Appendix B

Appendix B: Proposed Keyneton Wind Farm; Flora and Fauna Assessment (EBS Ecology)

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PROPOSED KEYNETON WIND FARM
FLORA AND FAUNA ASSESSMENT

Proposed Keyneton Wind Farm
Flora & Fauna Assessment

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Version 5

Prepared by EBS Ecology for Pacific Hydro Pty. Ltd.

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Front cover photo: SA Blue Gum (*Eucalyptus leucoxylon* ssp. *leucoxylon*), proposed Keyneton Wind Farm.

ebs ecology

Executive Summary

EBS Ecology conducted two flora and fauna surveys at the proposed Keyneton Wind Farm situated in north eastern Mount Lofty Ranges (South Australia as follows:

- a flora and fauna survey, completed in September 2008 – referred to as spring 2008 and
- a flora and fauna survey, completed in October/November 2009 – referred to as spring 2009.

This report does not include bird utilisation or bat surveys undertaken at the project site by EBS Ecology, which are documented in separate reports (EBS 2011a and b). No EPBC listed flora species of national conservation significance were identified during the survey. The State rare *Anogramma leptophylla* (Annual Fern) was recorded during the spring 2009 survey, found within vegetation association 12; *Allocasuarina verticillata* (Drooping Sheoak), *Acacia paradoxa* (Kangaroo Thorn) and *Dodonaea viscosa* (Sticky Hop Bush) Open Woodland over Grassland.

Two nationally threatened ecological communities were identified as possibly occurring within the project site: Peppermint Box (*Eucalyptus odorata)* Grassy Woodland of South Australia and Iron-Grass Natural Temperate Grassland of South Australia. The Peppermint Box (*Eucalyptus odorata*) Grassy Woodland was found to occur within vegetation associations 5 and 10. After further assessment in spring 2009, all patches were found to be in poor condition and therefore did not qualify as critically endangered under the *EPBC Act 1999.*

A total of 59 weed species were detected within the study area during the survey. Eight of these are declared plants under the *Natural Resources Management Act, 2004* and another 17 species are regarded as environmental weed species.

Few terrestrial fauna species were observed during the vegetation assessment. While the fauna habitat value of the proposed project site is generally poor, there are a number of locations within the project site that may provide important refuge and resources for amphibious species. Two species of frog were identified from calls, *Crinia signifera* (Common Froglet) and *Limnodynastes dumerilii* (Banjo Frog). Many areas of woodland within the site contain trees either with existing hollows or the ability to develop hollows in the future. The rocky outcrops and woodlands within the project site provide breeding, feeding and basking sites for a range of reptiles. Three reptile species were recorded during this survey; *Pogona barbata* (Eastern Bearded Dragon), *Tiliqua rugosa* (Sleepy Lizard) and *Tiliqua scincoides Tiliqua scincoides (*Eastern Bluetongue).

Pacific Hydro's proposed layout has been designed so as to avoid potential impacts to areas of conservation significance. All turbines are proposed outside these areas of significance. Associated access tracks and infrastructure will also be designed to follow existing tracks wherever possible and to also avoid areas of significance.

Where impacts are unavoidable, it is recommended that impacts are minimised. To this extent, the only potential impacts upon areas of significance are within the project's southern cluster, to site entry/exit points along Pine Hut Road. At these locations, existing site access points to site will be utilised, however some minor impacts to existing native vegetation may be necessary if these points are to be widened. Pacific Hydro will need to address Significant Environmental Benefit (SEB) obligations for any native vegetation clearance undertaken. The areas where Peppermint Box were found (within vegetation associations 5 and 10), may be a suitable location to direct SEBs.

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GLOSSARY AND ABBREVIATION OF TERMS

BDBSA	Biological Databases of South Australia (managed by DENR)
Bonn Convention	Convention on the Conservation of Migratory Species of Wild Animals
CP	Conservation Park
DEH	Department of Environment and Heritage (now known as DENR)
DENR	Department of Environment and Natural Resources
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities
EBS	Environmental and Biodiversity Services
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
IBRA	Interim Biogeographical Regionalisation of Australia
JAMBA	Japan Australia Migratory Bird Agreement
NP	National Park
NPW Act	*National Parks and Wildlife Act 1972*
Priority species	a species expected to be at relatively greater risk than other species
Project area	the broader geographical location (20km buffer) within which the project site is situated
Project site	the area that was surveyed within the proposed wind farm boundary (as provided by Pacific Hydro)
SA	South Australia
SEB	Significant Environmental Benefit
ssp.	subspecies
sp.	species (singular)
spp.	species (plural)
TEC	Threatened Ecological Community

1 INTRODUCTION

1.1 Location

The proposed Keyneton Wind Farm is located approximately 65 kilometres northeast of Adelaide, six kilometres west of Sedan and approximately 10 kilometres east of Angaston. It is situated within the eastern hills of the Mt Lofty Ranges and is generally bound by: the Marne River to the south, the townships of Cambrai (to the south-east), Towitta (north-east), Moculta (north-west) and Eden Valley (south-west) (Figure 1). Land uses within the area are predominantly agriculture (grazing areas for sheep, alpacas and horses), cropping and horticulture (vineyards).

The project consists of 42 turbines located in two clusters; the northern area comprising of 22 turbines and the southern 20 turbines (Figure 2). The project site extends approximately 15 kilometres in a north to south direction (with an approx five kilometre gap between the clusters) and is located in the Mid Murray Council Area.

1.2 Survey effort

Two flora and fauna assessments have been undertaken at the proposed Keyneton Wind Farm by EBS Ecology on behalf of Pacific Hydro Pty Ltd. These included:

- a flora and fauna assessment, completed in September 2008 – referred to as spring 2008
- flora and fauna surveys completed in October/November 2009 – referred to as spring 2009.

The spring 2008 vegetation assessment provided a broad overview of native vegetation present on site (including types and condition) for the purpose of an initial scope for the proposed wind farm site. The spring 2009 survey detailed species records and refined the vegetation association mapping initially undertaken in 2008. By undertaking the 2009 survey in late spring, the majority of flora species were identifiable, which maximised survey accuracy. The report provides an inventory of the vegetation associations present within potentially impacted areas. Particular reference is given to association condition, biodiversity value, threatened ecological community status and habitat value for species of conservation significance.

