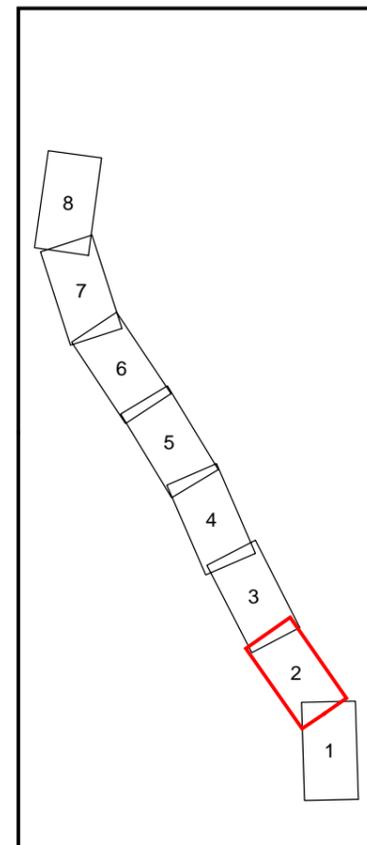
Coordinate System: GDA 1994 MGA Zone 50

### LEGEND

○ Quadrats

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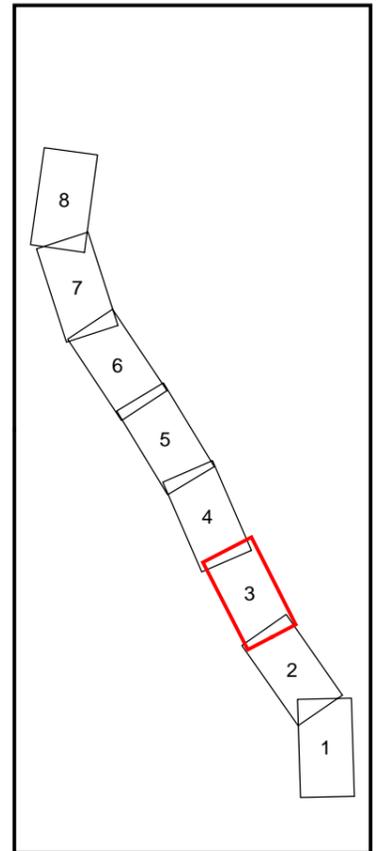
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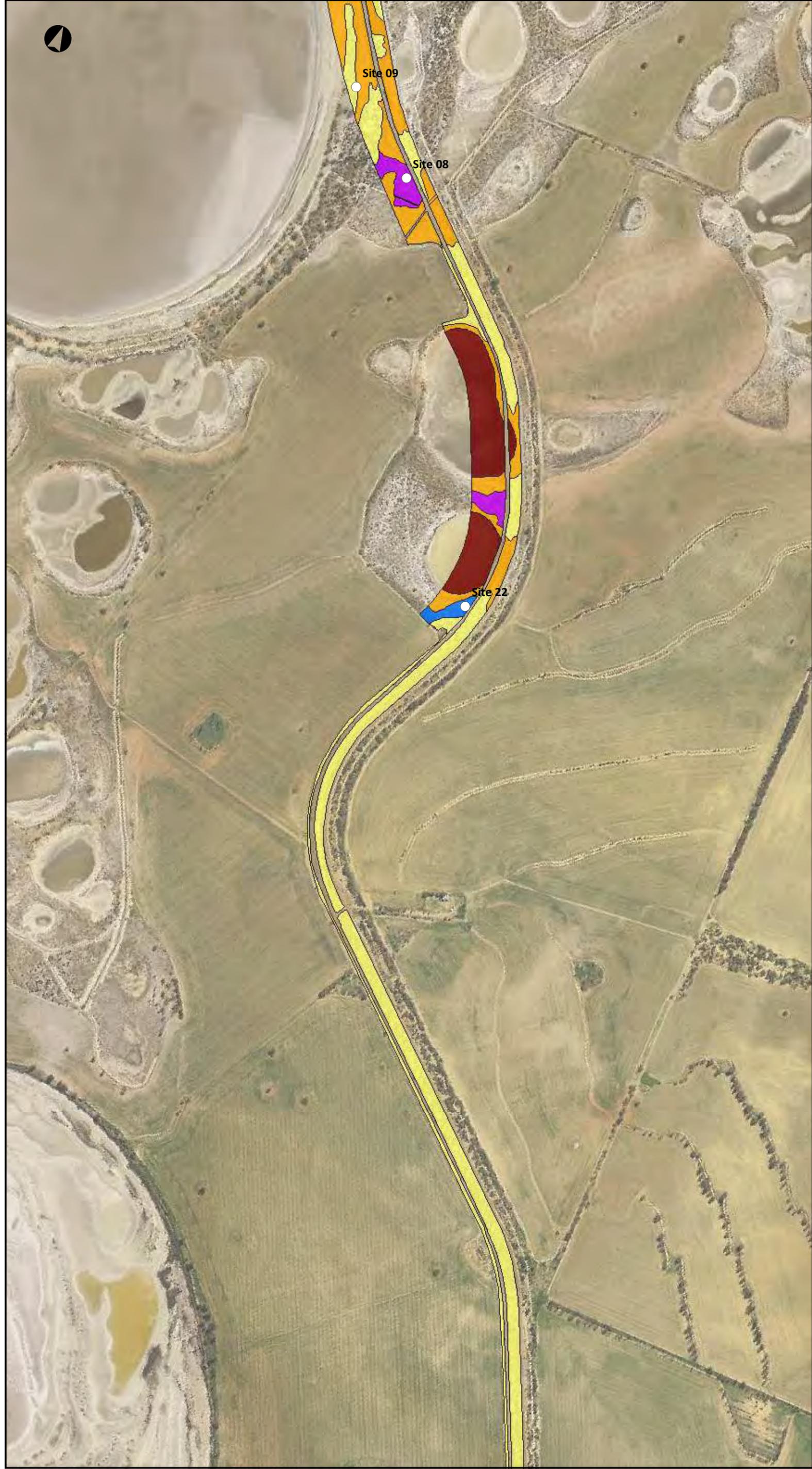


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**Fauna Habitats of the Project Area**

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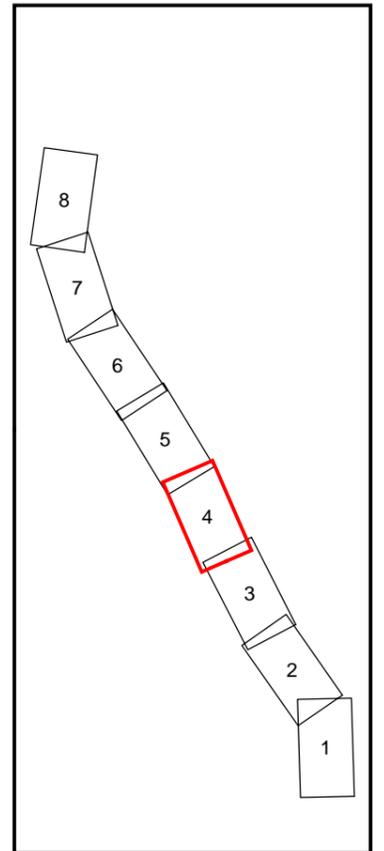
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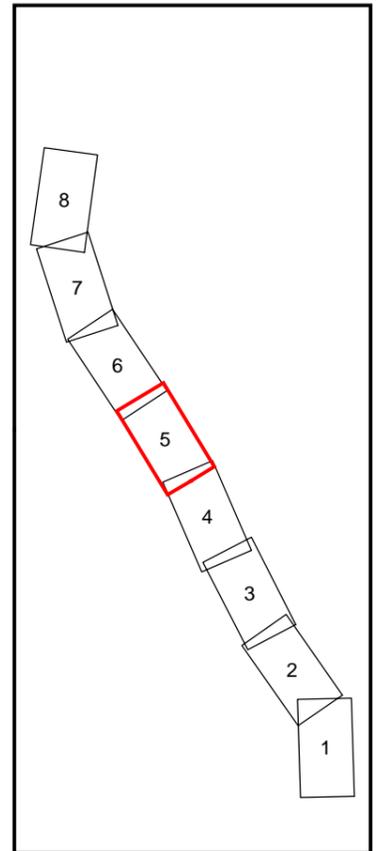
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**Fauna Habitats of the Project Area**

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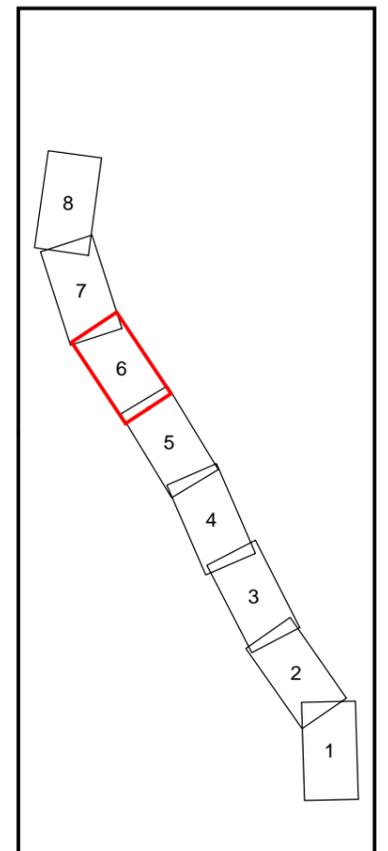
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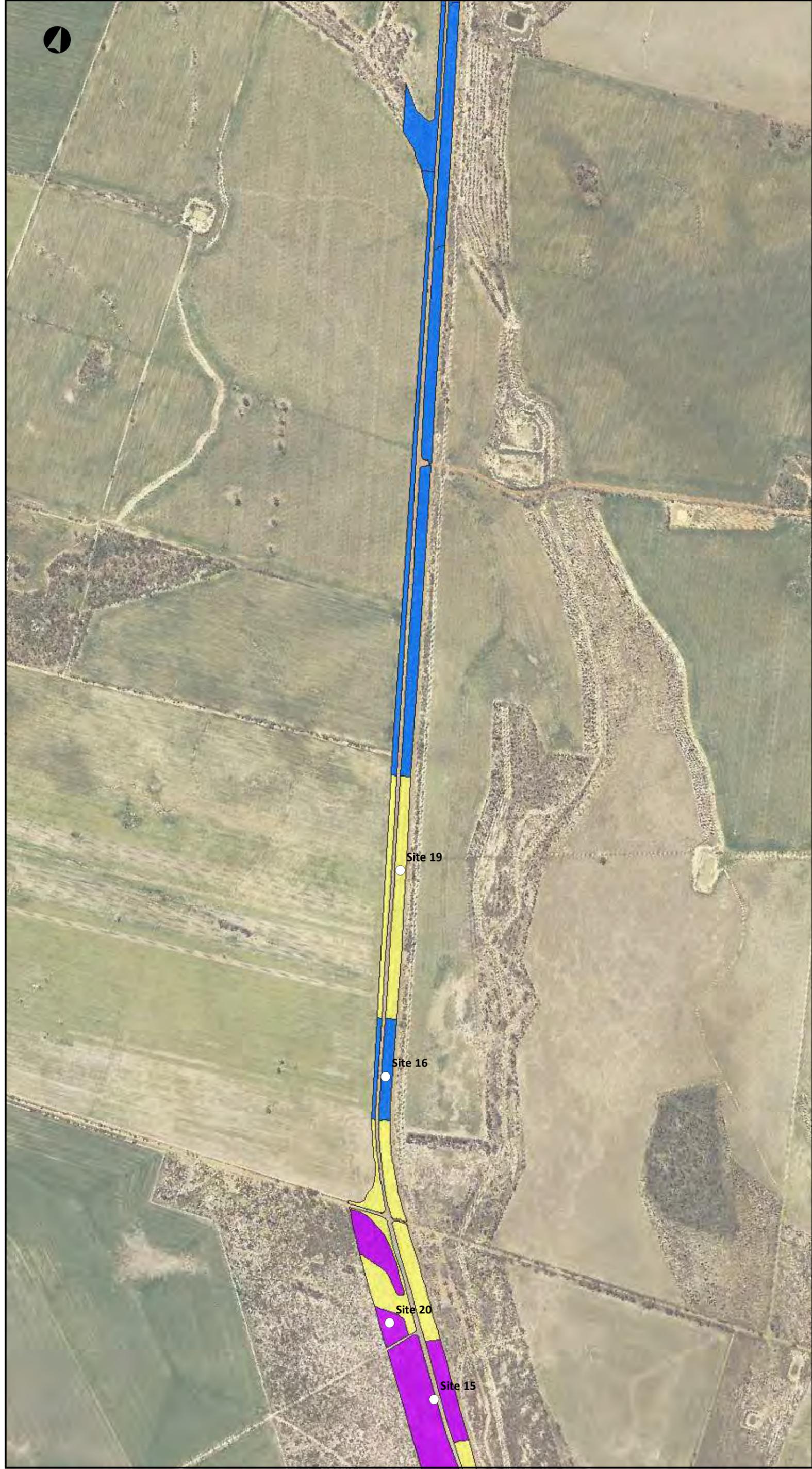


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**Fauna Habitats of the Project Area**

Figure 9

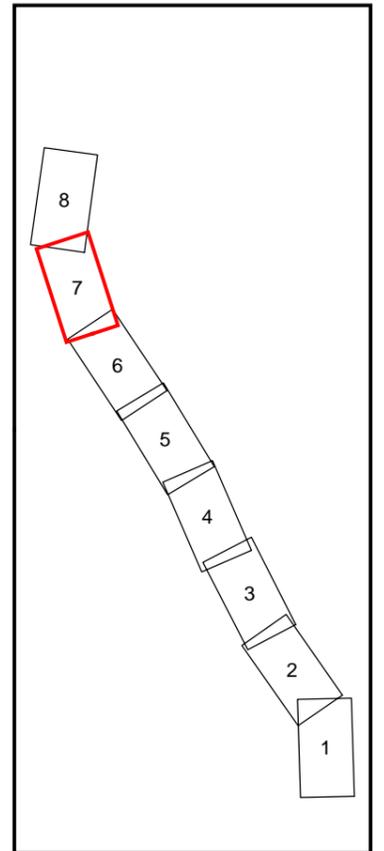
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**Fauna Habitats of the Project Area**

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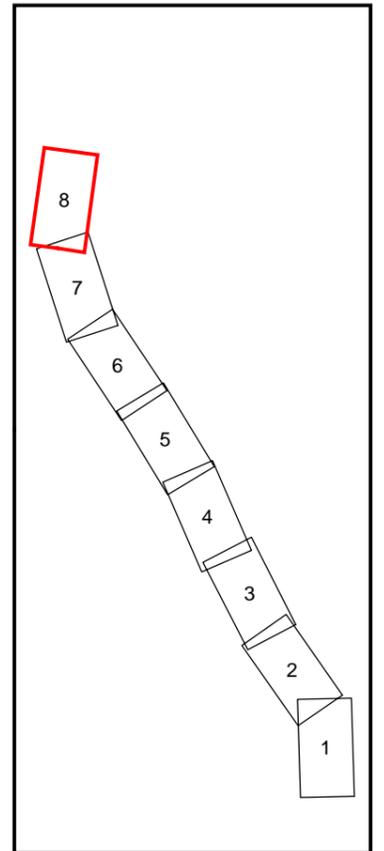
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## 7.0 Discussion

### 7.1 Flora

A total of 113 species from 58 genera and 27 families were recorded within the survey area during the field assessment. This number is lower than what would be typically expected given the timing of the survey and site conditions. It is estimated that the number of species recorded from *Poaceae* and *Asteraceae* in particular would be much greater in a survey carried out during spring.

#### 7.1.1 Threatened, Priority and other Significant Flora

One species listed as Declared Rare Flora or Threatened (T or X) under the WC Act or as Threatened under the EPBC Act were recorded from within the survey area (*Grevillea dryandroides* subsp. *dryandroides*).

Threats to population recorded within the survey area (population 5a) are listed in DEC (2000) as weed invasion and road maintenance. It was not possible to determine the density of weeds at the site due to the season, however it was noted that it appeared heavy machinery/vehicles had been accessing the rail reserve directly from the road and running over the vegetation in the vicinity of this population.



Plate 1 *Grevillea dryandroides* subsp. *dryandroides*

Of the four priority species recorded during the field assessment seasonality and a lack of material for positive identification meant that three of these species were not able to be identified to a complete degree of certainty and are therefore denoted with a question mark.

*Acacia dissona* var. *indoloria* (P3) is a domed or rounded, dense, pungent shrub 0.5 to 2m high. Flowering occurs between August and September and therefore there was not enough material available to identify this species to 100% certainty, however it appears likely that it was recorded from one location within the survey area (Site 14). There are currently 18 known records of this species at the WA Herbarium, the record from this field assessment appears to be a new location for this species. The optimal time to verify the presence of this species in the study area is August to September.

*Acacia scalena* (P3) is an intricately branched, rigid, often straggly prickly shrub 0.5 to 1.5 metres high. It flowers between June and September and therefore there was not enough material at the time of survey to identify this species to 100% certainty.

There are 37 known records of *Acacia scalena*, with one occurring within the survey area. This location was searched on foot and *Acacia scalena* was not observed, it was however observed in 1958 approximately 1.8 km south east of this record (Figure 8). As is typical with records prior to GPS the accuracy is often unreliable and therefore it may correspond with the location recorded during this survey.

*Acacia lirellata* subsp. *compressa* (P2) is a bushy procumbent spreading shrub to approximately 0.5 metres high to 1.2 metres wide. There are 31 currently known records of this species, with three occurring within the survey area. One individual *Acacia lirellata* subsp. *compressa* was recorded approximately 270 metres north of previous records (Figure 8).

*Dampiera glabrescens* (P1) is an erect perennial herb 0.2 to 0.5 metres high. There are 11 known records of this species with two occurring within the road reserve and a further six in the vicinity. Material collected during the field assessment was poor due to the dry conditions and senescent state of this species at the time, however it appears likely that the species recorded is *Dampiera glabrescens* (P1). A total of 333 individuals were recorded during the survey, it is likely that a greater number of individuals occur within the survey area, as these plants were senescent at the time of the survey and difficult to count (Plate 2).



**Plate 2** *Dampiera glabrescens* observed within the survey area, in a senescent state due to dry conditions

Based on desktop assessment of specimen records and preferred habitat, it has been determined that the following species are likely to occur in the survey area, however were not recorded in the field survey (as detailed below):

- *Frankenia conferta* (T)
- *Caladenia cristata* (P1)
- *Synaphea constricta* (P3)

There is a population of *Frankenia conferta* (T) recorded from Damboring Lake, approximately seven metres from the edge of the survey area (or 107 metres from the existing road). This area was searched on foot and the species was not located. The preferred habitat of this species is the high water mark of lake shorelines to the tops of low mounds within saline pans (DEC, 2009).

*Caladenia cristata* (P1) being a cryptic species would only be observed while in flower (typically between August and September). Suitable habitat for this species occurs within the survey area (sandy rise above clay flats) and therefore to locate this species a targeted survey would be required during its flowering period.

*Synaphea constricta* has not been previously recorded within the road reserve, however DEC records indicate that it occurs approximately 83 metres from the edge of the survey area (or 183 metres from the existing road). It was not recorded during the field survey within any of the quadrats and opportunistic flora searches, however it is still considered likely to occur.

Based on desktop assessment of specimen records and preferred habitat, it has been determined that the following species may occur within the survey area:

- *Acacia* sp. Petrudor Rocks (B.R. Maslin 7714) (P1)
- *Boronia ericifolia* (P2)
- *Verticordia venusta* (P3)
- *Caladenia drakeoides* (T)
- *Pododtheca unisetata* (P3)
- *Lepidobolus densus* (P3)
- *Grevillea pythara* (T)
- *Eremophila viscida* (T)
- *Chamelaucium* sp. Wongan Hills (B.H. Smith 1140) (P3)
- *Goodenia perryi* (P3)
- *Gunniopsis rubra* (P3)
- *Angianthus micropodioides* (P3)
- *Tecticornia fimbriata* (P3)
- *Grevillea kenneallyi* (P2)
- *Acacia trinalis* (P1)
- *Gompholobium wonganense* (P3)
- *Caladenia x ornata* (P1)
- *Urodon capitatus*

*Acacia* sp. Petrudor Rocks (B.R. Maslin 7714) (P1), *Verticordia venusta* (P3), *Chamelaucium* sp. Wongan Hills (B.H. Smith 1140) (P3), *Grevillea kenneallyi* (P2), *Gompholobium wonganense* (P3) and *Urodon capitatus* were not flowering at the time of survey and were likely to have been inconspicuous.

*Acacia trinalis* (P1) is a bushy shrub or tree to four metres high, if present within the survey area it is likely that it would have been observed.

*Boronia ericifolia* (P2) was not flowering at the time of survey and may have been inconspicuous within the low heath of similar species in which it has been previously recorded. The location of previous records was searched on foot and several collections of species with similar leaf morphology were taken, however these were not determined to be *Boronia ericifolia*.

*Caladenia drakeoides* (T) and *Caladenia x ornata* (P1) are tuberous perennial herbs and were likely to have been dormant at the time of the survey and were therefore not recorded.

*Pododtheca unisetata* (P3), *Angianthus micropodioides* (P3) and *Gunniopsis rubra* (P3) are annual herbs and were unlikely to have been present at the time of the survey.

Several *Restionaceae* spp. were collected, however none were identified as *Lepidobolus densus* (P3). If present and encountered within the survey area and flowering (exact flowering period is unknown), it is likely that this species would have been observed if present.

It is likely that if present within the survey area, *Grevillea pythara* (T) would have been observed due to its distinctive spreading habit and grey-green leaves.

It is likely that if present and encountered within the survey area *Eremophila viscida* (T) would have been observed due to its distinctive glossy leaves, despite not flowering at the time of survey. The previously recorded location of the species within the survey area was searched on foot and it was not observed.

*Goodenia perryi* (P3) is a small herb which as with *Dampiera glabrescens* was likely to have been in a senescent state and inconspicuous at the time of the survey.

Several *Tecticornia* species were collected during the survey, however none were identified as *Tecticornia fimbriata* (P3). If present and encountered during the survey it is likely that this species would have been recorded.

### 7.1.2 Introduced Species

Based on the result of the field assessment it appears that the site has a low percentage of introduced species, however many introduced species commonly recorded from the area are annual and would not have been present at the time of the survey. It is expected that if a survey was carried out during the spring months, a much greater number of introduced species would be recorded.

It is likely that many of the 72 additional introduced species identified from the desktop assessment would be present within the survey area.

Skeleton Weed (*Chondrilla juncea*) was not recorded during field assessment, however was identified from the desktop assessment as occurring in the area. This species is listed as a Declared Plant by DAFWA. It is categorised as a P1 and P2 Declared Weed within both the shires of Dallwallinu and Wongan-Ballidu. The requirements for control of P1 Declared Weeds are to prohibit movement and P2 aims to eradicate infestation. Complete landholder obligations and suggested control methods are listed in Appendix G.

## 7.2 Vegetation

In general the vegetation of the site consists of samphire heath and salt tolerant *Melaleuca* scrub in the vicinity of salt lakes and a combination of 'Eucalyptus tree mallee', 'Allocasuarina, *Melaleuca* and *Acacia* Scrub' and 'Eucalyptus *loxophleba* woodland' in the areas above the saline flats. The vegetation gradually changes as the salinity level increases before it reverts to salt tolerant vegetation types. This has resulted in a number of small (in terms of area) vegetation communities within that transition zone. It is likely that these vegetation units have undergone a gradual change over time with increasing salinity to a suite of more salt tolerant species.

In general it is not possible to definitively comment on the level of diversity within the recorded vegetation units due the lack of ephemeral and annual species recorded in the data. Based on the out of season data, the Samphire Heath and *Melaleuca* thicket communities have the lowest species richness (6 and 5.5 respectively), this is generally considered to be an indicator of high salinity as there are less species tolerant to the increasing levels of salt. The woodland communities have a low to moderate level of diversity and the *Allocasuarina-Melaleuca* Scrub community (AcSaCTS) has the greatest species richness (19.5). Species richness for each vegetation community is listed in Table 10.

### 7.2.1 Locally and Regionally Significant Vegetation

EPA Position statement No.2 lays out a series of constraints which relate to biodiversity. One of them is to protect at least 30% of the original extent of vegetation complexes in unconstrained areas and 10% in constrained areas (i.e. urban zoned regions). The survey area is considered an unconstrained area; therefore the 30% protection target applies.

All vegetation associations within the survey area, with the exception of '125' (bare areas; salt lakes) have less than 30% of their original extent remaining and can therefore be considered regionally significant (Section 6.2.1.1 and Table 8). In addition to this, all vegetation containing Threatened/Priority flora and/or PECS/TECs is considered to be regionally significant for the purpose of this report.

Ordinarily, the local representation of vegetation is determined for the area assessed (the survey area). For the purposes of this report, representation of less than 5% of the total area assessed has been considered to define limited representation in the local context.

Based on this, all 13 mapped vegetation units can be considered to be regionally significant due to the presence of Threatened and Priority flora, the P3 PEC Woodlands of the Wheatbelt and vegetation that falls within areas with less than 30% pre-European Vegetation remaining (Section 6.2.2.4 and Table 12). In addition to this, six of the 13 mapped vegetation units can be considered to be locally significant as they make up less than 5% of the total area assessed. As described in Section 6.2.2.1, these vegetation units are the result of a transitional zone between the saline drainage channels and upland woodlands and thickets. It is possible that these vegetation units have been undergoing a gradual change of state over time with increasing salinity to more salt tolerant species.