The survey results have been used by Pacific Hydro to inform and refine the turbine layout (i.e. – to avoid and minimise potential impacts), detail potential impacts of the construction and operation of the proposed wind farm and make recommendations in relation to avoiding or mitigating potential impacts.

This report does not include reference to bird utilisation or bat survey assessments undertaken at the project site by EBS Ecology. Please refer to *Bat surveys at the proposed Keyneton Wind Farm* (EBS 2011a) and *Proposed Keyneton Wind Farm Avifauna and Raptor Nest Assessment* (EBS 2011b) for more information.

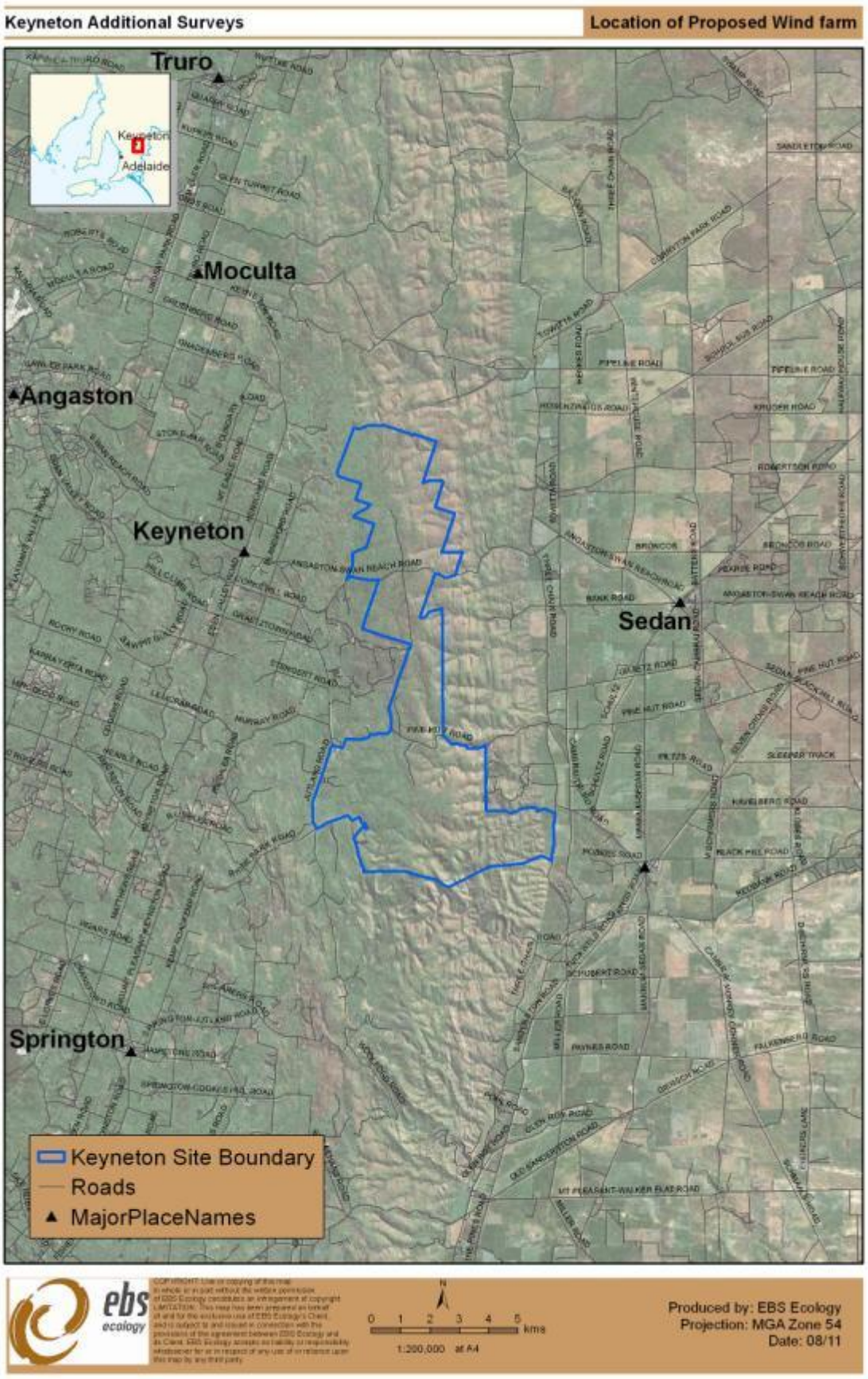


Figure 1. Location of the proposed Keyneton wind farm project site, Northern Mt. Lofty Ranges Region of South Australia.

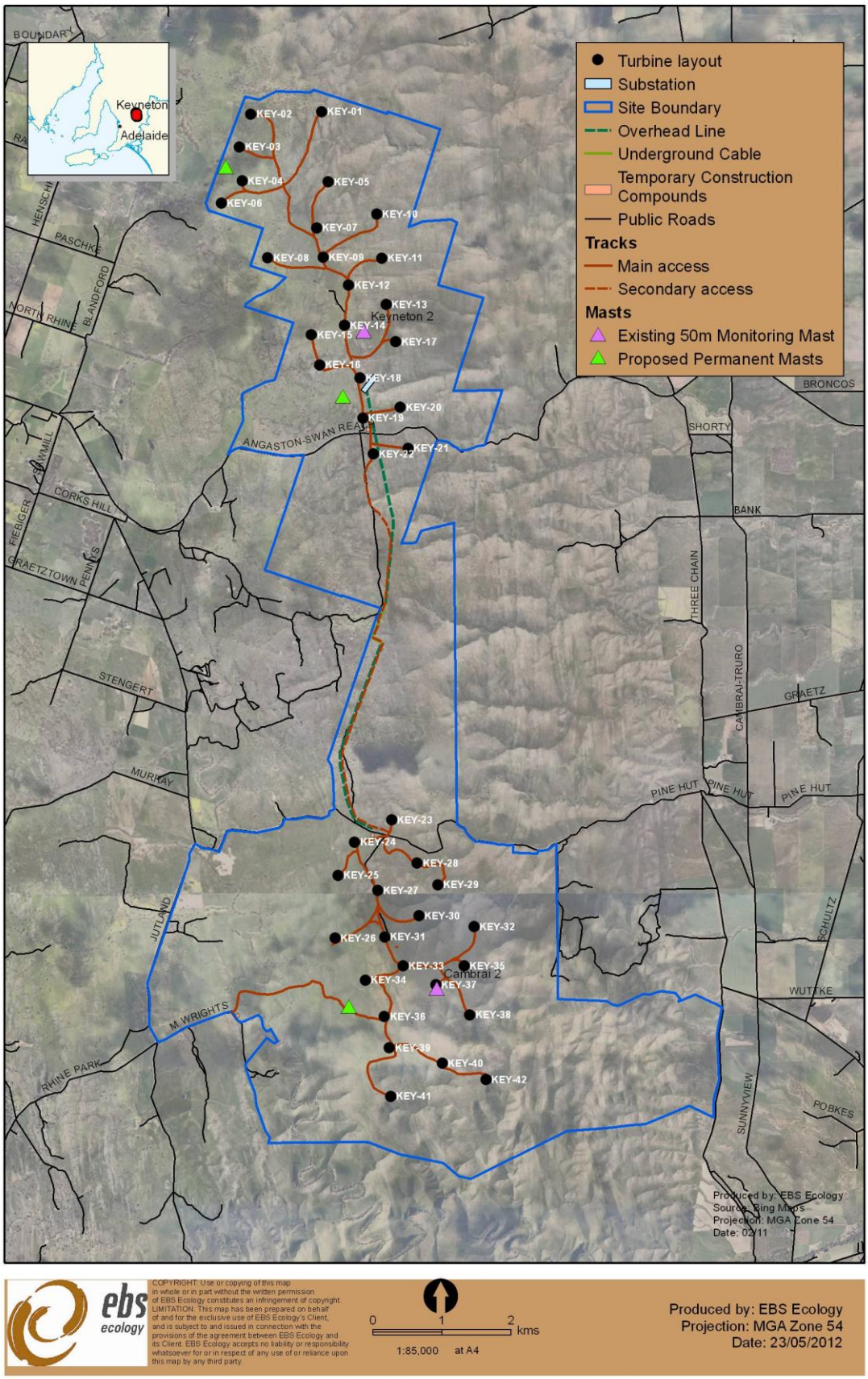


Figure 2. Location of the proposed turbines within the Keyneton project site.

1.3 Project Aims

- Assess the vegetation present within the area of proposed turbine sites and associated work areas and determine the potential impacts to vegetation in accordance with the *Native Vegetation Act 1991;*
- Undertake a fauna assessment (desktop and field observations) to identify any fauna that is known to, or potentially inhabit the areas to be impacted by the proposed works, and determine the likely impacts on these fauna species;
- Identify any flora or fauna of conservation significance at Local, State and National level that may occur within the areas to be impacted by the works, as identified from review of the relevant biological databases, relevant literature, and field observations;
- Report on any matters of national, state or local environmental significance likely to be impacted upon and review the proposal under the 'Significant Impact Guidelines' of the Commonwealth *Environment Protection and Biodiversity Conservation (EPBC) Act 1999;*
- Identify areas of listed Threatened Ecological Communities and assess these areas against the criteria outlined within the *EPBC Act 1999;*
- Provide photographs representing vegetation associations that will likely be impacted upon;
- Provide mapping that shows the location of surveyed vegetation associations, vegetation condition and any other specific issues detected during the field survey;
- Provide recommendations to avoid and minimise potential impacts, associated with construction and operation of the wind farm.

A specific bird and bat assessment were also undertaken at the project site with aims and results of these surveys discussed in individual reports. Please refer to *Bat surveys at the proposed Keyneton Wind Farm* (EBS 2011a) and *Proposed Keyneton Wind Farm Avifauna and Raptor Nest Assessment* (EBS 2011b) for more information.

2 REGIONAL AND SITE INFORMATION

2.1 Climate

The nearest weather station to the site is located in the township of Nurioopta, in the Barossa Valley region, approximately 14.5 km west of the north-west corner of the site boundary (Figure 1). While the climate conditions in Nurioopta were most likely to have differed than those experienced on site, (namely that the Keyneton site is probably windier, slightly warmer and considerably drier in comparison), it was considered the logical surrogate station when compared to other stations within the wider area (e.g. the mallee plains). The data recorded in Table 1 and graphically displayed in Figure 3, is provided by the Bureau of Meteorology, South Australia (Commonwealth of Australia, 2010).

Table 1. Average monthly rainfall and temperature data, Nurioopta, SA

Month	Temp °C (Mean maximum)	Rainfall mm (mean)
Jan	28.8	18.8
Feb	28.6	18.5
Mar	25.7	22.2
Apr	21.4	38.2
May	17	55
June	14.2	56.3
July	13.2	66.2
Aug	14.3	63.6
Sept	16.8	60
Oct	20.2	49.4
Nov	23.8	29.3
Dec	26.3	24.3

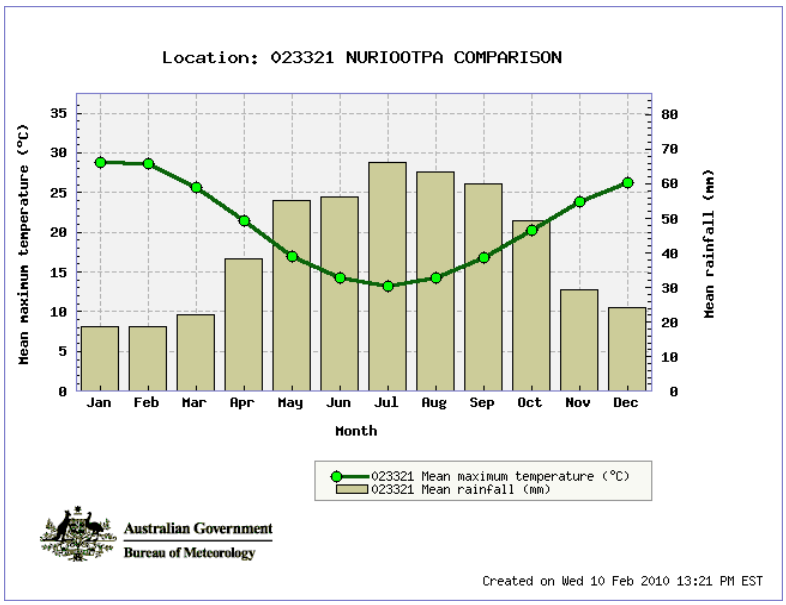


Figure 3. Average monthly rainfall and temperature data, Nurioopta, SA.