Bare areas associated with salt lakes are not considered to be regionally significant as Beeston *et al* (2002) have found that there is 90.46% of the original extent of these remaining, which is related to the fact that these areas are not suitable for cultivation.

## 7.2.2 Threatened and Priority Ecological Communities

One PEC is known to occur within five kilometres of the survey area (The Priority 1 ecological community – ‘Red Morrell Woodlands of the Wheatbelt’). The assessment of vegetation within the survey area (based on the presence of Red Morrell) indicates that this PEC does not occur within the survey area.

All *Eucalyptus loxophleba* subsp. *supralaevis* woodlands within the survey area (Vegetation Units – ELOWATOS, ELOWAMTOS & EWAIS) are considered to be equivalent to the P3 PEC – ‘*Eucalyptus* Woodlands of the Western Australian Wheatbelt’ based on their structure and dominant *Eucalyptus* species present. These woodlands cover a total area of 74.51 hectares or 29.77% of the total area assessed.

## 7.2.3 Vegetation Condition

A large proportion of the area assessed is considered to be in ‘Very Good’ or better condition (39.64%). It is possible that some of this may be downgraded if a survey is conducted in spring as it was difficult to estimate which areas would have a cover of annual weeds or which would have an understorey of annual native herbs and grasses. The presence of agricultural land and cleared areas adjacent to native vegetation provides a pathway for the invasion of weeds. There are also other factors in the general area which have likely caused the ongoing degradation of vegetation including; maintenance and grading of the current road verge and rail access track, maintenance to the pipeline which runs along the road and any works associated with salt lake crossings and drainage.

In general salinity is restricted to the valley floors, however an assessment of the West Mortlock Catchment (of which the survey area is within) estimates that approximately 197,000 hectares in the wider catchment is located near valley floors and could ultimately become waterlogged or saline if the groundwater rises sufficiently (Cummins, 2002). The West Mortlock catchment covers 700,000 ha in the central Wheatbelt and drains into the Avon River. Salinity within the survey area, in the areas adjacent to the valley floors appears to have been increasing over time, resulting in the degradation of non salt tolerant vegetation types and the gradual transition of these to more salt tolerant assemblages. This is reflected in the condition mapping, with these areas generally given a lower condition rating, however the naturally occurring fringing vegetation of the salt lakes (*Tecticornia* heath and *Melaleuca* thicket) is generally considered to be in ‘Good to Very Good’ or ‘Very Good’ condition where species present do not exhibit signs of stress from increasing salinity.

## 7.3 Fauna

### 7.3.1 Significant Fauna Species

*Calyptorhynchus latirostris* (Carnaby's Cockatoo) (Endangered (EPBC) and Schedule one (WC Act) was identified by the desktop study as being likely to occur within the survey area. It was previously recorded in 2003 in Dalwallinu, south of Walebing. This species has been known to occupy the Wheatbelt area during the breeding and non-breeding season and may nest in hollows of Salmon and York gum and feed on proteaceous species within the survey area.

Potential nesting habitat (York Gum Woodland) makes up 30% of the total Survey area however as no suitable Habitat trees were observed during the field survey, the likelihood of this species nesting within the survey area is low. Potential foraging habitat (‘*Eucalyptus* Tree Mallee’ and ‘Shrubland and Scrub’) occupy 39% of the total

survey area. Larger stands of feeding habitat occur near and adjacent to the survey area, and as such, the species may utilize this in preference to the survey area and this is likely to be the reason why Carnaby's Cockatoo was not observed during the field survey. Due to these factors, this species is unlikely to be impacted by the proposal.

Based on the desktop assessment, the following significant species may occur in the survey area:

- *Pomatostomus superciliosus ashbyi* (White-browed Babbler Western Wheatbelt subspecies) (Priority four (DEC))
- *Isodon obesulus fusciventer* (Southern Brown Bandicoot) (Priority five (DEC))
- *Falco peregrinus* (Peregrine Falcon) (Schedule four (WC Act))
- *Ardeotis australis* (Australian Bustard) (Priority four (DEC))
- *Burhinus grallarius* (Bush Stone-curlew) (Priority four (DEC))
- *Merops ornatus* (Rainbow Bee-eater) (Marine and Migratory (EPBC))
- *Apus pacificus* (Fork-tailed Swift) (Marine and Migratory (EPBC))
- *Aspidites ramsayi* (Woma) (Schedule four (WC Act))
- *Egernia stokesii badia* (Western Spiny-tailed Skink) (Endangered (EPBC) and Schedule one (WC Act))

The White-browed Babbler (Western Wheatbelt subspecies) (Priority four (DEC)) occurs in south-western Australia in arid and semi-arid zones in mulga and *Acacia* thickets and scrub, and the shrubland understorey (Gannet and Crowley, 2000) of *Eucalyptus* forests, *Casuarina* woodlands and mallee (Johnstone and Storr, 2004). While the White-browed Babbler was recorded during the survey, determination to the subspecies level was not possible.

Southern Brown Bandicoot (Priority five (DEC)) occurs in forested areas, woodlands, shrublands, with sites generally displaying a combination of sandy soils with the lower stratum consisting of dense heath vegetation (Van Dyck & Strahan, 2008). The last record in the vicinity of the survey area was from 1980 (West Ballidu). In general, the lower stratum of vegetation within the survey area is not considered to be dense enough to provide suitable habitat for this species and refuge from introduced predators.

Peregrine Falcon (Schedule four (WC Act)) occurs across much of mainland Australia occupying diverse habitats, from rainforest to arid scrubland. It relies on abundant prey, secure nest sites and a lack of human interference. (Pizzey & Knight, 2007). This species was not recorded during the survey, however the species still may be an infrequent visitor to the area. Assuming the species does use the area, given the linear nature of the proposal, the species is unlikely to be impacted.

The Australian Bustard (Priority four (DEC)) occupies open dry woodlands of mulga, mallee, heath, tussock grasslands, spinifex, and arid scrub (Morcombe 2003). It was last recorded in the area in 2008, south of Watheroo National Park. While habitat for this species does occur within the survey area, the majority is fragmented and therefore the likelihood of this species occurring is low.

The Bush Stone-curlew (Priority four (DEC)) occupies woodlands, mallee and mulga and within these habitats it requires some groundcover of small sparse shrubs, grass or twig litter (Morcombe 2003). While the survey area does contain York Gum Woodland and some areas of *Eucalyptus* Tree Mallee, these habitats do not contain suitable groundcover for this species and therefore is unlikely to occur within the survey area.

The Rainbow Bee-eater (Marine and Migratory (EPBC)) is a common species which occupies numerous habitats including open woodlands with sandy loamy soil, sand ridges, sandpits, riverbanks, road cuttings, beaches, dunes, cliffs, mangroves and rainforests. It is possible that this species will occupy open woodland areas within the survey area. The Rainbow Bee-eater avoids heavy forest that would hinder its pursuit of its insect prey (Morcombe 2003). The Rainbow Bee-eater is a widespread, common species found all over Australia and has been previously recorded in the area. Due to the populous status of the species, and the limited number of suitable breeding banks recorded within the survey area, this species is unlikely to be impacted by the proposal.

The Fork-tailed Swift (Marine and Migratory (EPBC)) is a regular summer migrant to Australia, arriving in October and leaving by mid-April. It is generally observed flying high overhead, over open country, semi-arid deserts to coasts and forests (Pizzey & Knight 2007). This species was not observed during the field survey, this is likely to

be due to the timing of the survey as most individuals have left Australia by mid-April. Given the mobile nature of this species and linear corridor of impact, there are unlikely to be any impacts on this species.

The Woma (Schedule four (WC Act)) is found in woodlands, heaths and shrublands, often associated with spinifex and is known to utilise soil cracks, monitor and mammal burrows for shelter (Wilson & Swan 2010). During the field investigation of the survey area, few suitable burrows were observed. The Woma has been recorded previously in the area, however due to the linear nature of the proposal, and lack of suitable shelters, this species is unlikely to be impacted, if it occurred in the survey area.

There are two forms of Western Spiny-tailed Skink (brown form and black form) (Endangered (EPBC) and Schedule one (WC Act)). The brown form typically occupies York Gum (*Eucalyptus loxophleba*) woodland however some occupied sites have been found in Gimlet (*E. salubris*) and Salmon Gum (*E. salmonophloia*) woodland (DSEWPaC 2013). The black form of Western Spiny-tailed Skink occupies rock crevices in large, isolated rocky outcrops, typically granite (Duffield and Bull, 2002). No suitable granite outcrops were observed during the field assessment, so the likelihood of the black form of Western Spiny-tailed Skink occurring is very low. While suitable habitat species do occur for the brown form in the York Gum Woodland, no suitable hollows were observed during this assessment. Following the establishment of a concept design or during subsequent surveys a targeted search for hollows within suitable habitat for the brown form of the species would confirm potential impacts.

The remaining five species identified by the desktop study are considered unlikely to occur in the survey area as discussed below.

Western Whipbird was recorded in West Ballidu in 1842. This species inhabits dense mallee heath and following the field investigation is deemed unlikely to occur within the survey area due to the lack of suitable habitat.

Malleefowl was recorded in West Ballidu in 1842 and 1902. Due to the lack of large connected remnant woodland areas this species is unlikely to occur in the survey area.

Australian Painted Snipe occurs alone or in small groups in freshwater marshes, preferring swamps with temporary water regimes and a combination of shallow water with exposed wet mud and dense, low vegetation, especially tussock grasses. Can use a wider range of habitats in non breeding periods but avoids areas of tall, dense reeds (Geering *et al* 2008). During the field investigation, no suitable habitat for this species was observed, therefore it is unlikely that it would occur within the survey area.

The Great Egret occupies a wide variety of wet habitats including freshwater wetlands, dams, flooded pastures, estuarine mudflats, mangroves and reefs (Morcombe 2003). The species is also known to visit shallows of rivers, sewage ponds and irrigation areas (Pizzey & Knight 2007). There is no suitable habitat for this species within the survey area and therefore the likelihood of occurrence for the Great Egret is very low. Salt lakes with temporary water regimes are present within the survey area and the species may investigate these, however due to the high salt concentrations, the species would not linger long.

The Cattle Egret typically occupies moist pastures with tall grass, shallow wetlands and margins (Morcombe 2003). The species has also been observed in garbage tips, tidal mudflats and drains (Pizzey & Knight 2007). There is no suitable habitat for this species within the survey area. Salt lakes with temporary water regimes are present within the survey area and the species may investigate these, however due to the high salt concentrations, the species would not linger long, therefore likelihood of occurrence is low.

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## 8.0 Assessment against the 10 Clearing Principles

Principle Number	Principle Description	Assessment	Outcome
1	Native vegetation should not be cleared if it comprises a high level of biological diversity	<p>It is difficult to determine the level of biodiversity in terms of species richness for mapped vegetation units within the survey area due to the suite of annual and ephemeral species not being recorded. However the majority of the survey area is within mapped vegetation associations with less than 30% pre-European extent remaining and is thus likely to comprise a high level of biodiversity comparative to other areas in the region. Table 8 lists vegetation associations mapped within the survey area and the area of pre-European vegetation remaining, plus the area remaining within the Shire of Wongan-Ballidu and Shire of Dalwallinu. Threatened and Priority Flora and Priority Ecological Communities are all indicative of the high biological diversity of the area. The following have been recorded within the survey area:</p> <ul style="list-style-type: none"> <li>- <i>Grevillea dryandroides</i> subsp. <i>dryandroides</i> (T)</li> <li>- <i>Acacia ?dissona</i> var. <i>indoloria</i> (P3)</li> <li>- <i>Acacia ?scalena</i> (P3)</li> <li>- <i>Acacia lirellata</i> subsp. <i>compressa</i> (P2)</li> <li>- <i>Dampiera ?glabrescens</i> (P1)</li> <li>- The P3 PEC – ‘Eucalyptus Woodlands of the Western Australian Wheatbelt’</li> </ul>	<p><b>At Variance</b> Initial survey indicates that the proposal would be at variance to this principle, however this should be revised once a final disturbance footprint has been considered.</p>
2	Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia	<p>The native vegetation within the survey area is not considered to be necessary for the maintenance of a significant habitat for fauna. Areas of York Gum Woodland have the potential to provide habitat for the brown form of Western Spiny-tailed Skink. However, providing clearing in these areas is avoided, or restricted to narrow linear sections, associated impacts are unlikely to be significant in the context of habitat for the skink or effect long term survival.</p> <p>Consideration was also given to the potential for these areas of woodland to provide nesting habitat for the Threatened Carnaby’s Cockatoo, however during the survey the Eucalyptus <i>loxophleba</i> observed were not considered to be large or mature enough to serve this purpose (did not contain any observable hollows or potential hollows)..</p>	<p><b>Not at Variance</b></p>

Principle Number	Principle Description	Assessment	Outcome
3	Native vegetation should not be cleared if it includes, or is necessary for the continued existence of rare flora	<i>Grevillea dryandroides</i> subsp. <i>dryandroides</i> (T) was recorded from within the survey area during the May 2012 flora and vegetation survey. There are currently five known populations containing approximately 115 individuals (DEC, 2000). Populations 1a and 5a fall within the survey area. The area surrounding population 1a was searched on foot, however no individuals were recorded. Four individuals were recorded at population 5a, with a further five recorded approximately 400 metres north of 5a. Locations of recorded <i>Grevillea dryandroides</i> subsp. <i>dryandroides</i> are shown in Figure 8. Threats to population 5a are listed in DEC (2000) as weed invasion and road maintenance. It was not possible to determine the density of weeds at the site due to the seasonal timing, however it was noted that it appeared that heavy machinery/vehicles had been accessing the rail reserve directly from the road and running over the vegetation in the vicinity of this population.	<b>At Variance</b> Initial survey indicates that the proposal would be at variance to this principle, however this should be revised once a final disturbance footprint has been considered.
4	Native vegetation should not be cleared if it comprises whole or a part of, or is necessary for the maintenance of a Threatened Ecological Community	Based on the results of the desktop and field assessments presented in this report, there are no Threatened Ecological Communities present within the survey area. A search was undertaken on the DEC Threatened Ecological Community Database and there are no previously recorded occurrences of TECs or PECs within the survey area. There are no known occurrences of any TECs within five kilometres of the survey area, there is however the known occurrence of the following PEC within five kilometres of the survey area:  - The Priority 1 ecological community – ‘Red Morrell Woodlands of the Wheatbelt’	<b>Not at Variance</b>
5	Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared	The Avon Wheatbelt region has been extensively cleared for agriculture. On a broad scale, the West Mortlock catchment area (which includes the Shires of Wongan-Ballidu and Dalwallinu and covers 700, 000 ha in the Central Wheatbelt, draining into the Avon River) has 5.1% of original vegetation remaining with an average remnant size of 7.3 hectares (Cummins, 2003). All vegetation associations that occur within the survey area, with the exception of 125 (bare areas; salt lakes) have less than 30% of pre-European extent remaining (Table 8). Given that the average remnant size in the catchment is approximately 7.3 hectares any large, continuous remnants can be considered to be significant, such as those that occur in the vicinity of Ballidu and Pithara, as well as the mostly continuous chain of Salt Lakes associated with Damboring Lake. However, as the proposed works are an upgrade to an existing road impacts to linkage corridors are unlikely to be significant.	<b>At Variance</b>

Principle Number	Principle Description	Assessment	Outcome
6	Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland	Rivers in Wheatbelt valley floors are often reduced to a series of channels and lakes that rarely link up and flow, resulting in a complex geometry of inter-linked channels and lakes (DEC, 2005). The current road intersects a chain of interconnected saline lakes and channels (Figure 8) and there are a series of small bridges and culverts that allow the road to cross the wetland area. Works associated with the upgrade of the road in this location are likely to result in the clearing of the associated vegetation types (SH and MITOS).	<b>At Variance</b> Initial survey indicates that the proposal would be at variance to this principle, however this should be revised once a final disturbance footprint has been considered.
7	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation	<p>The clearing of native vegetation in the wheatbelt region and its replacement with shallow rooted, annual cropping species has resulted in the reduction transpiration and thus rise in watertables resulting in mobilisation of salt stored deep within the soil, resulting in land degradation (DEC, 2005). Given the current levels of clearing (approximately 95%) that have occurred in the West Mortlock Catchment (Cummins, 2003), there is the potential for minimal additional clearing to increase land degradation. However, the potential clearing of remant vegetation associated with the proposed road upgrade in the context of the catchment would be unlikely trigger significant land degradation as a result of increasing salinity.</p> <p>The main soil types in the survey area which include freely drained sandy earths and shallow loamy duplex soils on valley floors may be susceptible to the following land degradation issues; soil acidification, structural decline, wind and water erosion and subsoil compaction (Cummins, 2003). There may be some minor impacts from wind and water erosion which the sandy soil is susceptible to, however given the adjacent land use and limited amount of clearing expected to be carried out it is unlikely that the proposal will cause 'appreciable' land degradation.</p>	<b>Unlikely to be at variance</b> Initial survey indicates that the proposal is unlikely to be at variance to this principle, however this should be revised once a final disturbance footprint has been considered.
8	Native vegetation should not be cleared if it is likely to have an impact on the environmental values of any adjacent or nearby conservation area	The nearest conservation area is the Lake Damboring Nature Reserve which is approximately 500 metre west of the road reserve Lake Damboring is associated with a chain of saline lakes which are relatively continuous (intersected by the current Northam-Pithara Road, pipeline infrastructure and rail corridor – see Figure 8). Given the current intersection of the salt lake chain by the road, rail and pipeline, is unlikely that any additional clearing associated with the road upgrade which is likely to be narrow and linear in nature would have a significant impact on the Lake Damboring Nature Reserve.	<b>Not at Variance</b>

Principle Number	Principle Description	Assessment	Outcome
9	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or ground water	<p><b>Surface Water</b></p> <p>The wheatbelt landscape is flat and the ancient river valleys have become filled with sediment (DEC, 2005). Rivers in these ancient valleys are typically reduced to chains of salt lakes that only link up and flow after exceptionally high rainfall (DEC, 2005). In most years rainfall is insufficient to cause systems to flow and the high rates of evaporation mean that the lakes and pools are dry for much of the year (DEC, 2005). The chain of salt lakes that intersects the survey area is an example of an ancient river valley that has been reduced to a chain of interconnecting salt lakes (Figure 8). Given the sporadic surface water flows of these channels, it is unlikely that the clearing of native vegetation would cause deterioration of surface water quality providing the existing flows are maintained.</p> <p><b>Ground Water</b></p> <p>the clearing of native vegetation in the Wheatbelt region and its replacement with shallow rooted, annual cropping species has resulted in the reduction transpiration and thus rise in watertables resulting in mobilisation of salt stored deep within the soil (DEC, 2005). The topography of the site (broad flat valleys) is such that the groundwater would be expected to be close to the surface and evidence of this occurring is noted within the survey area where vegetation shows sign of stress or decline in areas adjacent to salt lakes. As proposed disturbance is likely to involve the clearing of relatively narrow bands of vegetation, it is considered unlikely that this will cause any further deterioration in the quality or levels of ground water.</p>	<p><b>Unlikely to be at variance</b></p> <p>Initial survey indicates that the proposal is unlikely to be at variance to this principle, however this should be revised once a final disturbance footprint has been considered</p>
10	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause or exacerbate the incidence or intensity of flooding	As the proposed clearing is likely to involve the clearing of relatively narrow bands of vegetation, and drainage of run-off would be managed as part of the road design it is unlikely that the clearing of native vegetation as part of this proposal would cause or exacerbate the incidence or intensity of flooding.	<b>Not at Variance</b>

## Conclusions and Recommendations

The significant ecological findings from the assessment of the survey area are:

- One species of Threatened flora recorded (*Grevillea dryandroides* subsp. *dryandroides*).
- Four species of Priority Flora recorded (*Acacia ?scalena*, *A. lirellata* subsp. *compressa*, *A. ?dissona* var. *indoloria*, *Dampiera ?glabrescens*).
- No fauna species of conservation significance recorded.
- One P3 PEC (Eucalyptus Woodlands of the Western Australian Wheatbelt) recorded covering 74.51 ha or 29.77% of the total area assessed.
- 99.22 ha or 39.64% of total area surveyed is considered to be in 'Very Good' or better condition.
- 240.06 ha or 95.91% of total area surveyed falls within vegetation associations that have less than 30% pre-European extent remaining.
- All 13 vegetation units can be considered to be regionally significant due to a combination of factors including; presence of rare and priority flora, being within a vegetation association with less than 30% pre-European extent remaining and presence of a PEC.
- Six vegetation units can be considered to be locally significant as they make up less than five percent of the total area surveyed.
- Based on the findings of this survey and a preliminary assessment against the ten clearing principles (considering the entire area surveyed for this report and without knowing the exact area to be cleared) it has been determined that generally any clearing in the area may be at variance with four of the ten clearing principles as follows:
  - native vegetation should not be cleared if it comprises a high level of biological diversity
  - native vegetation should not be cleared if it includes, or is necessary for the continued existence of rare flora
  - native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared
  - native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland

Based on the significant findings of this survey the following recommendations are made for further surveys to be carried out to assist with approvals for the proposal:

- Avoid areas which have triggered the 'at variance' outcomes in the preliminary assessment against the ten clearing principles included in this report. This includes avoiding (where possible) the following areas as part of a concept design
  - remnant vegetation in Good or better condition, particularly that which is part of a larger remnant (eg not just a narrow strip along road edge)
  - vegetation mapped as *Eucalyptus loxophleba* Woodlands
  - populations of *Grevillea dryandroides* subsp. *dryandroides* (T)
  - vegetation associated with wetlands (salt lakes).
- Carry out a final assessment against the 10 clearing principles following the establishment of a concept design.
- Minimise impacts to York Gum Woodland as it is potential habitat for the brown form of the Western Spiny-tailed Skink that has the potential to occur in the region.
- Carry out a follow up flora and vegetation survey in spring to capture additional species, ephemerals and annuals and confirm vegetation condition based on weed cover

- Targeted survey for identified Threatened and Priority flora species particularly those which could not be observed during the May 2012 survey (due to dormancy or survey not being during annual growth period).
- Re-collection of *Acacia scalena*, *Acacia dissona* var. *indoloria* and *Dampiera glabrescens* during spring flowering period to confirm identification.
- Re-visit the locations of the nine rare flora markers where no Threatened flora was located during the out of season May 2012 survey to confirm the status of these markers
- Consultation with DEC to determine the conservation value of the saline lakes that intersect the survey area to determine appropriate management actions.

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Appendix A

# Definitions of Threatened and Priority Flora Species

## Definition of Rare and Priority Flora Species (DEC, 2012a)

Conservation Code	Category
X	<b>Presumed Extinct Flora (Declared Rare Flora - Extinct)</b> Taxa which have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such Schedule 2 under the WC Act.
T	<b>Threatened Flora – (Declared Rare Flora – Extant)</b> Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection and have been gazetted as such (Schedule 1 under the WC Act).
P1	<b>Priority One – Poorly Known Species</b> Species that are known from one or a few collections or sight records (generally less than five), all on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, Shire, Westrail and Main Roads WA road, gravel and soil reserves, and active mineral leases and under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes.
P2	<b>Priority Two – Poorly Known Species</b> Species that are known from one or a few collections or sight records, some of which are on lands not under imminent threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes.
P3	<b>Priority Three – Poorly Known Species</b> 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.
P4	<b>Priority Four – Rare, Near Threatened and other species in need of monitoring</b> (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.
P5	<b>Priority Five: Conservation Dependent species</b> Species that are not threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.

## Appendix B

# Categories of Threatened Flora Species

**Environment Protection and Biodiversity Conservation Act, 1999**

Conservation Code	Category
<b>Ex</b>	<b>Extinct</b> Taxa which at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
<b>ExW</b>	<b>Extinct in the Wild</b> Taxa which is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
<b>CE</b>	<b>Critically Endangered</b> Taxa which at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
<b>E</b>	<b>Endangered</b> Taxa which is not critically endangered and it is facing a very high risk of extinction in the wild in the immediate or near future, as determined in accordance with the prescribed criteria.
<b>V</b>	<b>Vulnerable</b> Taxa which is not critically endangered or endangered and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
<b>CD</b>	<b>Conservation Dependent</b> Taxa which at a particular time if, at that time, the species is the focus of a specific conservation programme, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.

Appendix C

# Categories of Threatened and Priority Fauna Species

## Appendix C

### Definitions of Threatened and Priority Fauna Categories

Table 1 WC Act Codes for Threatened Flora

Conservation Code	Category
Schedule 1	Fauna that is rare or likely to become extinct, are declared to be fauna that is in need of special protection.
Schedule 2	Fauna that is presumed to be extinct, are declared to be fauna that is in need of special protection.
Schedule 3	Birds that are subject to an agreement between the governments of Australia and Japan relating to the protection of migratory birds and birds in danger of extinction are declared to be fauna that is in need of special protection.
Schedule 4	Fauna that is in need of special protection, otherwise than for the reasons mentioned [in Schedule 1 – 3].

Table 2 Categories of Specially Protected Fauna Species as prioritised by DEC

Conservation Code	Category
P1	<p><b>Priority One</b></p> <p>Taxa with few, poorly known populations on threatened lands. Taxa which are known from few specimens or sight records from one or a few localities on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, active mineral leases. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.</p>
P2	<p><b>Priority Two</b></p> <p>Taxa with few, poorly known populations on conservation lands. Taxa which are known from few specimens or sight records from one or a few localities on lands not under immediate threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.</p>
P3	<p><b>Priority Three</b></p> <p>Taxa with several, poorly known populations, some on conservation lands. Taxa which are known from few specimens or sight records from several localities, some of which are on lands not under immediate threat of habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.</p>
P4	<p><b>Priority Four</b></p> <p>Taxa in need of monitoring. Taxa which are considered to have been adequately surveyed, or for which sufficient knowledge is available, and which are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands.</p>
P5	<p><b>Priority Five</b></p> <p>Taxa in need of monitoring. Taxa which are not considered threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.</p>

Table 3 Categories of Threatened Fauna Species – EPBC Act

Conservation Code	Category
Ex	<p><b>Extinct</b></p> <p>Taxa not definitely located in the wild during the past 50 years</p>
ExW	<p><b>Extinct in the Wild</b></p>

Conservation Code	Category
	Taxa known to survive only in captivity
CE	<b>Critically Endangered</b> Taxa facing an extremely high risk of extinction in the wild in the immediate future
E	<b>Endangered</b> Taxa facing a very high risk of extinction in the wild in the near future
V	<b>Vulnerable</b> Taxa facing a high risk of extinction in the wild in the medium-term
NT	<b>Near Threatened</b> Taxa that risk becoming Vulnerable in the wild
CD	<b>Conservation Dependent</b> Taxa whose survival depends upon ongoing conservation measures. Without these measures, a conservation dependent taxon would be classified as Vulnerable or more severely threatened
DD	<b>Data Deficient (Insufficiently Known)</b> Taxa suspected of being Rare, Vulnerable or Endangered, but whose true status cannot be determined without more information

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Appendix D

# Summary of Vascular Flora Species Recorded

**Project: Pithara to Ballidu F+V**

	# Sites	%
Myrtaceae sp.	3	13.6
80 Lauraceae		
Cassytha sp.	1	4.5
116 Boryaceae		
Borya constricta	5	22.7
128 Asparagaceae		
Lomandra effusa	1	4.5
130 Hemerocallidaceae		
Dianella revoluta	7	31.8
138 Haemodoraceae		
Conostylis aculeata subsp. bromelioides	1	4.5
Haemodorum discolor	1	4.5
156 Cyperaceae		
Gahnia drummondii	4	18.2
Lepidosperma sp.	1	4.5
Lepidosperma sp. P1 Small Head (M.D. Tindale 166A)	1	4.5
159 Restionaceae		
Lepidobolus preissianus	3	13.6
162 Ecdeiocoleaceae		
Ecdeiocolea monostachya	5	22.7
163 Poaceae		
? Thyridolepis sp.	5	22.7
Amphipogon caricinus var. caricinus	2	9.1
Aristida holathera var. holathera	1	4.5
Austrostipa ? nitida	6	27.3
* Avena barbata	2	9.1
Enteropogon ramosus	1	4.5
* Eragrostis curvula	1	4.5
175 Proteaceae		
Grevillea ? armigera	3	13.6
Grevillea ? hakeoides subsp. stenophylla	1	4.5
Grevillea ? levis	2	9.1
Grevillea dryandroides subsp. dryandroides (T)	1	4.5
Grevillea petrophiloides subsp. petrophiloides	1	4.5
Grevillea sp.	1	4.5
Hakea ? erecta	1	4.5
Hakea scoparia subsp. scoparia	2	9.1
Isopogon scabriusculus subsp. stenophyllus	1	4.5
Persoonia rufiflora	1	4.5
Petrophile ? drummondii	1	4.5
Petrophile shuttleworthiana	1	4.5
Synaphea spinulosa subsp. spinulosa	1	4.5
181 Dilleniaceae		
Hibbertia nutans	1	4.5
Hibbertia sp.	1	4.5
201 Fabaceae		
Acacia ? anthochaera	1	4.5

**Project: Pithara to Ballidu F+V**

	# Sites	%
Acacia ? coolgardiensis	1	4.5
Acacia ? dissona var. indoloria (PP3)	2	9.1
Acacia ? lasiocalyx	1	4.5
Acacia ? ligustrina	1	4.5
Acacia ? neurophylla subsp. neurophylla	2	9.1
Acacia ? scalena (PP3)	1	4.5
Acacia acuaria	7	31.8
Acacia acuminata	6	27.3
Acacia daphnifolia	2	9.1
Acacia eremaea	5	22.7
Acacia ericksoniae	1	4.5
Acacia lirellata subsp. compressa (P2)	1	4.5
Acacia sp.	2	9.1
Daviesia hakeoides subsp. subnuda	2	9.1
Daviesia nudiflora subsp. nudiflora	2	9.1
Mirbelia ramulosa	1	4.5
<hr/>		
203 Polygalaceae		
Comesperma integerrimum	1	4.5
<hr/>		
208 Rhamnaceae		
? Cryptandra sp.	1	4.5
Cryptandra apetala var. apetala	1	4.5
<hr/>		
217 Casuarinaceae		
Allocasuarina acutivalvis subsp. acutivalvis	2	9.1
Allocasuarina campestris	6	27.3
<hr/>		
281 Myrtaceae		
? Aluta aspera	3	13.6
? Scholtzia sp.	2	9.1
Baeckea ? crispiflora	1	4.5
Baeckea sp. ?Dudawa (M.E. Trudgen MET 5369)	1	4.5
Calytrix sp.	1	4.5
Darwinia diosmoides	1	4.5
Darwinia purpurea	2	9.1
Eucalyptus ? celastroides subsp. virella	1	4.5
Eucalyptus ? horistes	1	4.5
Eucalyptus erythronema var. marginata	2	9.1
Eucalyptus horistes	4	18.2
Eucalyptus leptopoda subsp. arctata	2	9.1
Eucalyptus loxophleba subsp. lissophloia	1	4.5
Eucalyptus loxophleba subsp. supralaevis	7	31.8
Eucalyptus rigidula	1	4.5
Leptospermum erubescens	1	4.5
Melaleuca acuminata subsp. websteri	2	9.1
Melaleuca atroviridis	5	22.7
Melaleuca conothamnoides	1	4.5
Melaleuca cordata	4	18.2
Melaleuca coroncarpa	2	9.1
Melaleuca hamata	4	18.2
Melaleuca lateralis	1	4.5
Melaleuca lateriflora	5	22.7
Melaleuca laxiflora	2	9.1
Melaleuca orbicularis	2	9.1

**Project: Pithara to Ballidu F+V**

	# Sites	%
Melaleuca thyoides	2	9.1
299 Sapindaceae		
Dodonaea ? inaequifolia	2	9.1
Dodonaea bursariifolia	3	13.6
311 Thymelaeaceae		
Pimelea ? avonensis	1	4.5
338 Santalaceae		
Exocarpos aphyllus	1	4.5
Santalum acuminatum	8	36.4
357 Amaranthaceae		
Ptilotus polystachyus	1	4.5
358 Chenopodiaceae		
Atriplex bunburyana	4	18.2
Enchylaena tomentosa var. tomentosa	2	9.1
Maireana ? brevifolia	1	4.5
Maireana brevifolia	2	9.1
Maireana sp.	1	4.5
Rhagodia drummondii	6	27.3
Sarcocornia quinqueflora	1	4.5
Sclerolaena diacantha	4	18.2
Tecticornia ? halocnemoides	2	9.1
Tecticornia indica subsp. bidens	6	27.3
Tecticornia pergranulata subsp. pergranulata	2	9.1
364 Aizoaceae		
? Gunniopsis sp.	2	9.1
Gunniopsis ? quadrifida	4	18.2
Sarcozona praecox	2	9.1
403 Ericaceae		
Astroloma serratifolium	2	9.1
417 Solanaceae		
Solanum lasiophyllum	1	4.5
428 Scrophulariaceae		
Eremophila papillata	1	4.5
Eremophila sp.	1	4.5
458 Goodeniaceae		
Dampiera ? glabrescens (PP1)	1	4.5
460 Asteraceae		
Olearia dampieri subsp. eremicola	1	4.5
Olearia homolepis	1	4.5
Olearia muelleri	1	4.5

## Appendix E

# Summary of Vascular Flora Species Recorded at Each Community

Family Code	Species Name	Vegetation Unit											
		AcSACTS	ELOTMLLOS	ELOWATOS	SH	MITOS	ELOWAMTOS	AeSaTSMNS	GSTOS	EWAIS	EHTMATS	EctMMS	GTSACOH
031	? <i>Thyridolepis</i> sp.					+		+					+
031	<i>Aristida holathera</i> var. <i>holathera</i>	+											
031	<i>Austrostipa</i> ? <i>nitida</i>	+		+				+				+	
031	<i>Avena barbata</i>						+			+			
031	<i>Enteropogon ramosus</i>				+								
031	<i>Eragrostis curvula</i>				+								
032	<i>Gahnia drummondii</i>	+								+		+	
032	<i>Lepidosperma</i> sp.							+					
032	<i>Lepidosperma</i> sp. P1 Small Head (M.D. Tindale 166A)	+											
039	<i>Lepidobolus preissianus</i>	+	+										
039A	<i>Ecdeiocolea monostachya</i>	+	+									+	
054B	<i>Lomandra effusa</i>	+											
054L	<i>Borya constricta</i>	+									+	+	
054P	<i>Dianella revoluta</i>	+		+			+	+		+		+	
055	<i>Conostylis aculeata</i> subsp. <i>bromelioides</i>						+						
055	<i>Haemodorum discolor</i>											+	
070	<i>Allocauarina acutivalvis</i> subsp. <i>acutivalvis</i>	+											
070	<i>Allocauarina campestris</i>	+	+									+	
090	<i>Grevillea</i> ? <i>armigera</i>	+						+					
090	<i>Grevillea</i> ? <i>hakeoides</i> subsp. <i>stenophylla</i>	+											
090	<i>Grevillea</i> ? <i>levis</i>	+										+	
090	<i>Grevillea dryandroides</i> subsp. <i>dryandroides</i> (T)	+											
090	<i>Grevillea petrophiloides</i> subsp. <i>petrophiloides</i>												
090	<i>Grevillea</i> sp.											+	
090	<i>Hakea</i> ? <i>erecta</i>	+											
090	<i>Hakea scoparia</i> subsp. <i>scoparia</i>	+										+	
090	<i>Isopogon scabriusculus</i> subsp. <i>stenophyllus</i>	+											
090	<i>Persoonia ruffiflora</i>											+	
090	<i>Petrophile</i> ? <i>drummondii</i>	+											
090	<i>Petrophile shuttleworthiana</i>	+											
090	<i>Synaphea spinulosa</i> subsp. <i>spinulosa</i>	+											
092	<i>Exocarpos aphyllus</i>						+						
092	<i>Santalum acuminatum</i>	+		+				+	+			+	
105	<i>Atriplex bunburyana</i>				+	+			+				
105	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>						+			+			
105	<i>Maireana</i> ? <i>brevifolia</i>			+									
105	<i>Maireana brevifolia</i>	+					+						
105	<i>Maireana</i> sp.			+									
105	<i>Rhagodia drummondii</i>			+		+							+
105	<i>Sarcocornia quinqueflora</i>						+						
105	<i>Sclerolaena diacantha</i>					+	+		+				
105	<i>Tecticornia</i> ? <i>halocnemoides</i>				+	+							
105	<i>Tecticornia indica</i> subsp. <i>bidens</i>				+	+	+						
105	<i>Tecticornia indica</i> subsp. <i>bidens</i>					+							
105	<i>Tecticornia pergranulata</i> subsp. <i>pergranulata</i>				+	+							
106	<i>Ptilotus polystachyus</i>			+									
110	? <i>Gunniopsis</i> sp.				+	+							
110	<i>Gunniopsis</i> ? <i>quadrifida</i>				+	+	+						+
110	<i>Sarcozonia praecox</i>				+		+						
131	<i>Cassytha</i> sp.											+	
162	<i>Acacia</i> ? <i>anthochaera</i>			+									
162	<i>Acacia</i> ? <i>coolgardiensis</i>									+			
162	<i>Acacia</i> ? <i>dissona</i> var. <i>indoloria</i> (P3)									+		+	
162	<i>Acacia</i> ? <i>lasiocalyx</i>	+											
162	<i>Acacia</i> ? <i>ligustrina</i>								+				
162	<i>Acacia</i> ? <i>neurophylla</i> subsp. <i>neurophylla</i>	+	+										
162	<i>Acacia</i> ? <i>scalena</i> (P3)	+											
162	<i>Acacia acuarina</i>			+			+	+		+			
162	<i>Acacia acuminata</i>			+			+		+			+	+
162	<i>Acacia daphnifolia</i>			+					+				
162	<i>Acacia eremaea</i>				+	+	+	+				+	
162	<i>Acacia ericksoniae</i>									+			
162	<i>Acacia lirellata</i> subsp. <i>compressa</i> (P2)	+											
162	<i>Acacia</i> sp.			+									+
162	<i>Daviesia hakeoides</i> subsp. <i>subnuda</i>	+								+			
162	<i>Daviesia nudiflora</i> subsp. <i>nudiflora</i>	+											
162	<i>Mirbella ramulosa</i>												+
183	<i>Comesperma integerrimum</i>	+											
207	<i>Dodonaea</i> ? <i>inaequifolia</i>								+		+		
207	<i>Dodonaea bursariifolia</i>			+						+			
215	? <i>Cryptandra</i> sp.							+					
215	<i>Cryptandra apetala</i> var. <i>apetala</i>			+									
226	<i>Hibbertia nutans</i>	+											
226	<i>Hibbertia</i> sp.	+											
263	<i>Pimelea</i> ? <i>avonensis</i>	+											
273	? <i>Aluta aspera</i>	+						+					
273	? <i>Scholtzia</i> sp.	+											
273	<i>Baeckea</i> ? <i>crispiflora</i>											+	
273	<i>Baeckea</i> sp. ? <i>Dudawa</i> (M.E. Trudgen MET 5369)	+											
273	<i>Calytrix</i> sp.							+					

Family Code	Species Name	Vegetation Unit											
		AcSaCTS	EIOTMMLoS	ELOWATOS	SH	MITOS	ELOWAMTOS	AeSaTSMNS	GSTOS	EWaIS	EHTMaTS	EctMMS	GTSaCOH
273	<i>Darwinia diosmoides</i>												+
273	<i>Darwinia purpurea</i>	+	+										
273	<i>Eucalyptus ? celastroides subsp. virella</i>										+		
273	<i>Eucalyptus ? horistes</i>	+											
273	<i>Eucalyptus erythronema var. marginata</i>						+	+					
273	<i>Eucalyptus horistes</i>	+								+			
273	<i>Eucalyptus leptopoda subsp. arctata</i>		+	+									
273	<i>Eucalyptus loxophleba subsp. lissophloia</i>		+										
273	<i>Eucalyptus loxophleba subsp. supralaevis</i>			+		+	+	+	+				
273	<i>Eucalyptus rigidula</i>												+
273	<i>Leptospermum erubescens</i>							+					
273	<i>Melaleuca acuminata subsp. websteri</i>										+	+	
273	<i>Melaleuca atroviridis</i>	+										+	
273	<i>Melaleuca conothamnoides</i>	+										+	
273	<i>Melaleuca cordata</i>	+	+										
273	<i>Melaleuca coronicarpa</i>										+	+	
273	<i>Melaleuca hamata</i>					+	+	+					
273	<i>Melaleuca lateralis</i>					+							
273	<i>Melaleuca lateriflora</i>					+	+						
273	<i>Melaleuca laxiflora</i>	+											
273	<i>Melaleuca orbicularis</i>	+	+										
273	<i>Melaleuca thyoides</i>					+							+
273	<i>Myrtaceae sp.</i>	+											
287	<i>Astroloma serratifolium</i>	+											
315	<i>Solanum lasiophyllum</i>			+									
316	<i>Eremophila papillata</i>												+
316	<i>Eremophila sp.</i>			+									
341	<i>Dampiera ? glabrescens</i>	+											
345	<i>Olearia dampieri subsp. eremicola</i>	+											
345	<i>Olearia homolepis</i>								+				
345	<i>Olearia muelleri</i>										+		

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Appendix F

# Qualitative Quadrat Data

**Pithara to Ballidu F+V**

**Site 01**

**Described by** AS **Date** 22/05/2012 **Type** Q 10x10

**Season** P

**MGA Zone** 50 477514 **mE** 6615316 **mN** 116.765448 **E** -30.594365 **S**

**Soil** Light brown sandy loam

**Vegetation** Closed Tall Scrub to Tall open scrub of *Allocasuarina campestris* and *Santalum acuminatum* with occasional dominance by *Melaleuca atroviridis* over a Low Open Shrubland of *Astroloma serratifolium* and *Myrtaceae* sp. over an Open Sedgeland of *Gahnia drummondii*, *Dianella revoluta* and *Borya constricta* on light brown sandy loam.

**Veg Condition** Very Good to Excellent

**Notes** annuals and ephemerals not collected due to season



**SPECIES LIST:**

<b>Name</b>	<b>Cover</b>	<b>Height</b>	<b>Specimen</b>
? Scholtzia sp.	Assoc	Assoc	BP-15
Acacia ? neurophylla subsp. neurophylla	1	200	BP-06
Acacia ? scalena	Assoc		BP-35
Acacia lillata subsp. compressa	Assoc		BP-34
Allocasuarina campestris	70	250	BP-03
Amphipogon caricinus var. caricinus	<1	40	BP-04
Aristida holathera var. holathera	Assoc		4-opp-01
Astroloma serratifolium	<1	45	BP-07
Baeckea sp. ?Dudawa (M.E. Trudgen MET 5369)	Assoc	Assoc	BP-13
Borya constricta	<1	10	BP-08
Dampiera ? glabrescens	Assoc		BP-33
Darwinia purpurea	Assoc	Assoc	BP-11
Dianella revoluta	<1	60	
Eucalyptus horistes	Assoc	Assoc	BP-17
Gahnia drummondii	5	40	BP-02
Grevillea ? levis	Assoc	Assoc	BP-14
Grevillea dryandri subsp. dryandri	Assoc		
Melaleuca atroviridis	5	200	BP-01
Melaleuca laxiflora	Assoc	Assoc	BP-10
Myrtaceae sp.	<1	40	BP-09
Olearia dampieri subsp. eremicola	Assoc	Assoc	BP-16
Petrophile shuttleworthiana	Assoc		BP37
Pimelea ? avonensis	Assoc	Assoc	BP-12
Santalum acuminatum	20	400	BP-05

**Pithara to Ballidu F+V**

**Site 02**

**Described by** AS **Date** 22/05/2012 **Type** Q 10x10

**Season** P

**MGA Zone** 50 476910 mE 6616003 mN 116.759163 E -30.588155 S

**Soil** Very light brown Sandy loam with surface concretions

**Vegetation** Tall Open Scrub of *Allocasuarina campestris* with occasional *Santalum acuminatum* over Open Low Heath of *Melaleuca cordata* and *?Aluta aspera* over a Sedgeland of *Ecdeiocolea monostachya* with scattered *Borya constricta* on very light brown sandy loam with surface concretion.

**Veg Condition** Very Good



**SPECIES LIST:**

Name	Cover	Height	Specimen
? <i>Aluta aspera</i>	15	40	BP-20
? <i>Scholtzia</i> sp.	<1	40	BP-22
<i>Allocasuarina campestris</i>	40	450	BP-03
<i>Borya constricta</i>	<1	10	BP-08
<i>Comesperma integerrimum</i>	Assoc	Assoc	BP-28
<i>Daviesia hakeoides</i> subsp. <i>subnuda</i>	<1	40	BP-19
<i>Ecdeiocolea monostachya</i>	<1	45	
<i>Eucalyptus</i> ? <i>horistes</i>	Assoc	Assoc	BP-23
<i>Eucalyptus horistes</i>	Assoc	Assoc	BP-17
<i>Grevillea</i> ? <i>armigera</i>	<1	150	BP-21
<i>Isopogon scabriusculus</i> subsp. <i>stenophyllus</i>	Assoc	Assoc	BP-26
<i>Lepidobolus preissianus</i>	Assoc	Assoc	BP-24
<i>Lomandra effusa</i>	Assoc	Assoc	BP-27
<i>Melaleuca atroviridis</i>	<1	200	BP-01
<i>Melaleuca cordata</i>	20	60	BP-18
<i>Melaleuca orbicularis</i>	<1	50	BP26
Myrtaceae sp.	<1	50	BP-09
<i>Santalum acuminatum</i>	5	300	BP-05
<i>Synaphea spinulosa</i> subsp. <i>spinulosa</i>	Assoc	Assoc	BP-25

**Pithara to Ballidu F+V**

**Site 03**

**Described by**

AS

**Date** 22/05/2012 **Type** V

**Season** P

**MGA Zone** 50 476880 **mE** 6616106 **mN** 116.758852 **E** -30.587225 **S**

**Soil** Pale brown sandy loam

**Vegetation** Open Tree Mallee of *Eucalyptus leptopoda* subsp. *arctata* over Low Open Shrubland of *Melaleuca cordata* over an Open Sedgeland of *Ecdeiocolea monostachya* and *Lepidobolus preissianus* on pale brown sandy loam.

**Veg Condition** Very Good



**SPECIES LIST:**

<b>Name</b>	<b>Specimen</b>
Acacia ? neurophylla subsp. neurophylla	BP-06
Allocasuarina campestris	BP-03
Darwinia purpurea	BP-11
Ecdeiocolea monostachya	
Eucalyptus leptopoda subsp. arctata	BP-29
Eucalyptus loxophleba subsp. lissophloia	BP-30
Lepidobolus preissianus	BP-24
Melaleuca cordata	BP-18
Melaleuca orbicularis	BP26

**Pithara to Ballidu F+V**

**Site 04**

**Described by** AS **Date** 22/05/2012 **Type** Q 10x10

**Season** P

**MGA Zone** 50 476416 mE 6616685 mN 116.754026 E -30.581991 S

**Soil** Light brown sandy loam, light mantle of pebbles

**Vegetation** Tall Open Shrubland of *Allocasuarina acutivalvis* subsp. *acutivalvis* over a Tall Shrubland of *Hakea scoparia* subsp. *scoparia*, *Allocasuarina campestris*, and *Santalum acuminatum* over a Low Open Shrubland of *Melaleuca cordata* over a Very Open Sedgeland of *Ecdeiocolea monostachya* and *Lepidobolus preissianus* on light brown sandy loam with an open mantle of lateritic pebbles.

**Veg Condition** Very Good



**SPECIES LIST:**

Name	Cover	Height	Specimen
<i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i>	5	500	04-01
<i>Allocasuarina campestris</i>	3	200	04-04
<i>Astroloma serratifolium</i>	<1	40	BP-07
<i>Borya constricta</i>	<1	10	BP-08
<i>Daviesia nudiflora</i> subsp. <i>nudiflora</i>	<1	150	04-03
<i>Ecdeiocolea monostachya</i>	2	50	
<i>Gahnia drummondii</i>	<1	20	BP-02
<i>Grevillea ? armigera</i>	<1	120	BP-21
<i>Hakea scoparia</i> subsp. <i>scoparia</i>	7	200	04-02
<i>Lepidobolus preissianus</i>	<1	10	BP-24
<i>Lepidosperma</i> sp. P1 Small Head (M.D. Tindale 166A)	Assoc	Assoc	4-opp-2
<i>Melaleuca cordata</i>	1	60	BP-18
<i>Santalum acuminatum</i>	2	250	BP-05

**Pithara to Ballidu F+V**

**Site 05**

**Described by** AS **Date** 22/05/2012 **Type** Q 10x10

**Season** P

**MGA Zone** 50 476157 mE 6617191 mN 116.751336 E -30.577420 S

**Soil** Light brown red sandy loam with mantle of lateritic pebbles

**Vegetation** Low Open Woodland of *Eucalyptus loxophleba* subsp. *supralaevis* over Tall Open Shrubland of *Acacia acuminata* over scattered *Rhagodia drummondii* over a Very Open Grassland of *Austrostipa ?nitida* and *Amphipogon caricinus* var. *caricinus* on light brown sandy loam with an open mantle of lateritic pebbles.

**Veg Condition** Good to Very Good



**SPECIES LIST:**

Name	Cover	Height	Specimen
Acacia acuarria	<1	100	05-05
Acacia acuminata	6	350	
Acacia daphnifolia	Assoc	Assoc	05-opp-01
Amphipogon caricinus var. caricinus	<1	40	BP-04
Austrostipa ? nitida	<1	40	05-03
Cryptandra apetala var. apetala	<1	50	05-02
Dianella revoluta	<1	40	
Eremophila sp.	Assoc	Assoc	05-opp-02
Eucalyptus loxophleba subsp. supralaevis	8	500	05-01
Rhagodia drummondii	1	80	05-04
Santalum acuminatum	1	200	BP-05

**Pithara to Ballidu F+V**

**Site 06**

**Described by**

AS

**Date** 22/05/2012

**Type** V

**Season** P

**MGA Zone** 50 475988 mE 6617623 mN 116.749584 E -30.573518 S

**Soil** Pale brown/orange sandy loam

**Vegetation** Closed Low succulent Heath of *Tecticornia indica* subsp. *bidens* and *Tecticornia pergranulata* subsp. *pergranulata* on pale brown-orange sandy loam on fringes of salt lake.

**Veg Condition** Degraded

Notes: Annual grasses not collected, however expect them to be weeds such as *Ehrharta* sp. or *Avena* sp.