2.2 Interim Biogeographical Regionalisation of Australia zones and remnancy

The Keyneton project site occurs across two IBRA (Interim Biogeographical Regionalisation of Australia) Sub-regions: Broughton and Fleurieu, which both form part of the Flinders Lofty Block IBRA Bioregion. It also falls within the Mopami and Scotts Hill Environmental Associations, which DEH (2002) advises was estimated to have 5.6% and 10% of remnant native vegetation respectively (Table 2).

Table 2. Summary of the IBRA Bioregion, Subregion and Environmental Associations for the Keyneton project site

Flinders Lofty Block IBRA Bioregion	
Temperate to arid Proterozoic ranges, alluvial fans and plains, and some outcropping volcanics, with the semi arid to arid north supporting native cypress, black oak (belah) and mallee open woodlands, Eremophila and Acacia shrublands, and bluebush/saltbush chenopod shrublands on shallow, well-drained loams and moderately-deep, well-drained red duplex soils. The increase in rainfall to the south corresponds with an increase in low open woodlands of *Eucalyptus obliqua* (Messmate Stringybark) and *E. baxteri* (Brown Stringybark) on deep lateritic soils, and *E. fasciculosa* (Pink Gum) and *E. cosmophylla* (Cup Gum) on shallower or sandy soils.	
Broughton IBRA Subregion (FLB2)	
This subregion is characterised by a series of wide undulating intramontane basins with red duplex soils, separated by low but distinct northerly trending strike ridges. In the north the region leads into the Southern Flinders Ranges with no sharply defined landform boundary but a land use boundary marking the northern extremity of wheat cultivation. Due to widespread clearing for farming the only significant remnant of native vegetation is found in the Mt Remarkable area, where an open forest dominated by *Eucalyptus cladocalyx* (Sugar Gum) or by *E. goniocalyx* (Long-leaved Box) and *E. leucoxylon* (Bluegum) on reddish dense loams remains. Degraded remnants of *E. leucoxylon* (Bluegum) and *E. odorata* (Peppermint Box) woodlands can still be found on stony crests and steep slopes.	
Landform	Hills and valleys; alternating sub parallel hilly ridges and valleys with a general N-S trend in north. In south, hilly dissected tableland.
Geology	Dissected lateritized surface in south.
Soil	Hard setting loams with red clayey subsoils, highly calcareous loamy earths, hard setting loams with mottled yellow clayey subsoil, coherent sandy soils, cracking clays.
Vegetation	Eucalyptus woodlands with a shrubby understorey.
Remnant vegetation	10.7% of the subregion is mapped as remnant native vegetation, of which 1.5% is protected (1% (1095ha) in formal NPWS reserves and 0.5% (589 ha) is conserved in private Heritage Agreements under the *Native Vegetation Act 1991*.
Protected Areas	3 Conservation Parks
Fleurieu IBRA Subregion (KAN2)	
This subregion is predominantly an undulating to low hilly upland with steeper marginal ranges and hills. A lateritized surface occurs on the Fleurieu Peninsula and becomes increasingly dissected northward to where only a few remnants survive as rounded crests and summits with mottled -yellow duplex soils. The lowest lying areas are within the Inman Valley where soft glacial and fluvio-glacial deposits have been lowered more quickly than the surrounding sedimentary rocks. Much of the native vegetation has been cleared, however some remains in reserves and small isolated inaccessible areas. Low open woodland commonly dominated by *Eucalyptus obliqua* and *E. baxteri* are found in higher rainfall areas on deep, lateritic soils. Shallower or sandy soils support *E. fasciculosa, E cosmophylla* and in the northern part of the region *E. goniocalyx. E leucoxylon* dominates the woodlands on podzolised soils in the lower rainfall areas, *E. viminalis ssp. cygnetensis* (Rough-barked Manna Gum) dominates the wetter and cooler woodlands and *E. odorata* characterises drier sites. Eucalypts give way to *Allocasuarina verticillata* (Drooping Sheoak) in the most arid woodlands and in coastal situations on shallow rocky soils.	
Landform	Hills and valleys; alternating sub parallel hilly ridges and valleys with a general N-S trend in north. In south, hilly dissected tableland.
Geology	Dissected lateritized surface in south.
Soil	Hard setting loams with red clayey subsoils, highly calcareous loamy earths, hard setting loams with mottled yellow clayey subsoil, coherent sandy soils, cracking clays.
Vegetation	Eucalyptus shrublands with a shrubby understorey.

Remnant vegetation	18 Conservation Parks
Protected Areas	Approximately 12.3% of the subregion is mapped as remnant native vegetation, of which 19.5% is protected within NPW reserves (6509ha) and in private Heritage Agreements (1800ha) under the *Native Vegetation Act 1991,* with an additional 555ha in Forestry reserves.
Mopami IBRA Environmental Association	
Landform	Undulating plain on metasediments with low ridges and hills rising above it.
Geology	Metasediments and alluvium.
Soil	Hard pedal red duplex soils, reddish powdery calcareous loams and brown self-mulching cracking clays.
Vegetation	Grasslands and open parkland.
Remnant vegetation	5.6% of the association is mapped as remnant native vegetation, where 1.8% (79ha) is conserved in private Heritage Agreements under the *Native Vegetation Act 1991*
Protected Areas	None
Scotts Hill IBRA Environmental Association	
Landform	Structurally controlled ridges with steep slopes.
Geology	Metasediments.
Soil	Grey-brown weakly structured sandy soils, hard pedal mottled-yellow duplex soils and reddish siliceous loams.
Vegetation	Low woodland of *Allocasuarina verticillata* and *Eucalyptus odorata* and low open scrub of *Prostanthera aspalathoides* (Scarlet Mintbush) and *Correa* sp. (Mallee Correa).
Remnant vegetation	10% of the association is mapped as remnant native vegetation, where 0.5% is conserved in NPW reserves (48ha) and 0.86% (84 ha)
Protected Areas	2 Conservation Parks

NB: All remnancy figures are obtained from DEH data records (December 2007). It should be noted that no information is provided on the condition of the remnant vegetation.

3 COMPLIANCE AND LEGISLATIVE SUMMARY

3.1 Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places – defined in the Act as 'matters of national environmental significance'. The eight matters of national environmental significance protected under the Act are:

- World Heritage properties
- National Heritage places
- wetlands of international importance (listed under the Ramsar Convention)
- listed threatened species and ecological communities
- migratory species protected under international agreements
- Commonwealth marine areas
- the Great Barrier Reef Marine Park
- nuclear actions (including uranium mines).