**SPECIES LIST:**

<b>Name</b>	<b>Specimen</b>
Atriplex bunburyana	06-04
Enteropogon ramosus	06-05
Eragrostis curvula	
Tecticornia indica subsp. bidens	06-01
Tecticornia pergranulata subsp. pergranulata	06-02

**Pithara to Ballidu F+V**

**Site 07**

**Described by**

AS

**Date** 22/05/2012 **Type** V

**Season** P

**MGA Zone** 50 474618 **mE** 6620471 **mN** 116.735366 **E** -30.547790 **S**

**Soil** Light brown orange sandy loam

**Vegetation** Low Open Woodland of *Eucalyptus loxophleba* subsp. *supralaevis* over Tall Open Shrubland of *Acacia acuminata* over *Acacia acuarria* and *Acacia ?anthochaera* over a Low Shrubland of *Rhagodia drummondii* and *?Maireana brevifolia* over a Very Open Grassland of *Austrostipa ?nitida* on light brown-orange sandy loam.

**Veg Condition** Good



**SPECIES LIST:**

<b>Name</b>	<b>Cover</b>
Acacia ? anthochaera	07-01
Acacia acuarria	05-05
Acacia acuminata	07-02
Acacia sp.	Assoc
Austrostipa ? nitida	05-03
Dodonaea bursariifolia	07-04
Eucalyptus leptopoda subsp. arctata	Assoc
Eucalyptus loxophleba subsp. supralaevis	05-01
Maireana ? brevifolia	07-03
Ptilotus polystachyus	Assoc
Rhagodia drummondii	05-04
Solanum lasiophyllum	Assoc

**Pithara to Ballidu F+V**

**Site 08**

**Described by** AS **Date** 22/05/2012 **Type** Q 10x10

**Season** P

**MGA Zone** 50 472788 mE 6623944 mN 116.716378 E -30.516411 S

**Soil** Pale brown sandy loam with surface concretions, salty

**Vegetation** Tall Shrubland of *Melaleuca lateriflora* over a Low Shrubland of *Sclerolaena ?diacantha*, *Atriplex bunburyana* and *Rhagodia drummondii* with *Tecticornia indica* subsp. *bidens* and *Tecticornia pergranulata* subsp. *pergranulata* on pale brown sandy loam with surface salt crusting.

**Veg Condition** Good



**SPECIES LIST:**

<b>Name</b>	<b>Cover</b>	<b>C Class</b>	<b>Height</b>
? Thyridolepis sp.	<1	50	08-03
Atriplex bunburyana	2	40	06-04
Gunnopsis ? quadrifida	1	30	08-02
Melaleuca lateriflora	15	300	08-01
Rhagodia drummondii	1	25	05-04
Sclerolaena diacantha	5	45	08-06
Tecticornia indica subsp. bidens	<1	45	08-05
Tecticornia pergranulata subsp. pergranulata	<1	40	08-04

**Pithara to Ballidu F+V**

**Site 09**

**Described by** AS **Date** 22/05/2012 **Type** Q 10x10

**Season** P

**MGA Zone** 50 472562 mE 6624119 mN 116.714027 E -30.514826 S

**Soil** Light brown sand

**Vegetation** Low Open Woodland of *Eucalyptus loxophleba* subsp. *supralaevis* over scattered *Acacia eremaea* and *Melaleuca hamata*, with *Melaleuca hamata* becoming dominant in patches over Low Shrubland of *Rhagodia drummondii* and *Tecticornia indica* subsp. *bidens* on light brown sand in association with salt lakes.

**Veg Condition** Good to Very Good

**Notes** Salt lake edge



**SPECIES LIST:**

<b>Name</b>	<b>Cover</b>	<b>Height</b>	<b>Specimen</b>
Acacia acuaria	<1	150	05-05
Acacia eremaea	2	200	09-03
Conostylis aculeata subsp. bromelioides	1	20	09-02
Dianella revoluta	<1	45	
Enchylaena tomentosa var. tomentosa	Assoc	Assoc	09-opp-02
Eucalyptus loxophleba subsp. supralaevis	40	700	05-01
Gunnioopsis ? quadrifida	<1	20	08-02
Melaleuca hamata	Assoc	Assoc	09-opp-01
Melaleuca lateriflora	Assoc	Assoc	08-01
Rhagodia drummondii	5	60	05-04
Sarcozona praecox	<1	25	09-01
Tecticornia indica subsp. bidens	15	40	08-05

**Pithara to Ballidu F+V**

**Site 10**

**Described by** AS **Date** 22/05/2012 **Type** Q 10x10

**Season** P

**MGA Zone** 50 471195 mE 6626471 mN 116.699845 E -30.493571 S

**Soil** Pale brown sand

**Vegetation** Tall Shrubland of *Acacia eremaea* and *Santalum acuminatum* over a Shrubland of *Melaleuca hamata* over a Low Shrubland of *Leptospermum erubescens*, *Calytrix* sp. and *Cryptandra* sp. over a Very Open Grassland of *Austrostipa ?nitida* on pale brown sand.

**Veg Condition** Very Good



**SPECIES LIST:**

Name	Cover	Height	Specimen
? <i>Cryptandra</i> sp.	10	75	10-03
? <i>Thyridolepis</i> sp.	Assoc	Assoc	08-03
<i>Acacia acuarua</i>	2	100	05-05
<i>Acacia eremaea</i>	20	500	09-03
<i>Austrostipa ? nitida</i>	<1	20	05-03
<i>Calytrix</i> sp.	1	60	
<i>Dianella revoluta</i>	Assoc	Assoc	
<i>Lepidosperma</i> sp.	<1	10	10-04
<i>Leptospermum erubescens</i>	<1	65	10-01
<i>Melaleuca hamata</i>	20	200	09-opp-01
<i>Olearia homolepis</i>	<1	50	10-02
<i>Santalum acuminatum</i>	2	400	BP-05

**Pithara to Ballidu F+V**

**Site 11**

**Described by** AS **Date** 22/05/2012 **Type** Q 10x10

**Season** P

**MGA Zone** 50 470380 mE 6627789 mN 116.691390 E -30.481657 S

**Soil** Light brown orange clay loam

**Rock Type**

**Vegetation** Tall Open Scrub of *Grevillea ?armigera* and *Santalum acuminatum* over a Low Open Shrubland of *?Aluta aspera* over a Very Open Grassland of *Austrostipa ?nitida* on light brown-orange clay loam.

**Veg Condition** Good to Very Good



**SPECIES LIST:**

Name	Cover	Height	Specimen
? <i>Aluta aspera</i>	2	45	BP-20
? <i>Thyridolepis</i> sp.	1	40	08-03
<i>Atriplex bunburyana</i>	Assoc	Assoc	06-04
<i>Austrostipa ? nitida</i>	<1	40	05-03
<i>Dodonaea bursariifolia</i>	<1	180	11-01
<i>Eucalyptus erythronema</i> var. <i>marginata</i>	Assoc	Assoc	11-opp-01
<i>Eucalyptus loxophleba</i> subsp. <i>supralaevis</i>	Assoc	Assoc	05-01
<i>Grevillea ? armigera</i>	30	350	BP-21
<i>Santalum acuminatum</i>	50	250	BP-05

**Pithara to Ballidu F+V**

**Site 12**

**Described by** AS **Date** 22/05/2012 **Type** Q 10x10

**Season** P

**MGA Zone** 50 468065 mE 6636750 mN 116.667545 E -30.400736 S

**Soil** Light brown clay loam with surface concretions and lichens

**Vegetation** Low Open Woodland of *Eucalyptus loxophleba* subsp. *supralaevis* over a Tall Shrubland of *Acacia ?ligustrina* with occasional *Acacia acuminata* over an Open Shrubland of *Dodonaea ?inaequifolia* over a Low Open Shrubland of *Sclerolaena ?diacantha* on light brown clay loam with surface concretions and lichens.

**Veg Condition** Good to Very Good



**SPECIES LIST:**

Name	Cover	Height	Specimen
Acacia ? ligustrina	20	250	12-03
Acacia acuaria	<1	150	12-01
Acacia acuminata	1	400	07-02
Acacia daphnifolia	1	300	05-opp-01
Dodonaea ? inaequifolia	5	150	12-02
Eucalyptus loxophleba subsp. supralaevis	10	550	05-01
Sclerolaena diacantha	2	20	08-06

**Pithara to Ballidu F+V**

**Site 13**

**Described by** AS **Date** 22/05/2012 **Type** Q 10x10

**Season** P

**MGA Zone** 50 472383 mE 6624478 mN 116.712171 E -30.511583 S

**Soil** Very pale brown sandy clay

**Vegetation** Closed Low succulent Heath of *Tecticornia ?halocnemoides* and *Tecticornia indica* subsp. *bidens* with occasional scattered shrubs of *Acacia eremaea* in association with salt lakes.

**Veg Condition** Very Good

**Notes** Succulent low shrubland in association with salt lakes



**SPECIES LIST:**

<b>Name</b>	<b>Cover</b>	<b>Height</b>	<b>Specimen</b>
? <i>Gunniopsis</i> sp.	Assoc	15	13-opp-02
<i>Acacia eremaea</i>	Assoc	300	13-opp-01
<i>Gunniopsis</i> ? <i>quadrifida</i>	Assoc	10	08-02
<i>Maireana</i> sp.	<1	10	13-02
<i>Sarcosua praecox</i>	<1	10	09-01
<i>Tecticornia</i> ? <i>halocnemoides</i>	70	40	13-01
<i>Tecticornia indica</i> subsp. <i>bidens</i>	10	60	06-01

**Pithara to Ballidu F+V**

**Site 14**

**Described by** AS **Date** 23/05/2012 **Type** Q 10x10

**Season** P

**MGA Zone** 50 470125 mE 6628221 mN 116.688746 E -30.477753 S

**Soil** Very pale brown sandy loam

**Vegetation** Tree Mallee of *Eucalyptus horistes* over scattered patches of tall shrubs of *Acacia ?coolgardiensis* over an Open Heath of *Acacia ?dissona var. indoloria* (P3) and *Melaleuca laxiflora* over a Very Open Sedgeland of *Dianella revoluta* and *Gahnia drummondii* on pale brown sandy loam.

**Veg Condition** Good to Very good



**SPECIES LIST:**

Name	Cover	Height	Specimen
Acacia ? coolgardiensis	Assoc	500	14-opp-01
Acacia ? dissona var. indoloria	30	120	14-02
Acacia acuarria	<1	80	05-05
Acacia ericksoniae	<1	80	14-03
Avena barbata	Assoc		
Daviesia hakeoides subsp. subnuda	<1	50	BP-19
Dianella revoluta	<1	50	
Dodonaea bursariifolia	15	100	14-04
Enchylaena tomentosa var. tomentosa	Assoc	Assoc	09-opp-02
Eucalyptus horistes	50	500	14-01
Gahnia drummondii	<1	20	BP-02

**Pithara to Ballidu F+V**

**Site 15**

**Described by** AS **Date** 23/05/2012 **Type** Q 10x10

**Season** P

**MGA Zone** 50 468698 mE 6630225 mN 116.673939 E -30.459633 S

**Soil** Red brown Sand with salt crusting on surface

**Vegetation** Tall Open Scrub of *Melaleuca lateriflora* over a Low succulent Shrubland of *Tecticornia ?halocnemoides* and *Tecticornia indica* subsp. *bidens* on red brown sand with surface salt crusting.

**Veg Condition** Degraded



**SPECIES LIST:**

<b>Name</b>	<b>Cover</b>	<b>Height</b>	<b>Specimen</b>
Eucalyptus loxophleba subsp. supralaevis	Assoc	Assoc	05-01
Melaleuca lateriflora	41	200	08-01
Tecticornia ? halocnemoides	20	40	13-01
Tecticornia indica subsp. bidens	1	40	16-01

**Pithara to Ballidu F+V**

**Site 16**

**Described by** AS **Date** 22/05/2012 **Type** Q 10x10

**Season** P

**MGA Zone** 50 468302 mE 6631029 mN 116.669838 E -30.452367 S

**Soil** Pale brown loamy sand with a light quartz mantle

**Vegetation** Open Tree Mallee of *Eucalyptus horistes* with occasional patches where *Allocasuarina acutivalvis* subsp. *acutivalvis* becomes dominant, over a Tall Shrubland of *Santalum acuminatum* over an Open Heath of *Melaleuca cordata* with *Grevillea ?hakeoides* subsp. *stenophylla* over a Low Open Shrubland of *Melaleuca conothamnoides* over a Very Open Sedgeland of *Ecdeiocolea monostachya* on pale brown loamy sand with scattered quartz mantle.

**Veg Condition** Very Good

**Notes** occasional patches where *Allocasuarina* sp replaces mallee as dominant



**SPECIES LIST:**

Name	Cover	Height	Specimen
? <i>Aluta aspera</i>	1	80	BP-20
<i>Acacia ? lasiocalyx</i>	Assoc	Assoc	16-opp-02
<i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i>	Assoc	Assoc	04-01
<i>Allocasuarina campestris</i>	Assoc	Assoc	04-04
<i>Austrostipa ? nitida</i>	<1	40	05-03
<i>Daviesia nudiflora</i> subsp. <i>nudiflora</i>	Assoc	Assoc	04-03
<i>Dianella revoluta</i>	<1	40	
<i>Ecdeiocolea monostachya</i>	1	60	
<i>Eucalyptus horistes</i>	20	500	14-01
<i>Grevillea ? hakeoides</i> subsp. <i>stenophylla</i>	2	120	16-02
<i>Grevillea petrophiloides</i> subsp. <i>petrophiloides</i>	Assoc	Assoc	16-opp-03
<i>Hakea ? erecta</i>	Assoc	Assoc	16-opp-01
<i>Hibbertia nutans</i>	Assoc	Assoc	BP-31
<i>Hibbertia</i> sp.	Assoc	Assoc	BP-32
<i>Maireana brevifolia</i>	Assoc	Assoc	16-opp-04
<i>Melaleuca atroviridis</i>	Assoc	Assoc	BP-01
<i>Melaleuca conothamnoides</i>	5	60	16-03
<i>Melaleuca cordata</i>	40	100	BP-18
<i>Melaleuca laxiflora</i>	<1	100	BP-10
Myrtaceae sp.	Assoc	Assoc	BP-09
<i>Petrophile ? drummondii</i>	<1	120	16-01
<i>Santalum acuminatum</i>	20	250	BP-05

**Pithara to Ballidu F+V**

**Site 17**

**Described by** AS **Date** 24/05/2012 **Type** Q 10x10

**Season** P

**MGA Zone** 50 468033 mE 6636925 mN 116.667217 E -30.399156 S

**Soil** Pale brown sandy clay with surface concretion and lichens

**Vegetation** Tree Mallee of *Eucalyptus ?celastroides* subsp. *virella* over a Tall Shrubland of *Melaleuca acuminata* subsp. *websteri* over an Open Shrubland of *Melaleuca coronicarpa* over a Low Open Shrubland of *Olearia muelleri* over a Very Open Herbland of *Borya constricta* on pale brown sany clay with surface concretion and lichens.

**Veg Condition** Very Good to Excellent

**Notes** Looks like there would be a herbland of annuals in spring



**SPECIES LIST:**

Name	Cover	Height	Specimen
<i>Borya constricta</i>	<1	10	BP-08
<i>Dodonaea ? inaequifolia</i>	<1	130	12-02
<i>Eucalyptus ? celastroides</i> subsp. <i>virella</i>	50	900	17-04
<i>Melaleuca acuminata</i> subsp. <i>websteri</i>	15	250	17-01
<i>Melaleuca coronicarpa</i>	5	180	17-02
<i>Olearia muelleri</i>	5	60	17-03
<i>Santalum acuminatum</i>	Assoc	Assoc	BP-05

**Pithara to Ballidu F+V**

**Site 18**

**Described by** AS **Date** 24/05/2012 **Type** Q 10x10

**Season** P

**MGA Zone** 50 467351 mE 6634890 mN 116.660054 E -30.417501 S

**Soil** Pale brown gritty ironstone and quartz mantle ~10%, surface concretion

**Vegetation** Tall Shrubland of *Grevillea* sp. with scattered *Melaleuca acuminata* subsp. *websteri* over an Open Heath of *Allocasuarina campestris*, *Grevillea ?levis* and *Hakea scoparia* subsp. *scoparia* over an Open Grassland of *Austrostipa ?nitida* with scattered *Ecdeiocolea monostachya* on pale brown sandy clay with ironstone and quartz mantle and surface concretions.

**Veg Condition** Very Good to Excellent



**SPECIES LIST:**

Name	Cover	Height	Specimen
Acacia ? dissona var. indoloria	<1	90	14-02
Acacia acuminata	Assoc	Assoc	18-07
Acacia eremaea	Assoc	Assoc	13-opp-01
Allocasuarina campestris	15	140	04-04
Austrostipa ? nitida	40	15	05-03
Baeckea ? crispiflora	1	85	18-05
Borya constricta	1	10	BP-08
Cassylia sp.	Assoc	Assoc	18-08
Dianella revoluta	Assoc	Assoc	
Ecdeiocolea monostachya	1	40	
Gahnia drummondii	<1	40	18-01
Grevillea ? levis	10	100	18-03
Grevillea sp.	Assoc	Assoc	18-06
(this spp dom in comm just not in quad)			
Haemodorum discolor	<1	60	18-02
Hakea scoparia subsp. scoparia	5	190	18-04
Melaleuca acuminata subsp. websteri	2	200	17-01
Melaleuca atroviridis	Assoc	Assoc	BP-01
Melaleuca coronicarpa	<1	80	17-02
Persoonia ruffiflora	Assoc	Assoc	18-09

**Pithara to Ballidu F+V**

**Site 19**

**Described by**

AS

**Date** 24/05/2012 **Type** V

**Season** P

**MGA Zone** 50 468443 mE 6631661 mN 116.671326 E -30.446668 S

**Soil** Brown loamy sand

**Vegetation** Low Woodland of *Eucalyptus loxophleba* subsp. *supralaevis* with occasional *Eucalyptus erythronema* var. *marginata* over a scattered Tall Shrubland of *Melaleuca lateriflora*, *Melaleuca hamata* and *Melaleuca atroviridis* over an Open Low Heath of *Sarcocornia quinqueflora*, *Maireana brevifolia*, *Enchylaena tomentosa* subsp. *tomentosa* and *Tecticornia indica* subsp. *bidens* on brown sandy loam.

**Veg Condition** Good



**SPECIES LIST:**

Name	Specimen
Acacia acuaria	12-01
Acacia acuminata	07-02
Avena barbata	
Eremophila papillata	19-03
Eucalyptus erythronema var. marginata	11-opp-01
Eucalyptus loxophleba subsp. supralaevis	05-01
Exocarpos aphyllus	19-02
Maireana brevifolia	16-opp-04
Melaleuca atroviridis	
Melaleuca hamata	
Melaleuca lateriflora	08-01
Rhagodia drummondii	
Sarcocornia quinqueflora	19-01
Sclerolaena diacantha	

**Pithara to Ballidu F+V**

**Site 20**

**Described by**

AS

**Date** 24/05/2012 **Type** V

**Season** P

**MGA Zone** 50

468422 mE

6630307 mN

116.671066 E

-30.458886 S

**Vegetation** Closed Tall Scrub of *Melaleuca lateriflora* and *Melaleuca hamata* over *Atriplex bunburyana*.

**Veg Condition**



**SPECIES LIST:**

**Name**

*Atriplex bunburyana*

*Melaleuca hamata*

*Melaleuca lateralis*

**Pithara to Ballidu F+V**

**Site 21**

**Described by**

AS

**Date** 24/05/2012 **Type** V

**Season** P

**MGA Zone** 50 471507 mE 6626025 mN 116.703084 E -30.497603 S

**Soil** Brown sandy loam with white surface

**Vegetation** Tall Open Scrub of *Melaleuca lateriflora* and *Acacia eremaea* over an Open Low Heath of *Tecticornia indica* subsp. *bidens* and *Sclerolaena ?diacantha* on pale brown sandy loam with surface salt crusting.

**Veg Condition** Very Good



**SPECIES LIST:**

<b>Name</b>	<b>Specimen</b>
? <i>Gunniopsis</i> sp.	13-opp-02
? <i>Thyridolepis</i> sp.	08-03
<i>Acacia eremaea</i>	13-opp-01
<i>Melaleuca lateriflora</i>	08-01
<i>Melaleuca thyoides</i>	21-01
<i>Sclerolaena diacantha</i>	
<i>Tecticornia indica</i> subsp. <i>bidens</i>	21-02

**Pithara to Ballidu F+V**

**Site 22**

**Described by** AS **Date** 24/05/2012 **Type** Q 10x10

**Season** P

**MGA Zone** 50 473401 mE 6622928 mN 116.722741 E -30.525593 S

**Soil** pale brown sand

**Vegetation** Tall Shrubland of *Acacia* sp. with scattered *Acacia acuminata* and *Melaleuca thyoides* over a Closed Low Heath of *Darwinia diosmoides* over scattered *Gunniopsis ?quadrifida* on pale brown sand in association with salt lake.

**Veg Condition** Very Good



**SPECIES LIST:**

Name	Cover	Height	Specimen
? Thyridolepis sp.	Assoc	Assoc	08-03
Acacia acuminata	Assoc	Assoc	07-02
Acacia sp.	20	200	22-02
Darwinia diosmoides	70	60	22-01
Eucalyptus rigidula	Assoc	Assoc	22-opp-02
Gunniopsis ? quadrifida	3	10	08-02
Melaleuca thyoides	<1	200	21-01
Mirbelia ramulosa	Assoc	Assoc	22-opp-01
Rhagodia drummondii	Assoc	Assoc	

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## Appendix G

# DAFWA Recommended Control Measures for Skeleton Weed (*Chondrilla juncea*)

## Skeleton weed (*Chondrilla juncea*)



### Declaration

(Code: C= City; S=Shire; T=Town)

**Category :** P1; P2

**Location :** For the whole of the State

Standard Control Codes (these may vary for individual plants)	
<p><b>P1 REQUIREMENTS</b> Prohibits movement</p>	<p>The movement of plants or their seeds is prohibited within the State. This prohibits the movement of contaminated machinery and produce including livestock and fodder.</p>
<p><b>P2 REQUIREMENTS</b> Aim is to eradicate infestation</p>	<p>Treat all plants to destroy and prevent propagation each year until no plants remain. The infested area must be managed in such a way that prevents the spread of seed or plant parts on or in livestock, fodder, grain, vehicles and/or machinery.</p>



<p><b>P3 REQUIREMENTS</b> Aims to control infestation by reducing area and/or density of infestation</p>	<p>The infested area must be managed in such a way that prevents the spread of seed or plant parts within and from the property on or in livestock, fodder, grain, vehicles and/or machinery.</p> <p>Treat to destroy and prevent seed set all plants:</p> <ul style="list-style-type: none"> <li>• within 100 metres inside of the boundaries of the infestation</li> <li>• within 50 metres of roads and high-water mark on waterways</li> <li>• within 50 metres of sheds, stock yards and houses</li> </ul> <p>Treatment must be done prior to seed set each year.</p> <p>Of the remaining infested area:-</p> <p>Where plant density is 1-10 per hectare treat 100% of infestation. Where plant density is 11-100 per hectare treat 50% of infestation. Where plant density is 101-1000 per hectare treat 10% of infestation.</p> <p>Properties with less than 2 hectares of infestation must treat the entire infestation.</p> <p>Additional areas may be ordered to be treated.</p>
--	--

### Report any plants to the Department of Agriculture

All plants found must be reported immediately to Agriculture Western Australia or District Agriculture Protection officers to be dealt with under the Skeleton Weed Eradication Project.

### Control Method

#### Wheat

<b>Pre-seeding</b>	
• Paraquat 135 g/L + Diquat 115 g/L	• 1.0 L to 2.0. L
<b>In Crop - Early post emergence</b> (four leaf stage to early tillering)	
• clopyralid (300 g/L) or 750 g/kg + metsulfuron methyl (600 g/kg) + MCPA amine (500 g/L)	• 300 mL (or use 120 g of 750 g/kg) + 3g + 500 mL
<b>Late post emergence</b> From first node to flag leaf just visible	
• clopyralid (300 g/L) or 750 g/kg + MCPA amine/LV ester (500 g/L)	• 500 mL (or use 200 g of 750 g/kg) + 1 L

#### Barley

<b>Pre-seeding</b>	
• Paraquat 135 g/L + Diquat 115 g/L	• 1.0 L to 2.0. L
<b>In Crop - Early post emergence</b> (four leaf stage to early tillering)	
• clopyralid (300 g/L) or 750 g/kg + metsulfuron methyl (600 g/kg) + MCPA amine (500 g/L)	• 300 mL (or use 120 g of 750 g/kg) + 3g + 500 mL
<b>Late post emergence</b> From first node to flag leaf just visible	
• clopyralid (300 g/L) or 750 g/kg + MCPA amine/ester (500 g/L)	• 500 mL (or use 200 g of 750 g/kg) + 1 L



### Oats

<b>Pre-seeding</b>	
• Paraquat 135 g/L + Diquat 115 g/L	• 1.0 L to 2.0. L
<b>In Crop - Early post emergence</b> (four leaf stage to early tillering)	
• clopyralid (300 g/L) or 750 g/kg + MCPA amine (500 g/L)	• 300 mL (or use 120 g of 750 g/kg) + 500 mL
<b>Late post emergence</b> From first node to flag leaf just visible	
• clopyralid (300 g/L) or 750 g/kg + MCPA amine/ester (500 g/L)	• 500 mL (or use 200 g of 750 g/kg) + 1 L

### Canola

<b>Pre-seeding</b>	
• Paraquat 135 g/L + Diquat 115 g/L	• 1.0 L to 2.0. L
<b>In Crop - Early post emergence</b> (two to eight leaves)	
• clopyralid (300 g/L or 750 g/kg)	• 300 mL (or use 120 g of 750 g/kg)

### Lupins

<b>Pre-seeding</b>	
• glyphosate (various formulations) • Paraquat 135 g/L + Diquat 115 g/L	• Use rate recommended for other crop weeds • 1 to 2 L
<b>In Crop - Early post emergence</b> (two to six leaves & plants 4 to 10 cm high)	
• (500 g/L diflufenican) Various trade names	• 200 mL

### Pasture

<b>Winter</b>	
<b>Early treatment</b> (clover at least 3 leaf stage)	
• MCPA (250 g/L) + diflufenican (25 g/L) (eg. Tigrex/Nugrex) • (500 g/L diflufenican) various trade names	• 1 L • 200 mL
<b>Late treatment</b> (clover with more than 6 leaves and skeleton weed still as rosettes) Will damage clovers.	
• 2,4-D amine (500 g/L)	• 1.8 L
<b>Permanent i.e. Light land no cropping</b>	
• Clopyralid (300 g/L) or (750 g/kg) + MCPA/2,4-D amine 500	• 500 mL (or use 200 g of 750 g/kg) + 1 L
<b>Summer (for prevention of seed set in all crops &amp; pasture)</b>	
<b>Flowering Plants</b>	
• Paraquat 135 g/L + Diquat 115 g/L (glyphosate (450 g/L) - For non flowering plants) + 2,4-D ester (600 or 680 g/L) or (600 g/L)	• 1 L to 2 L • 0.5 L to 1.5 L + 0.6 L(680) or 0.7 L(600 g/L)



Active ingredient of glyphosate	Conversion Rates for different formulations of glyphosate L /ha				
	0.25	0.50	1	1.5	2
360	0.25	0.50	1	1.5	2
450	0.2	0.40	0.80	1.2	1.6
470	0.19	0.38	0.77	1.15	1.53
490	0.18	0.37	0.73	1.10	1.47
500	0.18	0.36	0.72	1.08	1.44
540	0.17	0.33	0.66	1.0	1.33
600	0.15 kg	0.30 kg	0.60 kg	0.90 kg	1.20 kg
680	0.13 kg	0.26 kg	0.53 kg	0.79 kg	1.07 kg
690	0.13 kg	0.26 kg	0.52 kg	0.78 kg	1.04 kg
700	0.13 kg	0.26 kg	0.51 kg	0.77 kg	1.03 kg
840	0.11 kg	0.21 kg	0.43 kg	0.64 kg	0.87 kg

## Weed Description

**Family** : Asteraceae  
**Form** : Herbaceous – Perennial  
**Status** : Present in WA

Native to southern Europe, the Mediterranean and south-west Asia. Relatively long-lived perennial with a deep tap root; stems and roots exude white latex when damaged.

- Stems** : Single stem to each rosette, 50 cm - 125 cm tall, with numerous branches. The stems and branches are hairless except for a few rigid hairs at the base of the stem.
- Leaves** : Hairless, initially produced as many-leaved rosettes. Rosette leaves are spear shaped; 40-120 mm long and 15-45 mm wide, and can often be purple in colour. Leaf margins are deeply toothed with the lobes pointing backwards towards the base. Smaller leaves are sometimes borne amongst the branches of flowering stems.
- Flowers** : Numerous, bright yellow heads, each with 9-12 florets. Heads can be solitary or in groups of 2-5 and are attached directly on the branch.
- Seed** : Brown, 3-4 mm long with numerous shallow ribs. Each seed carries a pappus of white bristles, 5-8 mm long.

## Other relevant information related to this topic:

- [Quarantine WA](#)
- [Permitted and quarantine species list](#)
- [A guide for skeleton weed management and control](#)
- [Skeleton weed in Western Australia : pocket guide](#)
- [Skeleton weed \(Chondrilla juncea L.\): best practice management guidelines](#)
- [Permit for minor off-label-use of a registered agvet chemical product](#)  
(Permit number – per9655)
- [Off-label permit \(olp\) for use of a registered agvet chemical product](#)  
(Permit number - per4590)
- [Off-label permit \(olp\) for use of a registered agvet chemical product](#)  
(Permit number – per8860)

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Appendix H

# EPBC Act Protected Matters Report



# 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 about the EPBC Act including significance guidelines, forms and application process details can be found at <http://www.environment.gov.au/epbc/assessmentsapprovals/index.html>

Report created: 02/05/12 14:12:28

[Summary](#)

[Details](#)

[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

[Coordinates](#)  
 Buffer: 1.0Km



## Summary

### Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance - see <http://www.environment.gov.au/epbc/assessmentsapprovals/guidelines/index.html>

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	None
<a href="#">Wetlands of International</a>	None
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Areas:</a>	None
<a href="#">Threatened Ecological Communities:</a>	None
<a href="#">Threatened Species:</a>	23
<a href="#">Migratory Species:</a>	8

## Other Matters Protected by the EPBC Act

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

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

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

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species. Information on EPBC Act permit requirements and application forms can be found at <http://www.environment.gov>.

<a href="#">Commonwealth Lands:</a>	1
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	5
<a href="#">Whales and Other Cetaceans:</a>	None
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves:</a>	None

## Extra Information

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

<a href="#">Place on the RNE:</a>	None
<a href="#">State and Territory Reserves:</a>	1
<a href="#">Regional Forest Agreements:</a>	None
<a href="#">Invasive Species:</a>	9
<a href="#">Nationally Important Wetlands:</a>	None

## Details

### Matters of National Environmental Significance

Threatened Species		[ Resource Information ]
Name	Status	Type of Presence
<b>BIRDS</b>		
<a href="#">Leipoa ocellata</a>		
Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
<a href="#">Rostratula australis</a> Australian Painted Snipe [77037]	Vulnerable	Species or species habitat may occur within area
<b>PLANTS</b>		
<a href="#">Acacia cochlocarpa subsp. velutinos</a> Velvety Spiral Pod Wattle [65112]	Critically Endangered	Species or species habitat likely to occur within area
<a href="#">Chorizema humile</a> Prostrate Flame Pea [32573]	Endangered	Species or species habitat likely to occur within area
<a href="#">Daviesia euphorbioides</a> Wongan Cactus [3477]	Endangered	Species or species habitat may occur within area
<a href="#">Drakonorchis drakeoides</a> [67353]	Endangered	Species or species habitat likely to occur within area
<a href="#">Eremophila pinnatifida</a> Pinnate-leaf Eremophila [64894]	Endangered	Species or species habitat may occur within area
<a href="#">Eremophila viscida</a> Vamish Bush [2394]	Endangered	Species or species habitat known to occur within area
<a href="#">Eucalyptus recta</a> [56430]	Endangered	Species or species habitat likely to occur within area
<a href="#">Frankenia conferta</a> Silky Frankenia [6074]	Endangered	Species or species habitat known to occur within area
<a href="#">Gastrolobium hamulosum</a> Hook-point Poison [9212]	Endangered	Species or species habitat may occur within area
<a href="#">Grevillea dryandroides subsp. dryandroides</a> Phalanx Grevillea [64646]	Endangered	Species or species habitat likely to occur within area
<a href="#">Grevillea dryandroides subsp. hirsuta</a> Halry Phalanx Grevillea [64577]	Endangered	Species or species habitat likely to occur within area
<a href="#">Grevillea pythara</a> Pythara Grevillea [64525]	Endangered	Species or species habitat known to occur within area
<a href="#">Gyrostemon reticulatus</a> Net-veined Gyrostemon [8491]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Hemiandra gardneri</a> Red Snakebush [7945]	Endangered	Species or species habitat may occur within area
<a href="#">Pityrodia axillaris</a> Native Foxglove, Woolly Foxglove [17376]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Rhagodia acicularis</a> Wongan Rhagodia [11145]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Rhizanthella gardneri</a> Underground Orchid, Western Australian Underground Orchid [20109]	Endangered	Species or species habitat likely to occur within area

Name	Status	Type of Presence
<a href="#">Roycea pycnophylloides</a> Saltmat [21161]	Endangered	Species or species habitat may occur within area
<a href="#">Stylidium merrallii</a> Merrall's Triggerplant [15441]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Verticordia staminosa subsp. staminosa</a> Wongan Featherflower [55825]	Endangered	Species or species habitat may occur within area

#### REPTILES

<a href="#">Egernia stokesii badia</a> Western Spiny-tailed Skink [64483]	Endangered	Species or species habitat likely to occur within area
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#### 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="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat may occur within area
<a href="#">Ardea alba</a> Great Egret, White Egret [59541]		Species or species habitat may occur within area
<a href="#">Ardea ibis</a> Cattle Egret [59542]		Species or species habitat may occur within area

#### Migratory Terrestrial Species

<a href="#">Leipoa ocellata</a> Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area

#### Migratory Wetlands Species

<a href="#">Ardea alba</a> Great Egret, White Egret [59541]		Species or species habitat may occur within area
<a href="#">Ardea ibis</a> Cattle Egret [59542]		Species or species habitat may occur within area
<a href="#">Rostratula benghalensis (sensu lato)</a> Painted Snipe [889]	Vulnerable*	Species or species habitat may occur within area

#### Other Matters Protected by the EPBC Act

##### Commonwealth Lands

[ [Resource Information](#) ]

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

##### Name

Commonwealth Land -

##### 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="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat may occur within area
<a href="#">Ardea alba</a> Great Egret, White Egret [59541]		Species or species habitat may occur within area
<a href="#">Ardea ibis</a> Cattle Egret [59542]		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="#">Rostratula benghalensis (sensu lato)</a> Painted Snipe [889]	Vulnerable*	Species or species habitat may occur within area

### Extra Information

#### State and Territory Reserves [\[ Resource Information \]](#)

Name	State
Damboring	WA

#### Invasive Species [\[ Resource Information \]](#)

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit,

Name	Status	Type of Presence
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#### Mammals

<a href="#">Capra hircus</a> Goat [2]		Species or species habitat likely to occur within area
<a href="#">Felis catus</a> Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
<a href="#">Oryctolagus cuniculus</a> Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
<a href="#">Vulpes vulpes</a> Red Fox, Fox [18]		Species or species habitat likely to occur within area

#### Plants

<a href="#">Asparagus asparagoides</a> Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
<a href="#">Carrichtera annua</a> Ward's Weed [9511]		Species or species habitat may occur within area

Name	Status	Type of Presence
<a href="#">Cenchrus ciliaris</a> Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
<a href="#">Chrysanthemoides monilifera</a> Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
<a href="#">Tamarix aphylla</a> 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

## Coordinates

-30.38416 116.67072,-30.40022 116.66834,-30.41271 116.65942,-30.45436 116.67013,  
-30.50254 116.7076,-30.51027 116.71117,-30.52158 116.72248,-30.52514 116.72366,  
-30.52752 116.72188,-30.53288 116.72188,-30.53704 116.72783,-30.54299 116.73437,  
-30.55429 116.73973,-30.56619 116.74508,-30.57095 116.74924,-30.58166 116.75341,  
-30.59296 116.76471,-30.6001 116.77244,-30.60188 116.77542,-30.60962 116.77482,  
-30.61794 116.77482,-30.61794 116.77482

## Caveat

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

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

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

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

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

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

- migratory and
- marine

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

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

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

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

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

## Acknowledgements

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

- [Department of Environment, Climate Change and Water, New South Wales](#)
- [Department of Sustainability and Environment, Victoria](#)
- [Department of Primary Industries, Parks, Water and Environment, Tasmania](#)

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

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

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Appendix I

# Nature Map Report

# NatureMap Species Report

Created By Alexandra Sleep on 14/05/2012

**Current Names Only** Yes  
**Core Datasets Only** Yes  
**Method** 'By Circle'  
**Centre** 116°43' 01" E, 30°30' 56" S  
**Buffer** 30km

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
1.	<i>Ablabesmyia notabilis</i>			
2.	4889 <i>Abutilon cryptopetalum</i>			
3.	3197 <i>Acacia aciphylla</i>			
4.	3199 <i>Acacia acuaria</i>			
5.	3200 <i>Acacia acuminata (Jam)</i>			
6.	3206 <i>Acacia aestivalis</i>			
7.	14584 <i>Acacia ancistrophylla var. ancistrophylla</i>			
8.	3216 <i>Acacia andrewsii</i>			
9.	15467 <i>Acacia assimilis subsp. assimilis</i>			
10.	3236 <i>Acacia beauverdiana (Pukkat)</i>			
11.	15471 <i>Acacia brumalis</i>			
12.	3264 <i>Acacia colletioides (Wait-a-while)</i>			
13.	15473 <i>Acacia congesta subsp. congesta</i>			
14.	14065 <i>Acacia congesta subsp. wonganensis</i>		P2	
15.	3269 <i>Acacia coolgardiensis (Spinifex Wattle)</i>			
16.	16118 <i>Acacia cracentis</i>			
17.	20435 <i>Acacia daphnifolia</i>			
18.	3285 <i>Acacia daviesioides</i>			
19.	3293 <i>Acacia denticulosa (Sandpaper Wattle)</i>		T	
20.	3301 <i>Acacia dielsii</i>			
21.	3303 <i>Acacia dilatata</i>			
22.	14619 <i>Acacia dissona var. indoloria</i>		P3	
23.	12257 <i>Acacia enervia subsp. explicata</i>			
24.	3321 <i>Acacia eremaea</i>			
25.	16020 <i>Acacia eremophila var. eremophila</i>			
26.	18194 <i>Acacia ericksoniae</i>			
27.	3324 <i>Acacia erinacea</i>			
28.	3325 <i>Acacia erioclada</i>			
29.	3342 <i>Acacia fragilis</i>			
30.	15282 <i>Acacia gibbosa</i>			
31.	3350 <i>Acacia glutinosissima</i>			
32.	3366 <i>Acacia hemiteles</i>			
33.	15286 <i>Acacia heteroneura var. petila</i>			
34.	3391 <i>Acacia jacksonioides</i>			
35.	3395 <i>Acacia jibberdingensis</i>			
36.	3408 <i>Acacia lasiocalyx (Silver Wattle)</i>			
37.	3412 <i>Acacia latipes</i>			
38.	11448 <i>Acacia leptospermoides subsp. leptospermoides</i>			
39.	3420 <i>Acacia ligustrina</i>			
40.	15477 <i>Acacia lineolata subsp. lineolata</i>			
41.	16977 <i>Acacia lirellata subsp. compressa</i>		P2	
42.	3425 <i>Acacia longiphylloidea (Long-leaved Wattle)</i>			
43.	3426 <i>Acacia longispinea</i>			
44.	3432 <i>Acacia mackeyana</i>			
45.	3439 <i>Acacia merinthophora</i>			
46.	3440 <i>Acacia merrallii</i>			
47.	3442 <i>Acacia microbotrya (Manna Wattle)</i>			
48.	3451 <i>Acacia multispicata</i>			
49.	15290 <i>Acacia neurophylla subsp. erugata</i>			
50.	15291 <i>Acacia neurophylla subsp. neurophylla</i>			
51.	15479 <i>Acacia nigripilosa subsp. nigripilosa</i>			
52.	3470 <i>Acacia orbifolia</i>			
53.	16141 <i>Acacia pravifolia</i>			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
54.	3513 <i>Acacia resinimarginea</i>			
55.	16145 <i>Acacia resinosa</i>			
56.	3515 <i>Acacia restiacea</i>			
57.	30033 <i>Acacia saligna</i> subsp. <i>lindleyi</i>			
58.	3528 <i>Acacia saxatilis</i>			
59.	14644 <i>Acacia scalena</i>		P3	
60.	3536 <i>Acacia semicircularis</i> (Wongan Wattle)		P4	
61.	3539 <i>Acacia sericocarpa</i>			
62.	3542 <i>Acacia sessilispica</i>			
63.	19153 <i>Acacia</i> sp. <i>Manmanning</i> (B.R. Maslin 7711)		P1	
64.	18615 <i>Acacia</i> sp. <i>Mullewa</i> (B.R. Maslin 4269)			
65.	18611 <i>Acacia</i> sp. <i>Petrudor Rocks</i> (B.R. Maslin 7714)		P1	
66.	20341 <i>Acacia</i> sp. <i>Wubin</i> (B.R. Maslin 4131)			
67.	29110 <i>Acacia</i> sp. <i>narrow phyllode</i> (B.R. Maslin 7831)			
68.	15484 <i>Acacia sphacelata</i> subsp. <i>sphacelata</i>			
69.	3557 <i>Acacia stenoptera</i> (Narrow Winged Wattle)			
70.	15294 <i>Acacia stereophylla</i> var. <i>stereophylla</i>			
71.	14625 <i>Acacia trinalis</i>		P1	
72.	3587 <i>Acacia ulicina</i>			
73.	15292 <i>Acacia yorkkrakensis</i> subsp. <i>acrita</i>			
74.	24559 <i>Acanthagenys rufogularis</i> (Spiny-cheeked Honeyeater)			
75.	24260 <i>Acanthiza apicalis</i> (Broad-tailed Thornbill)			
76.	24261 <i>Acanthiza chrysorrhoa</i> (Yellow-rumped Thornbill)			
77.	24265 <i>Acanthiza uropygialis</i> (Chestnut-rumped Thornbill)			
78.	1205 <i>Acanthocarpus canaliculatus</i>			
79.	25535 <i>Accipiter cirrocephalus</i> (Collared Sparrowhawk)			
80.	<i>Acercella falcipes</i>			
81.	7817 <i>Actinobole uliginosum</i> (Flannel Cudweed)			
82.	1779 <i>Adenanthos drummondii</i>			
83.	<i>Aedes camptorhynchus</i>			
84.	25544 <i>Aegotheles cristatus</i> (Australian Owlet-nightjar)			
85.	24301 <i>Aegotheles cristatus</i> subsp. <i>cristatus</i>			
86.	<i>Agraptocorixa parvipunctata</i>			
87.	185 <i>Aira cupaniana</i> (Silvery Hairgrass)	Y		
88.	1720 <i>Allocasuarina acutivalvis</i>			
89.	13904 <i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i>			
90.	13905 <i>Allocasuarina acutivalvis</i> subsp. <i>prinsepiana</i>			
91.	1721 <i>Allocasuarina campestris</i>			
92.	1722 <i>Allocasuarina corniculata</i>			
93.	1726 <i>Allocasuarina drummondiana</i>			
94.	1734 <i>Allocasuarina microstachya</i>			
95.	<i>Allodessus bistrigatus</i>			
96.	4905 <i>Alyogyne hakeifolia</i>			
97.	6565 <i>Alyxia buxifolia</i> (Dysentery Bush)			
98.	13380 <i>Amphibromus nervosus</i>			
99.	196 <i>Amphipogon caricinus</i> (Long Greybeard Grass)			
100.	12025 <i>Amphipogon caricinus</i> var. <i>caricinus</i>			
101.	199 <i>Amphipogon strictus</i> (Greybeard Grass)			
102.	24310 <i>Anas castanea</i> (Chestnut Teal)			
103.	24312 <i>Anas gracilis</i> (Grey Teal)			
104.	24315 <i>Anas rhynchotis</i> (Australasian Shoveler)			
105.	24316 <i>Anas superciliosa</i> (Pacific Black Duck)			
106.	7831 <i>Angianthus micropodioides</i>		P3	
107.	7836 <i>Angianthus tomentosus</i> (Camel-grass)			
108.	<i>Anisops hyperion</i>			
109.	<i>Anisops thienemanni</i>			
110.	11454 <i>Anthocercis anisantha</i> subsp. <i>anisantha</i>			
111.	24561 <i>Anthochaera carunculata</i> (Red Wattlebird)			
112.	6952 <i>Anthotroche pannosa</i> (Felted Anthotroche)			
113.	<i>Antiporus gilberti</i>			
114.	<i>Apocyclops dengizicus</i>			
115.	24285 <i>Aquila audax</i> (Wedge-tailed Eagle)			
116.	7838 <i>Arctotheca calendula</i> (Cape Weed)	Y		
117.	24610 <i>Ardeotis australis</i> (Australian Bustard)		P4	
118.	7842 <i>Argyroglottis turbinata</i>			
119.	207 <i>Aristida contorta</i> (Bunched Kerosene Grass)			
120.	<i>Arrenurus</i> sp.			
121.	25566 <i>Artamus cinereus</i> (Black-faced Woodswallow)			
122.	24353 <i>Artamus cyanopterus</i> (Dusky Woodswallow)			
123.	1266 <i>Arthropodium dyeri</i>			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
124.	25236 <i>Aspidites ramsayi</i> (Woma)		S	
125.	5331 <i>Astartea heteranthera</i>			
126.	6336 <i>Astroloma serratifolium</i> (Kondrung)			
127.	11489 <i>Atriplex acutibractea</i> subsp. <i>karoniensis</i>			
128.	2459 <i>Atriplex holocarpa</i> (Pop Saltbush)			
129.	2475 <i>Atriplex semibaccata</i> (Berry Saltbush)			
130.	2476 <i>Atriplex semilunaris</i> (Annual Saltbush)			
131.	2479 <i>Atriplex stipitata</i> (Mallee Saltbush)			
132.	2481 <i>Atriplex vesicaria</i> (Bladder Saltbush)			
133.	<i>Australocypris insularis</i>			
134.	<i>Austrolestes aridus</i>			
135.	17232 <i>Austrostipa blackii</i>		P3	
136.	17237 <i>Austrostipa elegantissima</i>			
137.	17239 <i>Austrostipa exilis</i>			
138.	17240 <i>Austrostipa flavescens</i>			
139.	17241 <i>Austrostipa hemipogon</i>			
140.	17246 <i>Austrostipa nitida</i>			
141.	17255 <i>Austrostipa trichophylla</i>			
142.	17257 <i>Austrostipa variabilis</i>			
143.	231 <i>Avellinia michelii</i>	Y		
144.	233 <i>Avena barbata</i> (Bearded Oat)	Y		
145.	24318 <i>Aythya australis</i> (Hardhead)			
146.	5341 <i>Baeckea crispiflora</i>			
147.	5346 <i>Baeckea floribunda</i>			
148.	5356 <i>Baeckea muricata</i>			
149.	36016 <i>Baeckea</i> sp. <i>Burakin</i> (M.E. & M.E. Trudgen 1423)			
150.	36061 <i>Baeckea</i> sp. <i>Dudawa</i> (M.E. Trudgen MET 5369)			
151.	36063 <i>Baeckea</i> sp. <i>Wanarra</i> (M.E. Trudgen MET 5376)			
152.	16738 <i>Baeckea</i> sp. <i>Wubin</i> (M.E. Trudgen 5404)			
153.	20455 <i>Baeckea</i> sp. <i>fine-leaved</i> (C.M. Lewis 517)			
154.	1804 <i>Banksia benthamiana</i>		P4	
155.	1842 <i>Banksia prionotes</i> (Acorn Banksia)			
156.	32136 <i>Banksia purdieana</i>			
157.	32315 <i>Barbula calycina</i>			
158.	17761 <i>Beaufortia aestiva</i>			
159.	5378 <i>Beaufortia bracteosa</i>			
160.	5386 <i>Beaufortia interstans</i>			
161.	<i>Bennelongia barangaroo</i>			
162.	<i>Berosus</i> sp.			
163.	<i>Bezzia</i> sp. 2			
164.	7856 <i>Blennospora drummondii</i>			
165.	7857 <i>Blennospora phlegmatocarpa</i>			
166.	<i>Boeckella triarticulata</i>			
167.	11498 <i>Boronia coerulescens</i> subsp. <i>spicata</i>			
168.	11274 <i>Boronia coerulescens</i> subsp. <i>spinescens</i>			
169.	4418 <i>Boronia ericifolia</i>		P2	
170.	1267 <i>Borya constricta</i>			
171.	1269 <i>Borya laciniata</i>			
172.	1273 <i>Borya sphaerocephala</i> (Pincushions)			
173.	3706 <i>Bossiaea concinna</i>		P3	
174.	3715 <i>Bossiaea peduncularis</i>			
175.	<i>Brachionus plicatilis</i> s.l.			
176.	8661 <i>Brachypodium distachyon</i> (False Brome)	Y		
177.	7871 <i>Brachyscome ciliaris</i>			
178.	7878 <i>Brachyscome iberidifolia</i>			
179.	7880 <i>Brachyscome lineariloba</i>			
180.	7882 <i>Brachyscome perpusilla</i>			
181.	16823 <i>Brachyscome perpusilla</i> var. <i>tenella</i>			
182.	7883 <i>Brachyscome pusilla</i>			
183.	25333 <i>Brachyurophus fasciolata</i> subsp. <i>fasciolata</i>			
184.	25245 <i>Brachyurophus semifasciata</i>			
185.	3000 <i>Brassica tournefortii</i> (Mediterranean Turnip)	Y		
186.	244 <i>Briza maxima</i> (Blowfly Grass)	Y		
187.	247 <i>Bromus arenarius</i> (Sand Brome)			
188.	249 <i>Bromus diandrus</i> (Great Brome)	Y		
189.	252 <i>Bromus madritensis</i> (Madrid Brome)	Y		
190.	253 <i>Bromus rubens</i> (Red Brome)	Y		
191.	1366 <i>Bulbine semibarbata</i> (Leek Lily)			
192.	24359 <i>Burhinus grallarius</i> (Bush Stone-curlew)		P4	
193.	25714 <i>Cacatua pastinator</i> (Western Long-billed Corella)			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
194.	25716 <i>Cacatua sanguinea</i> (Little Corella)			
195.	<i>Caenestheriella</i> sp.			
196.	29439 <i>Caesia</i> sp. Wongan (K.F. Kenneally 8820)			
197.	1583 <i>Caladenia cristata</i> (Crested Spider Orchid)		P1	
198.	11136 <i>Caladenia denticulata</i>			
199.	20433 <i>Caladenia denticulata</i> subsp. Jarrah forest (G.J. Keighery 13592)			
200.	15344 <i>Caladenia dimidia</i>			
201.	19217 <i>Caladenia drakeoides</i>		T	
202.	11165 <i>Caladenia falcata</i>			
203.	1614 <i>Caladenia roei</i> (Ant Orchid)			
204.	19277 <i>Caladenia x ornata</i>		P1	Y
205.	<i>Calamocelia</i> sp. 342 (ampulla variant)			
206.	2846 <i>Calandrinia calyptata</i> (Pink Purslane)			
207.	2848 <i>Calandrinia corrigioloides</i> (Strap Purslane)			
208.	2853 <i>Calandrinia eremaea</i> (Twining Purslane)			
209.	2854 <i>Calandrinia granulifera</i> (Pygmy Purslane)			
210.	29694 <i>Calandrinia kalanniensis</i>		P2	
211.	2855 <i>Calandrinia lehmannii</i>			
212.	2860 <i>Calandrinia polyandra</i> (Parakeelya)			
213.	40824 <i>Calandrinia sculpta</i>			
214.	20478 <i>Calandrinia</i> sp. Blackberry (D.M. Porter 171)			
215.	19454 <i>Calandrinia</i> sp. Needilup (K.R. Newbey 4892)			
216.	36560 <i>Callitris arenaria</i> (Sandplain Cypress)			
217.	36600 <i>Callitris pyramidalis</i> (Swamp Cypress)			
218.	7895 <i>Calocephalus multiflorus</i> (Yellow-top)			
219.	5408 <i>Calothamnus gilesii</i>			
220.	35756 <i>Calothamnus quadrifidus</i> subsp. <i>angustifolius</i>			
221.	35816 <i>Calothamnus quadrifidus</i> subsp. <i>quadrifidus</i>			
222.	7903 <i>Calotis hispidula</i> (Bindy Eye)			
223.	24734 <i>Calyptorhynchus latirostris</i> (Carnaby's Cockatoo)		T	
224.	5450 <i>Calytrix depressa</i>			
225.	5461 <i>Calytrix glutinosa</i>			
226.	5462 <i>Calytrix gracilis</i>			
227.	5465 <i>Calytrix leschenaultii</i>			
228.	5472 <i>Calytrix plumulosa</i>		P3	
229.	5476 <i>Calytrix sapphirina</i>			
230.	5479 <i>Calytrix strigosa</i>			
231.	5481 <i>Calytrix sylvana</i>			
232.	5487 <i>Calytrix violacea</i>			
233.	27642 <i>Candelariella antennaria</i>			
234.	3008 <i>Carrichtera annua</i> (Ward's Weed)	Y		
235.	11211 <i>Cassutha glabella</i> forma <i>dispar</i>			
236.	2955 <i>Cassutha nodiflora</i>			
237.	7916 <i>Centaurea melitensis</i> (Maltese Cockspur)	Y		
238.	19759 <i>Centipeda crateriformis</i> subsp. <i>crateriformis</i>			
239.	1124 <i>Centrolepis cephaliformis</i>			
240.	1126 <i>Centrolepis eremica</i>			
241.	1130 <i>Centrolepis humillima</i> (Dwarf Centrolepis)			
242.	1133 <i>Centrolepis pilosa</i>			
243.	1134 <i>Centrolepis polygyna</i> (Wiry Centrolepis)			
244.	7922 <i>Cephalopterum drummondii</i> (Pompom Head)			
245.	7924 <i>Ceratogyne obionoides</i> (Wingwort)			
246.	1215 <i>Chamaexeros fimbriata</i>			
247.	5490 <i>Chamelaucium brevifolium</i>			
248.	5491 <i>Chamelaucium ciliatum</i>			
249.	5493 <i>Chamelaucium drummondii</i>			
250.	35656 <i>Chamelaucium drummondii</i> subsp. <i>Carnamah</i> (R.J.Cranfield & P.J. Spencer 7966)			
251.	14808 <i>Chamelaucium drummondii</i> subsp. <i>drummondii</i>			
252.	35641 <i>Chamelaucium</i> sp. Wongan Hills (B.H. Smith 1140)		P3	
253.	24377 <i>Charadrius ruficapillus</i> (Red-capped Plover)			
254.	12796 <i>Cheilanthes adiantoides</i>			
255.	31 <i>Cheilanthes austrotenuifolia</i>			
256.	37 <i>Cheilanthes lasiophylla</i> (Woolly Cloak Fern)			
257.	12818 <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>			
258.	3168 <i>Cheiranthra filifolia</i>			
259.	24321 <i>Chenonetta jubata</i> (Australian Wood Duck)			
260.	2494 <i>Chenopodium murale</i> (Nettle-leaf Goosefoot)	Y		
261.	<i>Chironomus</i> aff. <i>altermans</i> (V24)			
262.	7925 <i>Chondrilla juncea</i> (Skeleton Weed)	Y		
263.	12974 <i>Chorizema rhynchotropis</i>			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
264.	7933 <i>Chthonocephalus pseudevax</i> (Woolly Groundheads)			
265.	24833 <i>Cincloramphus cruralis</i> (Brown Songlark)			
266.	24834 <i>Cincloramphus mathewsi</i> (Rufous Songlark)			
267.	24288 <i>Circus approximans</i> (Swamp Harrier)			
268.	24289 <i>Circus assimilis</i> (Spotted Harrier)			
269.	7370 <i>Citrullus lanatus</i> (Pie Melon)	Y		
270.	25675 <i>Colluricincla harmonica</i> (Grey Shrike-thrush)			
271.	14663 <i>Comesperma griffinii</i>		P2	
272.	4555 <i>Comesperma integerrimum</i>			
273.	4561 <i>Comesperma scoparium</i> (Broom Milkwort)			
274.	4563 <i>Comesperma spinosum</i> (Spiny Milkwort)			
275.	1861 <i>Conospermum brownii</i> (Blue-eyed Smokebush)			
276.	8824 <i>Conospermum croniniae</i>			
277.	1882 <i>Conospermum stoechadis</i> (Common Smokebush)			
278.	15611 <i>Conospermum stoechadis</i> subsp. <i>stoechadis</i> (Common Smokebush)			
279.	1423 <i>Conostylis aurea</i> (Golden Conostylis)			
280.	1446 <i>Conostylis prolifera</i> (Mat Cottonheads)			
281.	6614 <i>Convolvulus remotus</i>			
282.	7419 <i>Coopermookia strophiolata</i>			
283.	25568 <i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)			
284.	25592 <i>Corvus coronoides</i> (Australian Raven)			
285.	<i>Corynoneura</i> sp. (V49)			
286.	7944 <i>Cotula bipinnata</i> (Ferny Cotula)	Y		
287.	7945 <i>Cotula coronopifolia</i> (Waterbuttons)	Y		
288.	7946 <i>Cotula cotuloides</i> (Smooth Cotula)			
289.	24420 <i>Cracticus nigrogularis</i> (Pied Butcherbird)			
290.	25595 <i>Cracticus tibicen</i> (Australian Magpie)			
291.	25596 <i>Cracticus torquatus</i> (Grey Butcherbird)			
292.	17701 <i>Crassula closiana</i>			
293.	3137 <i>Crassula colorata</i> (Dense Stonecrop)			
294.	11709 <i>Crassula colorata</i> var. <i>acuminata</i>			
295.	11563 <i>Crassula colorata</i> var. <i>colorata</i>			
296.	11349 <i>Crassula decumbens</i> var. <i>decumbens</i>			
297.	3139 <i>Crassula exserta</i>			
298.	15706 <i>Crassula natans</i> var. <i>minus</i>	Y		
299.	25401 <i>Crinia pseudinsignifera</i> (Bleating Froglet)			
300.	15544 <i>Cryptandra apetala</i> var. <i>apetala</i>			
301.	9076 <i>Cryptandra myriantha</i>			
302.	16195 <i>Cryptandra wilsonii</i>			
303.	<i>Cryptochironomus griseidorsum</i>			
304.	24889 <i>Ctenophorus scutulatus</i>			
305.	25074 <i>Ctenotus schomburgkii</i>			
306.	<i>Culicoides</i> sp.			
307.	6663 <i>Cuscuta epithymum</i> (Lesser Dodder)	Y		
308.	15400 <i>Cyanicula amplexans</i>			
309.	6747 <i>Cyanostegia angustifolia</i> (Tinsel-flower)			
310.	6751 <i>Cyanostegia microphylla</i> (Tinsel Flower)			
311.	24322 <i>Cygnus atratus</i> (Black Swan)			
312.	6956 <i>Cyphanthera microphylla</i>			
313.	290 <i>Dactyloctenium radulans</i> (Button Grass)			
314.	7438 <i>Dampiera eriocephala</i> (Woolly-headed Dampiera)			
315.	7441 <i>Dampiera glabrescens</i>		P1	
316.	13156 <i>Dampiera haematotricha</i> subsp. <i>dura</i>			
317.	7451 <i>Dampiera lavandulacea</i>			
318.	7453 <i>Dampiera lindleyi</i>			
319.	7456 <i>Dampiera luteiflora</i> (Yellow Dampiera)			
320.	7472 <i>Dampiera salahae</i>			
321.	17997 <i>Dampiera</i> sp. Wongan Hills (R.D. Royce 6637)			
322.	7486 <i>Dampiera wellsiana</i> (Wells' Dampiera)			
323.	<i>Daphnia carinata</i>			
324.	<i>Daphnia</i> cf. <i>cephalata</i>			
325.	33942 <i>Daphnia jollyi</i>		P1	
326.	<i>Daphniopsis queenslandensis</i>			
327.	<i>Daphniopsis</i> sp.			
328.	5526 <i>Darwinia purpurea</i> (Rose Darwinia)			
329.	35618 <i>Darwinia</i> sp. Karonie (K. Newbey 8503)			
330.	6218 <i>Daucus glochidiatus</i> (Australian Carrot)			
331.	12975 <i>Daviesia benthamii</i> subsp. <i>acanthoclona</i>			
332.	11367 <i>Daviesia benthamii</i> subsp. <i>benthamii</i>			
333.	3797 <i>Daviesia cardiophylla</i>			