Any action that has, will have, or is likely to have a significant impact on matters of national environmental significance requires referral under the EPBC Act. Substantial penalties apply for undertaking an action that has, will have or is likely to have significant impact on a matter of national environmental significance without approval.

The EPBC Act Significant Impact Guidelines provide overarching guidance on determining whether an action is likely to have a significant impact on a matter of national environmental significance. In terms of nationally threatened species, the guidelines define an action as likely to have a significant impact if there is a real chance or possibility that it will:

- lead to a long term decrease in the population
- reduce the area of occupancy of the species
- fragment an existing population
- adversely affect critical habitat
- disrupt breeding cycles
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- result in the establishment of invasive species that are harmful to the species
- introduce disease that may cause the species to decline
- interfere with the recovery of the species.

For details of the relevant EPBC matters of national environmental significance database results see section 5.1.1.

3.2 Native Vegetation Act 1991

All native vegetation in South Australia is protected under the provisions of the *Native Vegetation Act 1991* (NV Act), except for certain areas identified in metropolitan Adelaide. The proposed wind farm development is located in the Mid Murray Council municipality where clearance of vegetation is prohibited unless approved by the Native Vegetation Council (NVC) or the activity requiring the clearance is exempt under the Native Vegetation Regulations 2005. In most circumstances, including exemptions, approval to clear vegetation is contingent upon the proponent providing a management plan that demonstrates a suitable SEB, a set aside area of land or payment in to the Native Vegetation Fund for the management of native vegetation that results in a net gain for the environment.

The proposed development is likely to be exempt under ***Exemption 5(1) (d) Building or provision of infrastructure, including infrastructure in the Public Interest*** providing that it complies with each of the sub-sections set out below.

> ***Pursuant to Section 27(1) (b) of the Act, native vegetation may, subject to any other Act or law to the contrary, be cleared if—***
> *(i) —*
> *(A) the clearance is incidental to the construction or expansion of a building or infrastructure and the Minister has, by instrument in writing, declared that he or she is satisfied that the clearance is in the public interest; or*
> *(B) the clearance is required in connection with the provision of infrastructure or services to a building or proposed building, or to any place; and*
> *(ii) any development authorisation required by or under the Development Act 1993 has been obtained; and*
> *(iii) the Council is satisfied (on the basis of information provided to the Council by the person seeking the benefit of this paragraph and such other information as the Council thinks fit) that, after taking into account the need to preserve biological diversity and the nature and purposes of any proposed building or infrastructure that is yet to be constructed, the proposed site of the building or infrastructure is the most suitable that is available; and*
>
> *(iv) the Council is satisfied (on the basis of information provided to the Council by the person seeking the benefit of this paragraph and such other information as the Council thinks fit) that, there is no other practicable alternative that would involve no clearance or the clearance of less vegetation or the clearance of vegetation that is less significant or (if relevant) the clearance of vegetation that has been degraded to a greater extent than the vegetation proposed to be cleared; and*
>
> *(v) the clearance is undertaken in accordance with a standard operating procedure determined or approved by the Council for the purposes of this provision or a management plan that has been approved by the Council, and either—*
> *(A) there will be a significant environmental benefit on the property where the clearance is being undertaken or within the same region of the State; or*
>
> *(B) either—*
> *the owner of the land (or a person acting on his or her behalf); or*
>
> *a person connected with the construction or expansion of the building or infrastructure, or the provision of the infrastructure or services (as the case requires),*

has, on application to the Council to proceed with clearing the vegetation in accordance with this provision, made a payment into the Fund of an amount considered by the Council to be sufficient to achieve a significant environmental benefit in the manner contemplated by section 21(6) of the Act.

3.3 National Parks and Wildlife Act 1972

The South Australian *National Parks and Wildlife Act 1972* covers the protection of native plants within reserves and native animals throughout the State. Threatened plant and animal species are listed in Schedules 7 (endangered species), 8 (vulnerable species) and 9 (rare species). Persons must comply with the conditions imposed upon permits and approvals and:

- persons must not take a native plant on a reserve, wilderness protection area, wilderness protection zone, land reserved for public purposes, a forest reserve or any other Crown land.
- persons must not take a native plant of a prescribed species on private land (there are currently no prescribed species listed under the Act)
- persons must not take a native plant on private land without the consent of the owner (such plants may also be covered by the *Native Vegetation Act 1991*).
- persons must not take a protected animal or the eggs of a protected animal without approval.
- persons must not keep protected animals unless authorised to do so.
- persons must not use poison to kill a protected animal without approval.

One threatened flora species, *Anogramma leptophylla* (Annual Fern) listed under schedule 9 was located during the field survey (see Section 5.2.2).

3.4 Development Act 1993

The 'Significant Tree' legislation under the *Development Act 1993*, does not apply to the Mid Murray Council area. It is only applicable in Metropolitan Adelaide and/or townships in the Adelaide Hills Council or parts of the Mount Barker Council.

4 METHODOLOGY

4.1 Database Searches

A search area of approximately 30km x 40km, from the middle point of the project site was used to obtain records from the Biological Database of SA (BDBSA) (DEH 2009). A 20km buffer search from the middle point of the project site was used to identify any matters of national and state environmental significance protected by the *EPBC Act 1999*. This was completed using the EPBC Protected Matters online database (DEWHA 2009). The BDBSA database search was conducted in February 2010, whilst the EPBC Protected Matters search was undertaken in December 2010.

The BDBSA is comprised of an integrated collection of corporate databases which meet DEH standards for data quality, integrity and maintenance. In addition to DEH biological data the BDBSA also includes dumps from external organisations. This external data is included under agreement with the organisation for ease of distribution but they remain custodian of the data and should be contacted directly for further information.

External Datasets sourced are as follows:

- Birds Australia (SA records) -1996 to 2002
- South Australia Ornithological Association (SAOA) - field trips database - supplied mid 2005, supplementary load September 2007
- SAOA Parks Data - supplied mid 2005
- SAOA Member Personal Records – supplied 2007
- Threatened Birds of the South East – supplied September 2006
- Southern Fleurieu Bird Watchers – supplied February 2007
- Australasian Wader Study Group - supplied 2005
- SA Museum - Herpetology - up until Aug 2004
- SA Museum - Bird - Loaded May 2005
- SA Museum - Mammal - Data up until start 2005 more details of particular State Museum records are available through the South Australian Museum.