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334.	3803 <i>Daviesia daphnoides</i>			
335.	3809 <i>Daviesia epiphyllum</i>			
336.	3810 <i>Daviesia euphorbioides</i> (Wongan Cactus)		T	
337.	12326 <i>Daviesia hakeoides</i> subsp. <i>subnuda</i>			
338.	3823 <i>Daviesia nematophylla</i>			
339.	3824 <i>Daviesia nudiflora</i>			
340.	12328 <i>Daviesia nudiflora</i> subsp. <i>amplectens</i>			
341.	16585 <i>Daviesia nudiflora</i> subsp. <i>nudiflora</i>			
342.	24995 <i>Delma australis</i>			
343.	25766 <i>Delma fraseri</i> (Fraser's Legless Lizard)			
344.	25296 <i>Demansia psammophis</i> subsp. <i>reticulata</i>			
345.	<i>Dero digitata</i>			
346.	17663 <i>Desmocladus asper</i>			
347.	<i>Diacyptris compacta</i>			
348.	1259 <i>Dianella revoluta</i> (Blueberry Lily)			
349.	11636 <i>Dianella revoluta</i> var. <i>divaricata</i>			
350.	25607 <i>Dicaeum hirundinaceum</i> (Mistletoebird)			
351.	29279 <i>Dicrastylis globiflora</i>			
352.	6771 <i>Dicrastylis parvifolia</i>			
353.	6773 <i>Dicrastylis reticulata</i>		P3	
354.	29315 <i>Dicrastylis rugosifolia</i>			
355.	2498 <i>Didymanthus roei</i>			
356.	27722 <i>Diploschistes ocellatus</i>			
357.	2799 <i>Disphyma crassifolium</i> (Round-leaved Pigface)			
358.	7961 <i>Dittrichia graveolens</i> (Stinkwort)	Y		
359.	11049 <i>Diuris corymbosa</i>			
360.	10858 <i>Diuris picta</i>			
361.	12936 <i>Diuris recurva</i>		P4	
362.	4752 <i>Dodonaea adenophora</i>			
363.	4755 <i>Dodonaea bursariifolia</i>			
364.	4760 <i>Dodonaea divaricata</i>			
365.	4766 <i>Dodonaea inaequifolia</i>			
366.	4768 <i>Dodonaea larreoides</i>			
367.	4775 <i>Dodonaea piniifolia</i>			
368.	11247 <i>Dodonaea viscosa</i> subsp. <i>angustissima</i>			
369.	24470 <i>Dromaius novaehollandiae</i> (Emu)			
370.	3092 <i>Drosera bulbosa</i> (Red-leaved Sundew)			
371.	3098 <i>Drosera glanduligera</i> (Pimpernel Sundew)			
372.	14298 <i>Drosera macrantha</i> subsp. <i>macrantha</i>			
373.	3107 <i>Drosera macrophylla</i> (Showy Sundew)			
374.	13387 <i>Drosera macrophylla</i> subsp. <i>macrophylla</i>			
375.	3128 <i>Drosera ramellosa</i> (Branched Sundew)			
376.	29207 <i>Drosera rupicola</i>			
377.	13185 <i>Drosera spilosa</i>			
378.	3133 <i>Drosera subhirtella</i> (Sunny Rainbow)			
379.	4459 <i>Drummondita hassellii</i> (Peak Charles Drummondita)			
380.	24650 <i>Drymodes brunneopygia</i> (Southern Scrub-robin)			
381.	11632 <i>Dysphania glomulifera</i> subsp. <i>eremaea</i>			
382.	33480 <i>Dysphania pumilio</i> (Clammy Goosefoot)			
383.	32348 <i>Eccremidium arcuatum</i>			
384.	1066 <i>Ecdiocolea monostachya</i>			
385.	25092 <i>Egernia depressa</i> (Pygmy Spiny-tailed Skink)			
386.	25107 <i>Egernia stokesii</i> subsp. <i>badia</i>		T	
387.	349 <i>Ehrharta longiflora</i> (Annual Veldt Grass)	Y		
388.	5187 <i>Elatine gratioloides</i> (Waterwort)			
389.	2510 <i>Enchylaena lanata</i>			
390.	2511 <i>Enchylaena tomentosa</i> (Barrier Saltbush)			
391.	12064 <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> (Barrier Saltbush)			
392.	19843 <i>Enekbatus sessilis</i>			
393.	19844 <i>Enekbatus stowardii</i>			
394.	<i>Enochrus elongatus</i>			
395.	<i>Enochrus maculiceps</i>			
396.	24567 <i>Epthianura albifrons</i> (White-fronted Chat)			
397.	24570 <i>Epthianura tricolor</i> (Crimson Chat)			
398.	378 <i>Eragrostis dielsii</i> (Mallee Lovegrass)			
399.	392 <i>Eragrostis pergracilis</i>			
400.	14103 <i>Eremaea pauciflora</i> var. <i>calyptra</i>			
401.	14104 <i>Eremaea pauciflora</i> var. <i>pauciflora</i>			
402.	7189 <i>Eremophila clarkii</i> (Turpentine Bush)			
403.	7193 <i>Eremophila decipiens</i> (Slender Fuchsia)			

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404.	14895 <i>Eremophila decipiens</i> subsp. <i>decipiens</i>			
405.	7198 <i>Eremophila deserti</i>			
406.	7200 <i>Eremophila drummondii</i>			
407.	7215 <i>Eremophila glabra</i> (Tar Bush)			
408.	19560 <i>Eremophila glabra</i> subsp. <i>verrucosa</i>			
409.	7231 <i>Eremophila lehmanniana</i>			
410.	7242 <i>Eremophila miniata</i> (Kopi Poverty Bush)			
411.	18570 <i>Eremophila oppositifolia</i> subsp. <i>angustifolia</i>			
412.	16523 <i>Eremophila papillata</i>			
413.	16039 <i>Eremophila pinnatifida</i>		T	
414.	7265 <i>Eremophila sargentii</i>		P2	
415.	17162 <i>Eremophila subfloccosa</i> subsp. <i>lanata</i>			
416.	7282 <i>Eremophila viscida</i> (Varnish Bush)		T	
417.	415 <i>Eriachne ovata</i>			
418.	4331 <i>Erodium aureum</i>	Y		
419.	4333 <i>Erodium cicutarium</i> (Common Storksbill)	Y		
420.	4335 <i>Erodium cygnorum</i> (Blue Heronsbill)			
421.	14377 <i>Erymophyllum ramosum</i> subsp. <i>ramosum</i>			
422.	12740 <i>Erymophyllum tenellum</i>			
423.	24379 <i>Erythronys cinctus</i> (Red-kneed Dotterel)			
424.	12895 <i>Eucalyptus arachnaea</i> subsp. <i>arachnaea</i>			
425.	9141 <i>Eucalyptus baudiniana</i>			
426.	5565 <i>Eucalyptus brachycorys</i> (Cowcowing Mallee)			
427.	5572 <i>Eucalyptus burracoppinensis</i> (Burracoppin Mallee)			
428.	12902 <i>Eucalyptus capillosa</i> subsp. <i>polyclada</i> (Mallee Wandoo)			
429.	11978 <i>Eucalyptus celastroides</i> subsp. <i>virella</i>			
430.	5588 <i>Eucalyptus ceratocorys</i>			
431.	11835 <i>Eucalyptus crucis</i> subsp. <i>lanceolata</i>			
432.	15804 <i>Eucalyptus dolichocera</i>			
433.	13549 <i>Eucalyptus ebbanoensis</i> subsp. <i>ebbanoensis</i>			
434.	11637 <i>Eucalyptus erythronema</i> var. <i>marginata</i> (Red-flowered Mallee)			
435.	18292 <i>Eucalyptus gittinsii</i> subsp. <i>illucida</i>			
436.	5673 <i>Eucalyptus horistes</i>			
437.	5675 <i>Eucalyptus incrassata</i> (Lerp Mallee)			
438.	15671 <i>Eucalyptus kochii</i> subsp. <i>kochii</i>			
439.	15670 <i>Eucalyptus kochii</i> subsp. <i>plenissima</i>			
440.	13057 <i>Eucalyptus leptopoda</i> subsp. <i>arctata</i>			
441.	11295 <i>Eucalyptus loxophleba</i> subsp. <i>loxophleba</i> (York Gum)			
442.	13038 <i>Eucalyptus loxophleba</i> subsp. <i>supralaevis</i>			
443.	13530 <i>Eucalyptus macrocarpa</i> subsp. <i>macrocarpa</i> (Mottlecah)			
444.	19323 <i>Eucalyptus moderata</i>			
445.	13513 <i>Eucalyptus myriadena</i> subsp. <i>myriadena</i>			
446.	5722 <i>Eucalyptus obtusiflora</i> (Dongara Mallee)			
447.	5725 <i>Eucalyptus oldfieldii</i> (Oldfield's Mallee)			
448.	20047 <i>Eucalyptus orthostemon</i>			
449.	5756 <i>Eucalyptus pyriformis</i> (Pear-fruited Mallee)			
450.	5761 <i>Eucalyptus rigidula</i> (Stiff-leaved Mallee)			
451.	5767 <i>Eucalyptus salubris</i> (Gimlet)			
452.	13034 <i>Eucalyptus sargentii</i> subsp. <i>sargentii</i>			
453.	5778 <i>Eucalyptus stowardii</i> (Fluted Horn Mallee)			
454.	12882 <i>Eucalyptus subangusta</i> subsp. <i>pusilla</i>			
455.	12883 <i>Eucalyptus subangusta</i> subsp. <i>subangusta</i>			
456.	12880 <i>Eucalyptus subangusta</i> subsp. <i>virescens</i>		P3	
457.	13027 <i>Eucalyptus tenera</i>			
458.	12905 <i>Eucalyptus wandoo</i> subsp. <i>pulverea</i>			
459.	19816 <i>Eucalyptus wubinensis</i>			
460.	16944 <i>Eucalyptus x carnabyi</i>		P4	
461.	5802 <i>Eucalyptus yilgarnensis</i> (Yorrell)			
462.	17896 <i>Euphorbia drummondii</i> subsp. <i>drummondii</i>			
463.	10977 <i>Exocarpos aphyllus</i> (Leafless Ballart)			
464.	10765 <i>Exocarpos sparteus</i> (Broom Ballart)			
465.	<i>Eylais</i> sp.			
466.	25621 <i>Falco berigora</i> (Brown Falcon)			
467.	25622 <i>Falco cenchroides</i> (Australian Kestrel)			
468.	5192 <i>Frankenia conferta</i> (Silky Frankenia)		T	
469.	5202 <i>Frankenia glomerata</i> (Cluster Head Frankenia)		P3	
470.	5209 <i>Frankenia pauciflora</i> (Seaheath)			
471.	12831 <i>Frankenia pulverulenta</i>	Y		
472.	18392 <i>Freesia alba</i> x <i>leichtlinii</i>	Y		
473.	25727 <i>Fulica atra</i> (Eurasian Coot)			

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474.	901 <i>Gahnia australis</i>			
475.	904 <i>Gahnia drummondii</i>			
476.	3889 <i>Gastrolobium bennettianum</i> (Cluster Poison)			
477.	3895 <i>Gastrolobium calycinum</i> (York Road Poison)			
478.	3900 <i>Gastrolobium floribundum</i> (Wodjil Poison)			
479.	3910 <i>Gastrolobium obovatum</i> (Boat-leaved Poison)			
480.	19188 <i>Gastrolobium reflexum</i>			
481.	16311 <i>Gazania linearis</i>	Y		
482.	24959 <i>Gehyra variegata</i>			
483.	25530 <i>Gerygone fusca</i> (Western Gerygone)			
484.	12780 <i>Gilberta tenuifolia</i>			
485.	33620 <i>Glischrocaryon angustifolium</i>			
486.	6143 <i>Glischrocaryon aureum</i> (Common Popflower)			
487.	6144 <i>Glischrocaryon flavescens</i>			
488.	7060 <i>Glossostigma diandrum</i>			
489.	3938 <i>Glycine canescens</i> (Silky Glycine)			
490.	7987 <i>Gnephosis acicularis</i> (Zigzag Gnephosis)			
491.	12624 <i>Gnephosis angianthoides</i>			
492.	7991 <i>Gnephosis drummondii</i>			
493.	7998 <i>Gnephosis macrocephala</i>			
494.	7999 <i>Gnephosis multiflora</i>		P3	
495.	8002 <i>Gnephosis tenuissima</i>			
496.	8003 <i>Gnephosis tridens</i>			
497.	8005 <i>Gnephosis uniflora</i>			
498.	3952 <i>Gompholobium obcordatum</i>			
499.	23488 <i>Gompholobium wonganense</i>		P3	
500.	6148 <i>Gonocarpus confertifolius</i>			
501.	6159 <i>Gonocarpus nodulosus</i>			
502.	7495 <i>Goodenia berardiana</i>			
503.	29362 <i>Goodenia coerulea</i>			
504.	12522 <i>Goodenia glareicola</i>			
505.	7513 <i>Goodenia hassallii</i>			
506.	12523 <i>Goodenia helmsii</i>			
507.	12572 <i>Goodenia perryi</i>		P3	
508.	7534 <i>Goodenia pinifolia</i> (Pine-leaved Goodenia)			
509.	7541 <i>Goodenia pusilliflora</i> (Smallflower Goodenia)			
510.	24443 <i>Grallina cyanoleuca</i> (Magpie-lark)			
511.	1949 <i>Grevillea acuaria</i>			
512.	1957 <i>Grevillea armigera</i> (Prickly Toothbrushes)			
513.	1958 <i>Grevillea asparagoides</i>		P3	
514.	8828 <i>Grevillea biformis</i>			
515.	15763 <i>Grevillea biformis</i> subsp. <i>biformis</i>			
516.	1965 <i>Grevillea biternata</i>			
517.	1966 <i>Grevillea brachystachya</i> (Short-spiked Grevillea)			
518.	1968 <i>Grevillea bracteosa</i> (Bracted Grevillea)			
519.	33580 <i>Grevillea bracteosa</i> subsp. <i>bracteosa</i>		T	
520.	13453 <i>Grevillea didymobotrya</i> subsp. <i>didymobotrya</i>			
521.	1996 <i>Grevillea dryandroides</i> (Phalanx Grevillea)			Y
522.	14411 <i>Grevillea dryandroides</i> subsp. <i>dryandroides</i>		T	Y
523.	2001 <i>Grevillea eriostachya</i> (Flame Grevillea)			
524.	2002 <i>Grevillea eryngioides</i> (Curly Grevillea)			
525.	8832 <i>Grevillea excelsior</i> (Flame Grevillea)			
526.	13430 <i>Grevillea hakeoides</i> subsp. <i>stenophylla</i>			
527.	19315 <i>Grevillea hookeriana</i> subsp. <i>digitata</i>			
528.	2018 <i>Grevillea huegelii</i>			
529.	2027 <i>Grevillea kenneallyi</i>		P2	
530.	2032 <i>Grevillea leucopteris</i> (White Plume Grevillea)			
531.	16797 <i>Grevillea levis</i>			
532.	15984 <i>Grevillea obliquistigma</i> subsp. <i>funicularis</i>			
533.	2056 <i>Grevillea paniculata</i>			
534.	2057 <i>Grevillea paradoxa</i> (Bottlebrush Grevillea)			
535.	13416 <i>Grevillea petrophiloides</i> subsp. <i>petrophiloides</i>			
536.	8838 <i>Grevillea pinaster</i>			
537.	2067 <i>Grevillea pinifolia</i> (Pine-leaved Grevillea)		P1	
538.	2077 <i>Grevillea pterosperma</i>			
539.	13941 <i>Grevillea pythara</i>		T	Y
540.	2104 <i>Grevillea teretifolia</i> (Round Leaf Grevillea)			
541.	2115 <i>Grevillea umbellulata</i>			
542.	2116 <i>Grevillea uncinulata</i> (Hook-leaf Grevillea)			
543.	2804 <i>Gunniopsis glabra</i>			

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544.	2805 <i>Gunniiopsis intermedia</i> (Yellow Salt Star)			
545.	2807 <i>Gunniiopsis quadrifida</i> (Sturts Pigface)			
546.	2809 <i>Gunniiopsis rubra</i>		P3	
547.	2810 <i>Gunniiopsis septifraga</i>			
548.	2788 <i>Gyrostemon subnudus</i>			
549.	27763 <i>Haematomma eremaeum</i>			
550.	1473 <i>Haemodorum simulans</i>			
551.	2140 <i>Hakea circumalata</i>			
552.	11924 <i>Hakea cygna</i> subsp. <i>cygna</i> (Swan Fruit Hakea)			
553.	2157 <i>Hakea erecta</i>			
554.	2163 <i>Hakea francisiana</i> (Emu Tree)			
555.	2167 <i>Hakea invaginata</i>			
556.	2181 <i>Hakea meisneriana</i>			
557.	2184 <i>Hakea multilineata</i> (Grass Leaf Hakea)			
558.	17557 <i>Hakea recurva</i> subsp. <i>recurva</i>			
559.	19131 <i>Hakea scoparia</i> subsp. <i>scoparia</i>			
560.	2211 <i>Hakea subsulcata</i>			
561.	2214 <i>Hakea trifurcata</i> (Two-leaf Hakea)			
562.	6692 <i>Halgania lavandulacea</i> (Blue Bush)			
563.	29716 <i>Halgania</i> sp. <i>Wongan Hills</i> (K.F. Kenneally 2393)			
564.	6177 <i>Haloragis platycarpa</i>		T	Y
565.	17781 <i>Hannafordia quadrivalvis</i> subsp. <i>quadrivalvis</i>			
566.	28253 <i>Hedynois rhagadioloides</i> subsp. <i>cretica</i>	Y		
567.	25408 <i>Heleioporus albopunctatus</i> (Western Spotted Frog)			
568.	<i>Hemicordulia tau</i>			
569.	33757 <i>Hemigenia bracteosa</i>			
570.	6848 <i>Hemigenia dielsii</i>			
571.	6849 <i>Hemigenia diplanthera</i>			
572.	6875 <i>Hemigenia westringioides</i> (Open Hemigenia)			
573.	27773 <i>Heterodea muelleri</i>			
574.	<i>Hexarthra fennica</i>			
575.	5108 <i>Hibbertia acerosa</i> (Needle Leaved Guinea Flower)			
576.	5121 <i>Hibbertia drummondii</i>			
577.	5124 <i>Hibbertia exasperata</i>			
578.	5130 <i>Hibbertia glomerosa</i> (Guinea-flower)			
579.	19779 <i>Hibbertia glomerosa</i> var. <i>glomerosa</i>			
580.	5134 <i>Hibbertia huegelii</i>			
581.	5149 <i>Hibbertia nutans</i> (Nodding Guinea Flower)			
582.	5165 <i>Hibbertia rostellata</i>			
583.	5166 <i>Hibbertia rupicola</i>			
584.	15863 <i>Hibbertia stowardii</i>			
585.	25734 <i>Himantopus himantopus</i> (Black-winged Stilt)			
586.	24491 <i>Hirundo neoxena</i> (Welcome Swallow)			
587.	5808 <i>Homalocalyx coarctatus</i>			
588.	448 <i>Hordeum glaucum</i> (Northern Barley Grass)	Y		
589.	8085 <i>Hyalochlamys globifera</i>			
590.	12742 <i>Hyalosperma demissum</i>			
591.	12743 <i>Hyalosperma glutinosum</i>			
592.	15447 <i>Hyalosperma glutinosum</i> subsp. <i>glutinosum</i>			
593.	5221 <i>Hybanthus floribundus</i>			
594.	6236 <i>Hydrocotyle pilifera</i>			
595.	11546 <i>Hydrocotyle pilifera</i> var. <i>glabrata</i>			
596.	6239 <i>Hydrocotyle rugulosa</i>			
597.	14991 <i>Hydrocotyle vigintimilia</i>		P1	
598.	<i>Hyphydrus</i> sp.			
599.	5817 <i>Hypocalymma angustifolium</i> (White Myrtle)			
600.	5824 <i>Hypocalymma puniceum</i> (Large Myrtle)			
601.	8086 <i>Hypochaeris glabra</i> (Smooth Catsear)	Y		
602.	11699 <i>Hypoxis glabella</i> var. <i>glabella</i>			
603.	33917 <i>Idiosoma nigrum</i> (Shield-backed Trapdoor Spider)		T	
604.	<i>Isidorella</i> sp.			
605.	7 <i>Isoetes australis</i>			
606.	9 <i>Isoetes caroli</i>			
607.	12 <i>Isoetes inflata</i>			
608.	15 <i>Isoetes tripus</i>			
609.	8087 <i>Isoetopsis graminifolia</i> (Cushion Grass)			
610.	911 <i>Isolepis congrua</i>			
611.	24153 <i>Isoodon obesulus</i> subsp. <i>fusciventer</i> (Quenda)		P5	
612.	14436 <i>Isopogon scabriusculus</i> subsp. <i>stenophyllus</i>			
613.	7396 <i>Isotoma hypocrateriformis</i> (Woodbridge Poison)			

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614.	3993 <i>Isotropis drummondii</i> (Lamb Poison)			
615.	3995 <i>Isotropis juncea</i> (Slender Lamb Poison)			
616.	14781 <i>Jacksonia acicularis</i>			
617.	4009 <i>Jacksonia eremodendron</i>			
618.	13013 <i>Jacksonia fasciculata</i>			
619.	4011 <i>Jacksonia foliosa</i>			
620.	4019 <i>Jacksonia macrocalyx</i>			
621.	4025 <i>Jacksonia restioides</i>			
622.	20454 <i>Juncus acutus</i> subsp. <i>acutus</i>	Y		
623.	1178 <i>Juncus bufonius</i> (Toad Rush)	Y		
624.	1194 <i>Juncus radula</i>			
625.	<i>Keratella australis</i>			
626.	<i>Keratella procurva</i>			
627.	<i>Keratella slackii</i>			
628.	19892 <i>Keraudrenia velutina</i> subsp. <i>velutina</i>			
629.	5840 <i>Kunzea pulchella</i> (Granite Kunzea)			
630.	20019 <i>Lachnagrostis filiformis</i>			
631.	468 <i>Lamarckia aurea</i> (Goldentop)	Y		
632.	<i>Lancetes lanceolatus</i>			
633.	17504 <i>Lasiopetalum molle</i> subsp. <i>molle</i>			
634.	13284 <i>Lawrencella rosea</i>			
635.	4959 <i>Lawrencia squamata</i>			
636.	1305 <i>Laxmannia omnifertilis</i>			
637.	27825 <i>Lecidea ochroleuca</i>			
638.	24557 <i>Leipoa ocellata</i> (Malleefowl)		T	
639.	3018 <i>Lepidium africanum</i> (Rubble Peppercross)	Y		
640.	3021 <i>Lepidium bonariense</i> (Peppercross)	Y		
641.	3042 <i>Lepidium pseudotasmanicum</i>		P4	
642.	3044 <i>Lepidium rotundum</i> (Veined Peppercross)			
643.	13774 <i>Lepidobolus densus</i>		P3	
644.	18109 <i>Lepidobolus preissianus</i> subsp. <i>volubilis</i>			
645.	930 <i>Lepidosperma costale</i>			
646.	937 <i>Lepidosperma longitudinale</i> (Pithy Sword-sedge)			
647.	16284 <i>Lepidosperma</i> sp. <i>P1 small head</i> (M.D. Tindale 166A)			
648.	947 <i>Lepidosperma tenue</i>			
649.	120 <i>Lepilaena cylindrocarpa</i>			
650.	121 <i>Lepilaena preissii</i> (Slender Water Mat)			
651.	1653 <i>Leporella fimbriata</i> (Hare Orchid)			
652.	2352 <i>Leptomeria preissiana</i>			
653.	15428 <i>Leptosema aphyllum</i>			
654.	4056 <i>Leptosema daviesioides</i>			
655.	5847 <i>Leptospermum erubescens</i> (Roadside Teatree)			
656.	30927 <i>Lerista kingi</i>			
657.	25149 <i>Lerista macropisthopus</i> subsp. <i>macropisthopus</i>			
658.	6379 <i>Leucopogon crassiflorus</i>			
659.	6401 <i>Leucopogon hamulosus</i>			
660.	6416 <i>Leucopogon nutans</i> (Drooping Leucopogon)			
661.	20870 <i>Leucopogon</i> sp. <i>Avon</i> (J. Buegge D34)			
662.	19517 <i>Leucopogon</i> sp. <i>outer wheatbelt</i> (M. Hislop 30)			
663.	7670 <i>Levenhookia dubia</i> (Hairy Stylewort)			
664.	7671 <i>Levenhookia leptantha</i> (Trumpet Stylewort)			
665.	39820 <i>Levenhookia murfettii</i>			
666.	7677 <i>Levenhookia stipitata</i> (Common Stylewort)			
667.	25659 <i>Lichenostomus leucotis</i> (White-eared Honeyeater)			
668.	24581 <i>Lichenostomus virescens</i> (Singing Honeyeater)			
669.	25661 <i>Lichmera indistincta</i> (Brown Honeyeater)			
670.	25415 <i>Limnodynastes dorsalis</i> (Western Banjo Frog)			
671.	25388 <i>Litoria moorei</i> (Motorbike Frog)			
672.	7402 <i>Lobelia gibbosa</i> (Tall Lobelia)			
673.	7403 <i>Lobelia heterophylla</i> (Wing-seeded Lobelia)			
674.	6508 <i>Logania flaviflora</i> (Yellow Logania)			
675.	10957 <i>Lolium perenne</i> x <i>rigidum</i>	Y		
676.	478 <i>Lolium rigidum</i> (Wimmera Ryegrass)	Y		
677.	1226 <i>Lomandra effusa</i> (Scented Matrush)			
678.	18049 <i>Lyginia imberbis</i>			
679.	<i>Lynceus</i> sp.			
680.	36375 <i>Lysimachia arvensis</i> (Pimpernel)	Y		
681.	34736 <i>Lysinema pentapetalum</i>			
682.	5050 <i>Lysiosepalum rugosum</i> (Wrinkled Leaf Lysiosepalum)			
683.	24132 <i>Macropus fuliginosus</i> (Western Grey Kangaroo)			

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684.	24135 <i>Macropus robustus</i> subsp. <i>erubescens</i> (Euro)			
685.	24136 <i>Macropus rufus</i> (Red Kangaroo)			
686.	2533 <i>Maireana amoena</i>			
687.	2537 <i>Maireana brevifolia</i> (Small Leaf Bluebush)			
688.	2538 <i>Maireana carnososa</i> (Cottony Bluebush)			
689.	2541 <i>Maireana enchylaenoides</i>			
690.	2544 <i>Maireana georgei</i> (Satiny Bluebush)			
691.	2550 <i>Maireana marginata</i>			
692.	2568 <i>Maireana trichoptera</i> (Downy Bluebush)			
693.	24326 <i>Malacorhynchus membranaceus</i> (Pink-eared Duck)			
694.	5865 <i>Malleostemon roseus</i>			
695.	5866 <i>Malleostemon tuberculatus</i>			
696.	25652 <i>Malurus leucopterus</i> (White-winged Fairy-wren)			
697.	24551 <i>Malurus pulcherrimus</i> (Blue-breasted Fairy-wren)			
698.	24583 <i>Manorina flavigula</i> (Yellow-throated Miner)			
699.	19421 <i>Marianthus bicolor</i> (Painted Marianthus)			
700.	17633 <i>Marianthus erubescens</i>			
701.	11275 <i>Medicago laciniata</i> var. <i>laciniata</i>	Y		
702.	4083 <i>Medicago truncatula</i> (Barrel Medic)	Y		
703.	25758 <i>Megalurus gramineus</i> (Little Grassbird)			
704.	15064 <i>Melaleuca acuminata</i> subsp. <i>websteri</i>			
705.	5870 <i>Melaleuca adnata</i>			
706.	20284 <i>Melaleuca atroviridis</i>			
707.	17982 <i>Melaleuca carrii</i>			
708.	5895 <i>Melaleuca conothamnoides</i>			
709.	5896 <i>Melaleuca cordata</i>			
710.	16088 <i>Melaleuca coroncarpa</i>			
711.	12387 <i>Melaleuca ctenoides</i>			
712.	19952 <i>Melaleuca dichroma</i>			
713.	5908 <i>Melaleuca eleuterostachya</i>			
714.	5909 <i>Melaleuca elliptica</i> (Granite Bottlebrush)			
715.	15603 <i>Melaleuca fulgens</i> subsp. <i>fulgens</i>			
716.	5916 <i>Melaleuca halmaturorum</i>			
717.	19486 <i>Melaleuca hamata</i>			
718.	5922 <i>Melaleuca lanceolata</i> (Rottnest Teatree)			
719.	5925 <i>Melaleuca lateriflora</i> (Gorada)			
720.	5931 <i>Melaleuca leptospermoides</i>			
721.	17981 <i>Melaleuca orbicularis</i>			
722.	15663 <i>Melaleuca pauperiflora</i> subsp. <i>fastigiata</i>			
723.	5949 <i>Melaleuca platycalyx</i>			
724.	37620 <i>Melaleuca protrusa</i>			
725.	5956 <i>Melaleuca pungens</i>			
726.	5958 <i>Melaleuca radula</i> (Graceful Honeymyrtle)			
727.	19449 <i>Melaleuca stereophloia</i>			
728.	5981 <i>Melaleuca thyooides</i>			
729.	13280 <i>Melaleuca viminea</i> subsp. <i>viminea</i>			
730.	25663 <i>Melithreptus brevirostris</i> (Brown-headed Honeyeater)			
731.	24736 <i>Melopsittacus undulatus</i> (Budgerigar)			
732.	25184 <i>Menetia greyii</i>			
733.	3050 <i>Menkea australis</i> (Fairy Spectacles)			
734.	24598 <i>Merops ornatus</i> (Rainbow Bee-eater)			
735.	2813 <i>Mesembryanthemum crystallinum</i> (Iceplant)	Y		
736.	2814 <i>Mesembryanthemum nodiflorum</i> (Slender Iceplant)	Y		
737.	<i>Mesocyclops brooksi</i>			
738.	954 <i>Mesomelaena preissii</i>			
739.	6891 <i>Microcorys ericifolia</i>			
740.	6899 <i>Microcorys obovata</i>			
741.	<i>Microcyclops varicans</i>			
742.	5999 <i>Micromyrtus obovata</i>			
743.	<i>Miconecta gracilis</i>			
744.	8105 <i>Millotia myosotidifolia</i>			
745.	14344 <i>Millotia tenuifolia</i> var. <i>tenuifolia</i> (Soft Millotia)			
746.	4091 <i>Mirbelia floribunda</i> (Purple Mirbelia)			
747.	4094 <i>Mirbelia microphylla</i>			
748.	4095 <i>Mirbelia multicaulis</i>			
749.	4097 <i>Mirbelia ramulosa</i>			
750.	4100 <i>Mirbelia spinosa</i>			
751.	4104 <i>Mirbelia trichocalyx</i>			
752.	490 <i>Monachather paradoxus</i>			
753.	29418 <i>Monoculus monstrosus</i>	Y		

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754.	24223 <i>Mus musculus</i> (House Mouse)			
755.	6190 <i>Myriophyllum decussatum</i>			
756.	<i>Mytilocypris tasmanica chapmani</i>			
757.	<i>Necterosoma penicillatus</i>			
758.	25425 <i>Neobatrachus kunapalari</i> (Kunapalari Frog)			
759.	25427 <i>Neobatrachus sutor</i> (Shoemaker Frog)			
760.	24738 <i>Neophema elegans</i> (Elegant Parrot)			
761.	6243 <i>Neosciadium glochidiatum</i>			
762.	30941 <i>Nephurus milii</i> (Barking Gecko)			
763.	492 <i>Neurachne alopecuroidea</i> (Foxtail Mulga Grass)			
764.	6976 <i>Nicotiana occidentalis</i> (Native Tobacco)			
765.	6978 <i>Nicotiana rotundifolia</i> (Round-leaved Tobacco)			
766.	<i>Notholca salina</i>			
767.	24229 <i>Notomys mitchellii</i> (Mitchell's Hopping-mouse)			
768.	24407 <i>Ocyphaps lophotes</i> (Crested Pigeon)			
769.	2365 <i>Olx benthamiana</i>			
770.	15450 <i>Olearia dampieri</i> subsp. <i>eremicola</i>			
771.	8136 <i>Olearia homolepis</i>			
772.	8140 <i>Olearia muelleri</i> (Goldfields Daisy)			
773.	8141 <i>Olearia muricata</i> (Rough-leaved Daisy Bush)			
774.	<i>Onychohydus</i> sp.			
775.	18255 <i>Opercularia vaginata</i> (Dog Weed)			
776.	17 <i>Ophioglossum lusitanicum</i> (Adders Tongue)			
777.	1372 <i>Ornithogalum arabicum</i> (Lesser Cape Lily)	Y		
778.	7122 <i>Orobanche minor</i> (Lesser Broomrape)	Y		
779.	4349 <i>Oxalis corniculata</i> (Yellow Wood Sorrel)	Y		
780.	30375 <i>Oxalis exilis</i>			
781.	4356 <i>Oxalis pes-caprae</i> (Soursob)	Y		
782.	25679 <i>Pachycephala pectoralis</i> (Golden Whistler)			
783.	25680 <i>Pachycephala rufiventris</i> (Rufous Whistler)			
784.	2964 <i>Papaver hybridum</i> (Rough Poppy)	Y		
785.	516 <i>Parapholis incurva</i> (Coast Barbgrass)	Y		
786.	33960 <i>Parartemia contracta</i>		P1	
787.	25681 <i>Pardalotus punctatus</i> (Spotted Pardalote)			
788.	25682 <i>Pardalotus striatus</i> (Striated Pardalote)			
789.	7089 <i>Parentucellia latifolia</i> (Common Bartsia)	Y		
790.	12670 <i>Parietaria cardiostegia</i>			
791.	1543 <i>Patersonia drummondii</i> (Drummond's Patersonia)			
792.	40423 <i>Pentameris airoides</i> (False Hairgrass)	Y		
793.	40424 <i>Pentameris airoides</i> subsp. <i>airoides</i>	Y		
794.	2255 <i>Persoonia angustiflora</i>			
795.	2259 <i>Persoonia coriacea</i> (Leathery-leaf Persoonia)			
796.	2270 <i>Persoonia quinquenervis</i>			
797.	2272 <i>Persoonia rufiflora</i>			
798.	15632 <i>Persoonia stricta</i>			
799.	24659 <i>Petroica goodenovii</i> (Red-capped Robin)			
800.	40723 <i>Petrophile globifera</i>		P3	
801.	10775 <i>Petrophile incurvata</i>			
802.	14441 <i>Petrophile pauciflora</i>		P3	
803.	2308 <i>Petrophile seminuda</i>			
804.	2310 <i>Petrophile shuttleworthiana</i>			
805.	14452 <i>Petrophile trifurcata</i>		P2	
806.	14447 <i>Petrophile wonganensis</i>			
807.	19825 <i>Petrohragia dubia</i>	Y		
808.	24409 <i>Phaps chalcoptera</i> (Common Bronzewing)			
809.	4494 <i>Phebalium ambiguum</i>			
810.	4502 <i>Phebalium microphyllum</i>			
811.	4504 <i>Phebalium tuberculosum</i>			
812.	20460 <i>Pheladenia deformis</i>			
813.	18507 <i>Philothea thryptomenoides</i>			
814.	24594 <i>Phylidonyris melanops</i> (Tawny-crowned Honeyeater)			
815.	16824 <i>Phyllangium sulcatum</i>			
816.	5229 <i>Pimelea aeruginosa</i>			
817.	5231 <i>Pimelea angustifolia</i> (Narrow-leaved Pimelea)			
818.	5232 <i>Pimelea argentea</i> (Silvery Leaved Pimelea)			
819.	5233 <i>Pimelea avonensis</i>			
820.	11644 <i>Pimelea brevistyla</i> subsp. <i>minor</i>			
821.	11402 <i>Pimelea imbricata</i> var. <i>piligera</i>			
822.	5268 <i>Pimelea sulphurea</i> (Yellow Banjine)			
823.	5272 <i>Pimelea villifera</i>			