4.2 Field survey

A number of flora and fauna surveys have been completed within the proposed Keyneton Wind Farm Site; a two day survey was completed in spring 2008 and surveys were undertaken over five separate days during the period October to November 2009 (Table 3). A summary of all surveys completed by EBS Ecology, on behalf of Pacific Hydro within the project site, is listed in Table 3.

The flora surveys were undertaken on foot and by vehicle, using existing vehicle tracks and traversing across cleared paddocks and more densely vegetated areas when required. During the vegetation survey, all areas were assessed to determine the locations of all vegetation associations and dominant flora species. All fauna species observed during the assessment were recorded.

The quality of the vegetation was recorded as per the condition ratings and Significant Environmental Benefit (SEB) ratios outlined in Table 4. A flora species list was compiled for each vegetation association (Appendix 1) and general photos of each vegetation association were taken.

Table 3. EBS Ecology Flora and Fauna survey dates

Survey Type	Date
Flora	22 – 23 September 2008
Flora	20 October 2009
Flora	22 October 2009
Flora	2 November 2009
Flora	6 November 2009
Flora	12 November 2009
Bats*	23-26 November 2009
Bats*	12 January 2010
Bats*	13 – 17 December 2010
Birds*	22 September and 20th October 2008
Birds*	22 – 26 June 2009
Birds*	7-10 September 2009
Birds*	13 – 16 December 2010

*****separate surveys and reports were undertaken to address birds and bats.

Table 4. Condition and SEB ratios used to rate the quality of vegetation associations within the project site

Condition	SEB Ratio	% total indigenous cover	Native Vegetation Council SEB Ratio Interim Policy	Understorey condition description	Indicators
Very Poor	0:1	<10%	Any potential clearance consists of lopping of overhanging limbs only &/or no indigenous understorey present.	Complete or almost complete destruction of understorey (by grazing &/or introduced plants). The understorey* consists mainly of alien species.	Vegetation structure no longer intact (e.g. removal of one or more vegetation strata). Scope for regeneration, but not to a state approaching good condition without intensive management. Dominated by very aggressive weeds. Partial or extensive clearing (> 50% of area). Evidence of heavy grazing (tracks, browse lines, species changes, no evidence of soil surface crust).
	1:1	10-19%	Areas are dominated by introduced species. Native vegetation is largely reduced to scattered trees, indigenous understorey flora reduced to scattered clumps and individual plants.		
	2:1	20-29%	Weeds dominate, scattered trees with indigenous understorey reduced to scattered clumps and individual plants.		
Poor	3:1	30-39%	Mostly intact overstorey vegetation but there is still considerable weed infestation amongst the understorey flora.	Heavy loss of plant species. The understorey* consists predominately of alien species, although a small number of natives persist.	Vegetation structure substantially altered (e.g. one or more vegetation strata depleted). Retains basic vegetation structure or the ability to regenerate it. Very obvious signs of long-term or severe disturbance. Weed dominated with some very aggressive weeds. Partial clearing (10 – 50% of area). Evidence of moderate grazing (tracks, browse lines, soil surface crust extensively broken).
	4:1	40-49%	Mostly intact overstorey vegetation but there is still considerable weed infestation amongst the understorey flora.		
Moderate	5:1	50-59%	Mostly intact, weed-free areas small, indigenous vegetation dominant.	Moderate loss of plant species. Substantial invasion of aliens resulting in significant competition, but native understorey* persists; for example, may be a low proportion of native species and a high native cover, or a high proportion of native species and low native cover.	Vegetation structure altered (e.g. one or more vegetation strata depleted). Most seed sources available to regenerate original structure. Obvious signs of disturbance (e.g. tracks, bare ground). Minor clearing (<10% of area). Considerable weed infestation with some aggressive weeds. Evidence of some grazing (tracks, soil surface crust patchy).
	6:1	60-69%	Mostly intact overstorey vegetation with moderate but not severe weed infestation amongst the understorey flora.		
Good	7:1	70-79%	Mostly intact overstorey and understorey vegetation, weed infestation is moderate to low, but the original vegetation is still dominant.	Understorey only slightly modified. High proportion of native species and native cover in the understorey*; reasonable representation of probable pre-European vegetation.	Vegetation structure intact (e.g. all strata intact). Disturbance minor, only affecting individual species. Only non-aggressive weeds present. Some litter build-up.
	8:1	80-89%			
Excellent	9:1	> 89%	Diverse vegetation with very little weed infestation.	Understorey largely undisturbed, minimal loss of plant species diversity. Very little or no sign of alien vegetation in the understorey*; resembles probable pre-European condition.	All strata intact and botanical composition close to original. Little or no signs of disturbance. Little or no weed infestation. Soil surface crust intact. Substantial litter cover.
	10:1		Diverse vegetation with no weed infestation.		

*Or all strata if the upper and lower strata are difficult to distinguish

Adapted from '*Guide to Roadside Vegetation Survey Methodology for South Australia*', (Stokes *et al.* 1998) and '*Guidelines for a Native Vegetation Significant Environmental Benefit Policy*', (DWLBC 2005).

4.3 Likelihood of occurrence

A likelihood of occurrence rating was assigned to each threatened species identified in the Protected Matters Search and BDBSA database searches (Table 5). This rating, 'Highly Likely', 'Likely', 'Possible' and 'Unlikely' takes the following criteria into consideration:

- date of the most recent record (taking into consideration the date of the last surveys conducted in the area)
- proximity of the records (distance to the project site)
- landscape location of the records, vegetation remnancy and vegetation type of the record location (taking into consideration the landscape, remnancy and vegetation type of the project site, with higher likelihood assigned to species that were found in similar locations/condition/vegetation associations)
- knowledge of the species habitat preferences, causes of its decline, and local population trends.

Table 5. Likelihood of occurrence criteria.