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824.	19744 <i>Pittosporum angustifolium</i>			
825.	6800 <i>Pityrodia axillaris</i> (Native Foxglove)		T	
826.	6801 <i>Pityrodia bartlingii</i> (Woolly Dragon)			
827.	6812 <i>Pityrodia lepidota</i>			
828.	6820 <i>Pityrodia teckiana</i>			
829.	6821 <i>Pityrodia terminalis</i> (Native Foxglove)			
830.	6252 <i>Platysace effusa</i>			
831.	6255 <i>Platysace juncea</i>			
832.	6257 <i>Platysace maxwellii</i> (Karno)			
833.	14999 <i>Platysace trachymenioides</i>			
834.	25703 <i>Podargus strigoides</i> (Tawny Frogmouth)			
835.	8172 <i>Podolepis canescens</i>			
836.	8173 <i>Podolepis capillaris</i> (Wiry Podolepis)			
837.	8177 <i>Podolepis lessonii</i>			
838.	8181 <i>Podolepis tepperi</i>			
839.	8182 <i>Podotheca angustifolia</i> (Sticky Longheads)			
840.	8184 <i>Podotheca gnaphalioides</i> (Golden Long-heads)			
841.	12733 <i>Podotheca pritzelii</i>		P3	
842.	12732 <i>Podotheca uniseta</i>		P3	
843.	24907 <i>Pogona minor</i> subsp. <i>minor</i>			
844.	8188 <i>Pogonolepis stricta</i>			
845.	24681 <i>Poliocephalus poliocephalus</i> (Hoary-headed Grebe)			
846.	<i>Polypedium nubifer</i>			
847.	24683 <i>Pomatostomus superciliosus</i> (White-browed Babbler)			
848.	34013 <i>Pomatostomus superciliosus</i> subsp. <i>ashbyi</i> (White-browed Babbler)		P4	
849.	4691 <i>Poranthera microphylla</i> (Small Poranthera)			
850.	16688 <i>Prasophyllum gracile</i>			
851.	1682 <i>Prasophyllum sargentii</i>			
852.	<i>Procladius paludicola</i>			
853.	4725 <i>Psammomoya choretroides</i>			
854.	25259 <i>Pseudonaja affinis</i> subsp. <i>affinis</i> (Dugite)			
855.	25263 <i>Pseudonaja modesta</i> (Ringed Brown Snake)			
856.	25264 <i>Pseudonaja nuchalis</i> (Gwardar)			
857.	25433 <i>Pseudophryne guentheri</i> (Crawling Toadlet)			
858.	24388 <i>Psophodes nigrogularis</i> subsp. <i>nigrogularis</i>		T	
859.	28000 <i>Psora decipiens</i>			
860.	1697 <i>Pterostylis scabra</i> (Bronze Shell Orchid)			
861.	11251 <i>Ptilotus divaricatus</i> var. <i>divaricatus</i>			
862.	2721 <i>Ptilotus exaltatus</i> (Tall Mulla Mulla)			
863.	11577 <i>Ptilotus gaudichaudii</i> var. <i>gaudichaudii</i>			
864.	12001 <i>Ptilotus gaudichaudii</i> var. <i>parviflorus</i>			
865.	2732 <i>Ptilotus holosericeus</i>			
866.	2733 <i>Ptilotus humilis</i>			
867.	2742 <i>Ptilotus manglesii</i> (Pom Poms)			
868.	2747 <i>Ptilotus obovatus</i> (Cotton Bush)			
869.	2751 <i>Ptilotus polystachyus</i> (Prince of Wales Feather)			
870.	25008 <i>Pygopus lepidopodus</i> (Common Scaly Foot)			
871.	24278 <i>Pyrrholaemus brunneus</i> (Redthroat)			
872.	25279 <i>Ramphotyphlops hamatus</i>			
873.	25288 <i>Ramphotyphlops waitii</i>			
874.	3061 <i>Raphanus raphanistrum</i> (Wild Radish)	Y		
875.	24776 <i>Recurvirostra novaehollandiae</i> (Red-necked Avocet)			
876.	3084 <i>Reseda lutea</i> (Cutleaf Mingonette)	Y		
877.	3085 <i>Reseda luteola</i> (Wild Mingonette)	Y		
878.	<i>Reticypris clava</i>			
879.	2577 <i>Rhagodia acicularis</i> (Wongan Rhagodia)		T	
880.	2581 <i>Rhagodia drummondii</i>			
881.	2584 <i>Rhagodia preissii</i>			
882.	11254 <i>Rhagodia preissii</i> subsp. <i>preissii</i>			
883.	19495 <i>Rhagodia</i> sp. <i>Watheroo</i> (R.J. Cranfield & P.J. Spencer 8183)			
884.	<i>Rhantus suturalis</i>			
885.	25614 <i>Rhipidura leucophrys</i> (Willie Wagtail)			
886.	13239 <i>Rhodanthe chlorocephala</i>			
887.	13240 <i>Rhodanthe chlorocephala</i> subsp. <i>chlorocephala</i>			Y
888.	13300 <i>Rhodanthe citrina</i>			
889.	13294 <i>Rhodanthe laevis</i>			
890.	13234 <i>Rhodanthe manglesii</i>			
891.	13296 <i>Rhodanthe polycephala</i>			
892.	13252 <i>Rhodanthe pygmaea</i>			
893.	13254 <i>Rhodanthe stricta</i>			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
894.	6599 <i>Rhyncharrhena linearis</i> (Bush Bean)			
895.	4698 <i>Ricinocarpos muricatus</i>			
896.	19942 <i>Ricinocarpos undulatus</i>			
897.	10970 <i>Rostraria cristata</i>	Y		
898.	11151 <i>Rostraria pumila</i>	Y		
899.	114 <i>Ruppia maritima</i> (Sea Tassel)			
900.	116 <i>Ruppia polycarpa</i>			
901.	40431 <i>Rytidosperma acerosum</i>			
902.	40425 <i>Rytidosperma caespitosum</i>			
903.	2906 <i>Sagina apetala</i> (Annual Pearlwort)	Y		
904.	30434 <i>Salsola australis</i>			
905.	2356 <i>Santalum acuminatum</i> (Quandong)			
906.	2358 <i>Santalum murrayanum</i> (Bitter Quandong)			
907.	2359 <i>Santalum spicatum</i> (Sandalwood)			
908.	2817 <i>Sarcozona praecox</i> (Sarcozona)			
909.	7615 <i>Scaevola hamiltonii</i>			
910.	7618 <i>Scaevola humifusa</i> (Procumbent Scaevola)			
911.	7643 <i>Scaevola sericophylla</i>			
912.	7644 <i>Scaevola spinescens</i> (Currant Bush)			
913.	597 <i>Schismus barbatus</i> (Kelch Grass)	Y		
914.	8200 <i>Schoenia cassiniana</i> (Schoenia)			
915.	17607 <i>Schoenus calcatus</i>			
916.	993 <i>Schoenus hexandrus</i>			
917.	994 <i>Schoenus humilis</i>			
918.	1002 <i>Schoenus nanus</i> (Tiny Bog Rush)			
919.	1006 <i>Schoenus odontocarpus</i>			
920.	18164 <i>Schoenus</i> sp. <i>smooth culms</i> (K.R. Newbey 7823)			
921.	6031 <i>Scholtzia drummondii</i>			
922.	14675 <i>Scholtzia</i> sp. <i>Gunyidi</i> (J.D. Briggs 1721)		P2	
923.	2609 <i>Sclerolaena diacantha</i> (Grey Copperburr)			
924.	2612 <i>Sclerolaena eurotioides</i> (Fluffy Bindii)			
925.	2626 <i>Sclerolaena parviflora</i> (Small-flower Saltbush)			
926.	8207 <i>Senecio glossanthus</i> (Slender Groundsel)			
927.	25881 <i>Senecio lacustrinus</i>			
928.	20161 <i>Senecio pinnatifolius</i>			
929.	25889 <i>Senecio spanomerus</i>			
930.	12276 <i>Senna artemisioides</i> subsp. <i>filifolia</i>			
931.	18444 <i>Senna charlesiana</i>			
932.	25534 <i>Sericornis frontalis</i> (White-browed Scrubwren)			
933.	4970 <i>Sida calyxhymenia</i> (Tall Sida)			
934.	16924 <i>Sida spodochroma</i>			
935.	<i>Sigara mullaka</i>			
936.	2909 <i>Silene gallica</i> (French Catchfly)	Y		
937.	15972 <i>Silene gallica</i> var. <i>gallica</i>	Y		
938.	2910 <i>Silene nocturna</i> (Mediterranean Catchfly)	Y		
939.	14583 <i>Siloxerus multiflorus</i>			
940.	25266 <i>Simoselaps bertholdi</i> (Jan's Banded Snake)			
941.	3070 <i>Sisymbrium irio</i> (London Rocket)	Y		
942.	3072 <i>Sisymbrium orientale</i> (Indian Hedge Mustard)	Y		
943.	30948 <i>Smicromis brevirostris</i> (Weebill)			
944.	24108 <i>Sminthopsis crassicaudata</i> (Fat-tailed Dunnart)			
945.	7013 <i>Solanum hoplopetalum</i> (Thorny Solanum)			
946.	7018 <i>Solanum lasiophyllum</i> (Flannel Bush)			
947.	7023 <i>Solanum nummularium</i> (Money-leaved Solanum)			
948.	7025 <i>Solanum oldfieldii</i>			
949.	8231 <i>Sonchus oleraceus</i> (Common Sowthistle)	Y		
950.	623 <i>Spartochloa scirpoidea</i>			
951.	2913 <i>Spergula pentandra</i> (Five Anther Spurry)	Y		
952.	2914 <i>Spergularia diandra</i> (Lesser Sand Spurry)	Y		
953.	8900 <i>Spergularia marina</i>			
954.	33619 <i>Spergularia tasmanica</i>			
955.	4733 <i>Stackhousia monogyna</i>			
956.	16198 <i>Stenanthemum intricatum</i>			
957.	13476 <i>Stenanthemum pomaderroides</i>			
958.	30212 <i>Stenopetalum lineare</i> var. <i>lineare</i>			
959.	19419 <i>Stenopetalum salicola</i>			
960.	<i>Sternopriscus multimaculatus</i>			
961.	25597 <i>Strepera versicolor</i> (Grey Currawong)			
962.	25590 <i>Streptopelia senegalensis</i> (Laughing Turtle-Dove)			
963.	7698 <i>Stylidium caricifolium</i> (Milkmaids)			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
964.	7704 <i>Stylidium confluens</i>			
965.	7721 <i>Stylidium emarginatum</i>			
966.	7749 <i>Stylidium leptophyllum</i> (Needle-leaved Triggerplant)			
967.	7751 <i>Stylidium limbatum</i> (Fringed-leaved Triggerplant)			
968.	7767 <i>Stylidium nungarinense</i> (Nungarin Triggerplant)			
969.	7785 <i>Stylidium repens</i> (Matted Triggerplant)			
970.	19247 <i>Stylidium septentrionale</i>			
971.	17992 <i>Stylidium</i> sp. Bindoon (K.F. Kenneally 11405)			
972.	17578 <i>Stylidium udusicola</i>			
973.	7810 <i>Stylidium yilgarnense</i> (Yilgarn Triggerplant)			
974.	3181 <i>Stylobasium australe</i>			
975.	1260 <i>Stypandra glauca</i> (Blind Grass)			
976.	6476 <i>Styphelia tenuiflora</i> (Common Pinheath)			
977.	25269 <i>Suta fasciata</i> (Rosen's Snake)			
978.	16868 <i>Synaphea constricta</i>		P3	
979.	16761 <i>Synaphea interioris</i>			
980.	2329 <i>Synaphea spinulosa</i>			
981.	25705 <i>Tachybaptus novaehollandiae</i> (Australasian Grebe)			
982.	24185 <i>Tadarida australis</i> (White-striped Freetail-bat)			
983.	24331 <i>Tadorna tadornoides</i> (Australian Shelduck)			
984.	30870 <i>Taeniopygia guttata</i> (Zebra Finch)			
985.	<i>Tanytarsus barbitarsis</i>			
986.	<i>Tanytarsus fuscithorax/semibarbitarsus</i>			
987.	31918 <i>Tecticornia doleiformis</i> (Samphire)			
988.	31714 <i>Tecticornia fimbriata</i>		P3	
989.	33236 <i>Tecticornia halocnemoides</i> (Shrubby Samphire)			
990.	33319 <i>Tecticornia indica</i> subsp. <i>bidens</i>			
991.	31718 <i>Tecticornia lepidosperma</i>			
992.	31674 <i>Tecticornia peltata</i>			
993.	33297 <i>Tecticornia pergranulata</i> subsp. <i>pergranulata</i> (Blackseed Samphire)			
994.	33216 <i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)			
995.	31716 <i>Tecticornia syncarpa</i>			
996.	4248 <i>Templetonia aculeata</i>			
997.	35840 <i>Templetonia ceracea</i>			
998.	4257 <i>Templetonia smithiana</i>			
999.	6937 <i>Teucrium sessiliflorum</i> (Camel Bush)			
1000.	1702 <i>Thelymitra campanulata</i> (Shirt Orchid)			
1001.	1714 <i>Thelymitra sargentii</i> (Freckled Sun Orchid)			
1002.	1718 <i>Thelymitra villosa</i> (Custard Orchid)			
1003.	5103 <i>Thomasia tremandroides</i>			
1004.	6053 <i>Thryptomene cuspidata</i>			
1005.	1338 <i>Thysanotus manglesianus</i> (Fringed Lily)			
1006.	1343 <i>Thysanotus patersonii</i>			
1007.	1348 <i>Thysanotus rectantherus</i>			
1008.	29456 <i>Thysanotus</i> sp. Twining Wheatbelt (N.H. Brittan 81/29)			
1009.	1351 <i>Thysanotus sparteus</i>			
1010.	25203 <i>Tiliqua occipitalis</i> (Western Bluetongue)			
1011.	25549 <i>Todiramphus sanctus</i> (Sacred Kingfisher)			
1012.	6268 <i>Trachymene cyanopetala</i>			
1013.	6279 <i>Trachymene ornata</i> (Spongefruit)			
1014.	6280 <i>Trachymene pilosa</i> (Native Parsnip)			
1015.	1483 <i>Tribonanthes longipetala</i>			
1016.	15509 <i>Trifolium tomentosum</i> var. <i>tomentosum</i>	Y		
1017.	33676 <i>Triglochin calcitrapa</i>			
1018.	33677 <i>Triglochin centrocarpa</i>			
1019.	146 <i>Triglochin minutissima</i>			
1020.	147 <i>Triglochin mucronata</i>			
1021.	19174 <i>Triglochin</i> sp. A Flora of Australia (G.J. Keighery 2477)			
1022.	150 <i>Triglochin stowardii</i>			
1023.	<i>Triplectides australis</i>			
1024.	32451 <i>Triquetrella papillata</i>			
1025.	4840 <i>Trymalium daphnifolium</i>			
1026.	24852 <i>Tyto alba</i> subsp. <i>delicatula</i> (Barn Owl)			
1027.	10880 <i>Urodon capitatus</i>		P3	
1028.	8254 <i>Urospermum picroides</i> (False Hawkbit)	Y		
1029.	8255 <i>Ursinia anthemoides</i> (Ursinia)	Y		
1030.	28092 <i>Usnea scabrida</i>			
1031.	24386 <i>Vanellus tricolor</i> (Banded Lapwing)			
1032.	25218 <i>Varanus gouldii</i> (Bungarra or Sand Monitor)			
1033.	7656 <i>Velleia cycnopotamica</i>			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
1034.	7658 <i>Velleia discophora</i> (Cabbage Poison)			
1035.	7664 <i>Velleia rosea</i> (Pink Velleia)			
1036.	7666 <i>Verreauxia reinwardtii</i> (Common Verreauxia)			
1037.	12388 <i>Verticordia acerosa</i> var. <i>preissii</i>			
1038.	6071 <i>Verticordia brachypoda</i>			
1039.	6073 <i>Verticordia chrysantha</i>			
1040.	12402 <i>Verticordia chrysanthella</i>			
1041.	12411 <i>Verticordia densiflora</i> var. <i>cespitosa</i>			
1042.	15432 <i>Verticordia densiflora</i> var. <i>densiflora</i>			
1043.	15621 <i>Verticordia endlicheriana</i> var. <i>compacta</i>			
1044.	12422 <i>Verticordia eriocephala</i> (Common Cauliflower)			
1045.	6083 <i>Verticordia grandis</i> (Scarlet Featherflower)			
1046.	12433 <i>Verticordia insignis</i> subsp. <i>compta</i>			
1047.	15435 <i>Verticordia monadelpha</i> var. <i>monadelpha</i>			
1048.	14716 <i>Verticordia muelleriana</i> subsp. <i>muelleriana</i>		P3	
1049.	6109 <i>Verticordia picta</i> (Painted Featherflower)			
1050.	6113 <i>Verticordia pritzelii</i> (Pritzel's Featherflower)			
1051.	6114 <i>Verticordia rennieana</i>			
1052.	12455 <i>Verticordia roei</i> subsp. <i>meiogona</i>		P1	
1053.	15614 <i>Verticordia staminosa</i> subsp. <i>staminosa</i>		T	
1054.	12468 <i>Verticordia venusta</i>		P3	
1055.	12471 <i>Verticordia wonganensis</i>		P2	
1056.	11018 <i>Vulpia muralis</i>	Y		
1057.	724 <i>Vulpia myuros</i> (Rat's Tail Fescue)	Y		
1058.	33101 <i>Vulpia myuros</i> forma <i>myuros</i>	Y		
1059.	7389 <i>Wahlenbergia preissii</i>			
1060.	8275 <i>Waitzia acuminata</i> (Orange Immortelle)			
1061.	13331 <i>Waitzia acuminata</i> var. <i>acuminata</i>			
1062.	13328 <i>Waitzia nitida</i>			
1063.	9247 <i>Westringia rigida</i> (Stiff Westringia)			
1064.	6659 <i>Wilsonia humilis</i> (Silky Wilsonia)			
1065.	12072 <i>Wurmbea dioica</i> subsp. <i>alba</i>			
1066.	1395 <i>Wurmbea drummondii</i> (York Gum Nancy)			
1067.	1401 <i>Wurmbea pygmaea</i>			
1068.	1403 <i>Wurmbea tenella</i> (Eight Nancy)			
1069.	<i>Xanthagrion erythronerum</i>			
1070.	28172 <i>Xanthoparmelia reptans</i>			
1071.	28327 <i>Xanthoparmelia semiviridis</i>			
1072.	12685 <i>Xanthosia bungei</i>			
1073.	2330 <i>Xylomelum angustifolium</i> (Sandplain Woody Pear)			
1074.	7113 <i>Zaluzianskya divaricata</i> (Spreading Night Phlox)	Y		
1075.	25765 <i>Zosterops lateralis</i> (Grey-breasted White-eye)			
1076.	12358 <i>Zygophyllum angustifolium</i>			
1077.	4385 <i>Zygophyllum apiculatum</i> (Gallweed)			
1078.	17277 <i>Zygophyllum lobulatum</i>			
1079.	4394 <i>Zygophyllum ovatum</i> (Dwarf Twinleaf)			
1080.	12359 <i>Zygophyllum simile</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.

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## Appendix J

# Locations of Threatened and Priority Flora recorded within the Survey area

Northam to Pithara Road Biological Survey (Ballidu to Pithara) - Appendix J - Locations of Threatened and Priority Flora recorded within the Study Area

Description	Species	Number	Time	Easting	Northing
Priority Flora	Acacia ?dissona var. indoloria (P3)			470125	6628221
Priority Flora	Acacia ?scalena (P3)	1	2012-05-23T02:35:50Z	478458.1065	6613359.56
Priority Flora	Acacia lirellata subsp. compressa (P2)	1	2012-05-23T02:07:14Z	478300.636	6613972.629
Priority Flora	Dampiera ?glabrescens (P1)	2	2012-05-23T01:21:14Z	478300.1785	6614057.072
Priority Flora	Dampiera ?glabrescens (P1)	10	2012-05-23T01:21:32Z	478296.5386	6614055.735
Priority Flora	Dampiera ?glabrescens (P1)	3	2012-05-23T01:22:30Z	478297.0231	6614053.187
Priority Flora	Dampiera ?glabrescens (P1)	2	2012-05-23T01:22:45Z	478298.1758	6614051.971
Priority Flora	Dampiera ?glabrescens (P1)	3	2012-05-23T01:23:02Z	478296.6434	6614051.303
Priority Flora	Dampiera ?glabrescens (P1)	4	2012-05-23T01:24:01Z	478296.6485	6614048.754
Priority Flora	Dampiera ?glabrescens (P1)	2	2012-05-23T01:25:48Z	478298.1896	6614045.1
Priority Flora	Dampiera ?glabrescens (P1)	1	2012-05-23T01:26:26Z	478297.0529	6614038.338
Priority Flora	Dampiera ?glabrescens (P1)	1	2012-05-23T01:26:42Z	478296.1909	6614038.003
Priority Flora	Dampiera ?glabrescens (P1)	5	2012-05-23T01:27:55Z	478295.6207	6614035.564
Priority Flora	Dampiera ?glabrescens (P1)	3	2012-05-23T01:28:14Z	478295.8233	6614030.135
Priority Flora	Dampiera ?glabrescens (P1)	1	2012-05-23T01:28:30Z	478295.3418	6614031.242
Priority Flora	Dampiera ?glabrescens (P1)	3	2012-05-23T01:28:44Z	478296.6851	6614030.58
Priority Flora	Dampiera ?glabrescens (P1)	2	2012-05-23T01:29:14Z	478299.0869	6614027.925
Priority Flora	Dampiera ?glabrescens (P1)	2	2012-05-23T01:29:47Z	478300.6212	6614027.595
Priority Flora	Dampiera ?glabrescens (P1)	1	2012-05-23T01:30:01Z	478301.7758	6614025.492
Priority Flora	Dampiera ?glabrescens (P1)	1	2012-05-23T01:30:43Z	478298.7003	6614029.475
Priority Flora	Dampiera ?glabrescens (P1)	3	2012-05-23T01:31:25Z	478301.9372	6614040.564
Priority Flora	Dampiera ?glabrescens (P1)	2	2012-05-23T01:31:41Z	478302.3179	6614041.894
Priority Flora	Dampiera ?glabrescens (P1)	1	2012-05-23T01:32:21Z	478301.9916	6614061.176
Priority Flora	Dampiera ?glabrescens (P1)	1	2012-05-23T01:32:37Z	478300.6386	6614066.604
Priority Flora	Dampiera ?glabrescens (P1)	10	2012-05-23T01:32:56Z	478301.8736	6614072.147
Priority Flora	Dampiera ?glabrescens (P1)	5	2012-05-23T01:33:16Z	478301.0033	6614075.913
Priority Flora	Dampiera ?glabrescens (P1)	3	2012-05-23T01:33:43Z	478298.5949	6614081.893
Priority Flora	Dampiera ?glabrescens (P1)	30	2012-05-23T01:53:18Z	478297.5666	6613925.968
Priority Flora	Dampiera ?glabrescens (P1)	20	2012-05-23T01:54:14Z	478298.8985	6613930.958
Priority Flora	Dampiera ?glabrescens (P1)	5	2012-05-23T01:54:54Z	478296.2988	6613936.715
Priority Flora	Dampiera ?glabrescens (P1)	1	2012-05-23T01:58:52Z	478294.9466	6613989.462
Priority Flora	Dampiera ?glabrescens (P1)	10	2012-05-23T01:59:51Z	478300.7666	6614002.994
Priority Flora	Dampiera ?glabrescens (P1)	4	2012-05-23T02:00:34Z	478299.7033	6614007.424
Priority Flora	Dampiera ?glabrescens (P1)	10	2012-05-23T02:01:03Z	478298.0646	6614011.965
Priority Flora	Dampiera ?glabrescens (P1)	10	2012-05-23T02:03:26Z	478292.5994	6614012.619
Priority Flora	Dampiera ?glabrescens (P1)	15	2012-05-23T02:04:55Z	478294.3565	6613996.886
Priority Flora	Dampiera ?glabrescens (P1)	10	2012-05-23T02:06:32Z	478298.3247	6613977.944
Priority Flora	Dampiera ?glabrescens (P1)	10	2012-05-23T02:07:46Z	478299.6903	6613966.2
Priority Flora	Dampiera ?glabrescens (P1)	5	2012-05-23T02:36:14Z	478454.7515	6613359.664
Priority Flora	Dampiera ?glabrescens (P1)	10	2012-05-23T02:40:02Z	478440.0242	6613438.649
Priority Flora	Dampiera ?glabrescens (P1)	2	2012-05-23T02:44:03Z	478440.1066	6613445.409
Priority Flora	Dampiera ?glabrescens (P1)	10	2012-05-23T02:44:17Z	478441.9339	6613442.31
Priority Flora	Dampiera ?glabrescens (P1)	1	2012-05-23T02:44:42Z	478444.9281	6613430.901
Priority Flora	Dampiera ?glabrescens (P1)	5	2012-05-23T04:00:31Z	478351.0415	6612690.883
Priority Flora	Dampiera ?glabrescens (P1)	4	2012-05-23T04:01:07Z	478351.1478	6612685.675
Priority Flora	Dampiera ?glabrescens (P1)	1	2012-05-23T04:07:13Z	478337.3695	6612578.595
Priority Flora	Dampiera ?glabrescens (P1)	2	2012-05-23T05:23:42Z	478230.2613	6611844.2
Priority Flora	Dampiera ?glabrescens (P1)	5	2012-05-23T05:24:48Z	478234.6585	6611897.292
Priority Flora	Dampiera ?glabrescens (P1)	10	2012-05-23T01:24:48Z	478307.4561	6614060.855
Priority Flora	Dampiera ?glabrescens (P1)	20	2012-05-23T01:25:57Z	478306.5789	6614068.056
Priority Flora	Dampiera ?glabrescens (P1)	5	2012-05-23T01:29:32Z	478306.9525	6614025.281
Priority Flora	Dampiera ?glabrescens (P1)	15	2012-05-23T01:30:22Z	478299.4757	6614025.266
Priority Flora	Dampiera ?glabrescens (P1)	1	2012-05-23T02:00:04Z	478304.9838	6614003.224
Priority Flora	Dampiera ?glabrescens (P1)	1	2012-05-23T02:00:13Z	478305.8434	6614004.777
Priority Flora	Dampiera ?glabrescens (P1)	15	2012-05-23T02:02:03Z	478322.0013	6614025.644
Priority Flora	Dampiera ?glabrescens (P1)	20	2012-05-23T02:04:49Z	478270.7631	6614003.155
Priority Flora	Dampiera ?glabrescens (P1)	5	2012-05-23T02:06:05Z	478269.8615	6613974.894
Threatened Flora	Grevillea dryandroides subsp. dryandroides	1	2012-05-23T05:01:18Z	478186.0647	6611567.727
Threatened Flora	Grevillea dryandroides subsp. dryandroides	1	2012-05-23T05:04:00Z	478189.1474	6611607.185
Threatened Flora	Grevillea dryandroides subsp. dryandroides	1	2012-05-23T05:15:07Z	478256.5758	6612054.478
Threatened Flora	Grevillea dryandroides subsp. dryandroides	1	2012-05-23T05:17:32Z	478251.7808	6612008.478
Threatened Flora	Grevillea dryandroides subsp. dryandroides	1	2012-05-23T05:17:39Z	478249.1981	6612006.035
Threatened Flora	Grevillea dryandroides subsp. dryandroides	1	2012-05-23T05:02:10Z	478203.111	6611573.856
Threatened Flora	Grevillea dryandroides subsp. dryandroides	1	2012-05-23T05:03:16Z	478205.4903	6611582.062
Threatened Flora	Grevillea dryandroides subsp. dryandroides	1	2012-05-23T05:17:56Z	478264.3585	6611997.2
Threatened Flora	Grevillea dryandroides subsp. dryandroides	2	2012-05-23T05:18:21Z	478261.3897	6611996.086

Appendix K

# Summary of Rare Flora Markers within the Survey area

## Appendix K - Summary of Rare Flora Markers within the Study Area

Site ID	Easting	Northing	Side of Road	Direction Facing	Target species (based on DEC records)	Comment	Photo
WP98	478378.6857	6613005.112	West	South	Unknown	No threatened or priority species observed.	
WP99	478177.6726	6611547.319	East	North	<i>Grevillea dryandroides</i> subsp. <i>dryandroides</i> (T)	Four individuals recorded	

Site ID	Easting	Northing	Side of Road	Direction Facing	Target species (based on DEC records)	Comment	Photo
WP103	478255.8248	6612046.719	East	South	<i>Grevillea dryandroides</i> subsp. <i>dryandroides</i>	Five individuals recorded	
WP89	478306.3883	6612399.781	East	North	<i>Grevillea dryandroides</i> subsp. <i>dryandroides</i> (T) ?	No Threatened flora recorded	

Site ID	Easting	Northing	Side of Road	Direction Facing	Target species (based on DEC records)	Comment	Photo
WP91	478284.4282	6612405.832	West	North	Unknown	No Threatened flora recorded	
WP22	468254.7833	6631186.955	East	South	Boronia ericifolia	No Threatened flora recorded No <i>Boronia ericifolia</i> recorded	No Photo Record
WP32	468290.942	6631035.351	East	North	Boronia ericifolia	No Threatened flora recorded No <i>Boronia ericifolia</i> recorded	No Photo Record
WP43	478292.2605	6614085.759	East	South	Grevillea dryandroides subsp. dryandroides	No Grevillea dryandroides subsp. dryandroides Dampiera ?glabrescens (P1) recorded	

Site ID	Easting	Northing	Side of Road	Direction Facing	Target species (based on DEC records)	Comment	Photo
WP68	478294.4817	6614029.91	East	North	Grevillea dryandroides subsp. dryandroides	No Grevillea dryandroides subsp. dryandroides Dampiera ?glabrescens (P1) recorded	No Photo Record
WP69	478298.2373	6613926.08	East	Not recorded	Grevillea dryandroides subsp. dryandroides ?	No Grevillea dryandroides subsp. dryandroides Dampiera ?glabrescens (P1) recorded	No Photo Record
WP82	478435.6526	6613276.068	East	North	Dampiera glabrescens (P1) ?	No significant flora recorded at this location	