Likelihood category	Criteria
Unlikely	• No BDBSA records despite survey effort considered adequate, or • No BDBSA records and survey effort is considered not adequate, and no suitable habitat is known to occur in the area, or • No BDBSA records and survey effort is not considered adequate, and no suitable habitat is known to occur in the area, and species of similar habitat needs have no records either.
Possible	• No BDBSA records, survey effort is considered not adequate, suitable habitat does occur (or isn't known if it does occur) and species of similar habitat needs have been recorded in the area, or • BDBSA records within the last 40 years, and the area is not largely intact, or • BDBSA records in the last 10 years, the species does not have highly specific needs, and habitat is largely intact.
Likely	• BDBSA records in the last 10 years, the species does not have highly specific habitat needs and the habitat is largely intact, or • BDBSA records in the last 10 years, the species does have highly specific habitat needs and these needs occur in the area.
Highly likely	• BDBSA records in the last 10 years, the species does not have highly specific needs, and the habitat is largely intact.

5 RESULTS

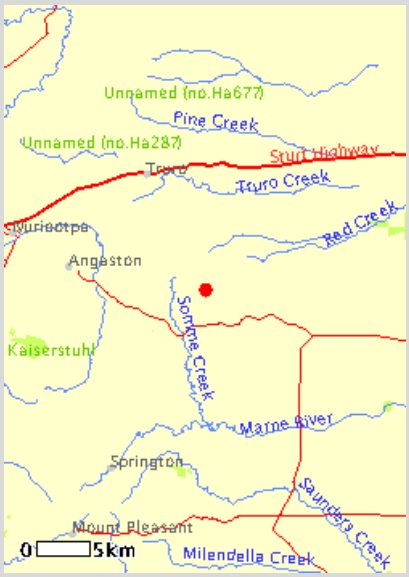
5.1 Database Search Results

5.1.1 EPBC Protected Matters Online Search Tool

A summary of the matters of national significance from the Protected Matters Online Search Tool (DEH 2008) are presented in Table 6. Three threatened ecological communities were identified as occurring within the EPBC search area: Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions; Peppermint Box (*Eucalyptus odorata)* Grassy Woodland of South Australia and Iron-Grass Natural Temperate Grassland of South Australia.

Thirteen flora species of national significance were identified from the EPBC search as potentially occurring within the project site (Table 7). Similarly thirteen threatened fauna species were identified from the search; two of the fauna species identified were fish species. Bird and bat species recorded within the search are listed in Table 7; they are consistent with those described within each individual report on birds and bats undertaken for the proposed Keyneton Wind Farm (EBS 2011a and b).

Table 6. Summary of the EPBC Protected Matters Database search.

Search Area	Matter of significance under the *EPBC Act, 1999*	Confirmed within the survey region	Proposed action likely to have significant impact	Referral required
	World Heritage properties	No	No	No
	National Heritage properties	No	No	No
	Wetlands of International Significance	Yes	Unlikely	Unlikely
	Nationally threatened species	Yes	Possible, if removal of habitat	Recommended
	Nationally Threatened Ecological Communities	Yes	Examples do not qualify as TEC (See Section 5.2.3)	No
	Migratory species	Yes	Possible if removal of critical habitat and disruption of migration routes	Recommended
	Commonwealth marine areas	No	No	No

A 20km buffer search from the middle point of the project site was used to identify any matters of national and state environmental significance protected by the *EPBC Act 1999*. This

Table 7. The likelihood of occurrence (within the proposed Keyneton Wind Farm project site) of conservation rated flora and fauna species based on 20km buffer search (EPBC Protected Matters Online Search Tool).

Species name	Common name	BDBSA Records in the area	Conservation status		Comments / Preferred habitat	Habitat on site	Likelihood of utilisation of project site
			Aus	SA			
Flora							
Arachnorchis argocalla	White-beauty Spider-orchid	Yes	EN	E	Prefers open grassy herbland under light, mixed Eucalypt and Callitris forest.	Yes	Possible
Caladenia tensa	Greencomb Spider-orchid	No	EN	V	Low-lying, often winter-wet areas in woodlands and low open forests	Yes	Unlikely
Dodonaea subglandulifera	Hop Bush	No	EN	V	Loam soils over slate and occasional rocky outcrops. remnant tall shrubland and open scrub with Murraylands Mallee	Yes	Unlikely
Euphrasia collina subsp. osbornii	Osborn's Eyebright	No	EN	E	The species has generally been recorded as growing in mallee scrubland (Barker 1982) but has also been found growing in sclerophyll forest and sometimes in sclerophyll woodland (Jessop & Toelken 1986).	Yes	Unlikely
Glycine latrobeana	Clover Glycine	No	VU	V	The species is found across south-eastern Australia in native grasslands, dry sclerophyll forests, woodlands and low open woodlands with a grassy ground layer (Lynch 1994b; Scarlett & Parsons 1993;	Yes	Unlikely
Hibbertia tenuis	Guinea Flower	No	CE	E	*Hibbertia tenuis* is endemic to the Southern Mount Lofty Ranges in South Australia. The species is known from a single location, on private property near Yundi, approximately 45 km south of Adelaide (Bates, pers. comm., 2009, as cited in (Threatened Species Scientific Committee (TSSC), 2010ap) Grows in wetland/swampy areas on boggy soils	No	Unlikely
Olearia pannosa ssp. *pannosa*	Silver Daisy-bush	Yes	VU	V	Grows in flat, sandy terrain and areas with rocky soils. A shrub in a grassy woodland understorey, likely to occur in areas with Box woodlands and likely on sheltered rocky outcrops with an overstorey.	Yes	Possible
Prasophyllum pallidum	Pale Leek-orchid	Yes	VU	R	In better soils of woodland and grassy open forest (Bates, 2009)	Yes	Possible

Species name	Common name	BDBSA Records in the area	Conservation status		Comments / Preferred habitat	Habitat on site	Likelihood of utilisation of project site
			Aus	SA			
Prasophyllum pruinosum	Plum Leek-orchid	No	EN	V	Open woodland and grassy forest with *Callitris gracilis, Eucalyptus leucoxylon* and *E. fasiculosa*. Occurs in the open or in the shelter of broom-like shrubs in well-drained fertile loams and sandy soils, usually with other leek-orchids (Willson and Bignall, 2008)	Yes	Unlikely
Senecio megaglossus	Superb Groundsel	Yes	VU	E	The species is mostly confined to rocky creek banks and rocky gorge/valley slopes (Jessop & Toelken, 1986)	No	Unlikely
Swainsona pyrophila	Yellow Swainson-pea	No	VU	V	Grows in mallee scrub on sandy or loamy soil, usually found only after fire.	No	Unlikely
Thelymitra cyanapicata	Blue Top Sun-orchid	No	CE	E	Occurs in *Eucalyptus viminalis, E. obliqua* open swampy woodland with a dense understorey of tea-tree, sedges, rushes and ferns including *Leptospermum continentale, Baumea tetragona, Gahnia sieberiana* and *Isolepis inundata*. Occurs in low-lying creeks and swamps with wet sandy soils (Willson and Bignall, 2008)	No	Unlikely
Thelymitra epipactoides	Metallic Sun-orchid	No	EN	E	In heathy woodland, in light sand over clay, terra rossa soils over limestone or in coloured sands in *Callitris* woodland (Bates, 2009).	No	Unlikely
Fauna							
Cinclosoma punctatum anachoreta	Spotted Quail-thrush (Mt Lofty Ranges)	No	CE	E	No records since 1981. Probably extinct in the region (Garnett & Crowley 2000).	No	Unlikely
Leipoa ocellata	Malleefowl	No	VU, Mi	V	Occurs in semi-arid and arid zones of temperate Australia, where it occupies shrublands and low woodlands that are dominated by mallee vegetation. Also occurs in eucalypt or native pine *Callitris* woodlands, *Acacia* shrublands, Broombush *Melaleuca uncinata* vegetation or coastal heathlands (Benshemesh, 2005b).	No	Unlikely

Species name	Common name	BDBSA Records in the area	Conservation status		Comments / Preferred habitat	Habitat on site	Likelihood of utilisation of project site
			Aus	SA			
Manorina melanotis	Black-eared Miner	No	EN, Mi	E	Restricted to small, local colonies through the Murray mallee of SA (Pizzey & Knight 1999) in mature mallee eucalypt woodland that has not been burnt for at least 50 years and has not been cleared (Muir et al. 1999).	No	Unlikely
Pachycephala rufogularis	Red-lored Whistler	No	VU	V	Inhabits low mallee shrublands, heathlands and woodlands that have an open canopy and a moderately dense but patchy understorey (Matthew et al. 1996).	No	Unlikely
Psophodes nigrogularis leucogaster	Western Whipbird (eastern)	No	VU	V	Usually occurs in habitats that have an open layer of mallee about 3–5 m tall and an understorey of dense shrubs about 1.5–2 m tall (Woinarski et al. 1988).	No	Unlikely
Rostratula australis	Australian Painted Snipe	No	VU	R	Generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains (Marchant & Higgins 1993).	No	Unlikely
Isoodon obesulus obesulus	Southern Brown Bandicoot	No	EN	V	Known to inhabit a variety of habitats including heathland, shrubland, sedgeland, heathy open forest and woodland and are usually associated with infertile, sandy and well drained soils, but can be found in a range of soil types (Coates et al. 2008). Within these vegetation communities they typically inhabit areas of dense ground cover.	No	Unlikely
Macrotis lagotis	Greater Bilby	No	VU	V	Extinct from the region	No	Unlikely
Nyctophilus corbeni	Greater Long-eared Bat	No	VU	V	This species inhabits a variety of vegetation types with dense understorey layers, such as *Eucalyptus* and *Allocasuarina* open woodlands and savannahs, however In South Australia this species is usually confined to tall mallee shrublands.	No	Possible

Species name	Common name	BDBSA Records in the area	Conservation status		Comments / Preferred habitat	Habitat on site	Likelihood of utilisation of project site
			Aus	SA			
Aprasia pseudopulchella	Flinders Ranges Worm-lizard	No	VU		Suitable habitat for this species includes unploughed grasslands, particularly where flat surface rocks occur in the landscape, and woodland areas containing loose woody debris and leaf litter (EBS Ecology, 2011). Occurs in open woodland, native tussock grassland, riparian habitats and rocky isolates (Cogger et al. 1993). Some habitat onsite but the occurrence of this species is thought to be unlikely	Yes	Unlikely
Tiliqua adelaidensis	Pygmy Blue-tongue Lizard	No	EN	E	Known to occupy spider burrows, made by wolf spiders and trapdoor spiders in native grassland habitats (Milne 1999), even highly degraded grasslands (dominated by exotic species) are potential habitat, providing that the area is unploughed and the soil structure remains intact. Project site most likely south of species' range however there have been no targeted surveys undertaken within the local area to date. General soil structure indicates that the species occurrence is unlikely.	Yes	Unlikely
Migratory Species							
Haliaeetus leucogaster	White-bellied Sea-Eagle	No	Mi	E	This species occurs near large rivers, fresh and saline lakes, reservoirs, estuaries and coastal seas. It is unlikely that the project site would support the presence of this species.	No	Unlikely
Hirundapus caudacutus	White-throated Needletail	Yes	Mi		Species is mostly aerial during its stay in Australia. It is unlikely to occur on site.	No	Unlikely
Merops ornatus	Rainbow Bee-eater	Yes	Mi		This species prefers open forests, woodlands, shrublands, and within cleared or semi-cleared habitats (including farmland). This species can be found located in close proximity to permanent water, widespread along creek lines in red gum communities. Low value habitat may be present on site which may support this species. Widespread across much of Australia.	Yes	Possible

Species name	Common name	BDBSA Records in the area	Conservation status		Comments / Preferred habitat	Habitat on site	Likelihood of utilisation of project site
			Aus	SA			
Ardea alba	Great Egret, White Egret	No	Mi (W), Ma		Species prefers floodwaters, rivers, wetlands, mudflats. May be present as a fly-over species.	No	Possible
Ardea ibis	Cattle Egret	No	Mi (W), Ma	R	This species occupies grasslands, woodlands and wetlands with a preference for moist areas with tall grass, shallow open wetlands and wetland margins. May utilise the site as a fly-over species.	No	Possible
Gallinago hardwickii	Latham's Snipe, Japanese Snipe	No	Mi (W)	R	A migratory species, it is very nomadic during its time in Australia. They use a variety of freshwater or brackish wetlands, preferring to be close to protective vegetation cover, including in-stream vegetation and adjoining grassy/sedgy areas which provide shelter from predators whilst feeding. Unsuitable habitat on site.	No	Unlikely
Rostratula benghalensis s. lat.	Painted Snipe	No	Mi (W)	V	This species is unlikely to occur on site with a preference for shallow terrestrial freshwater wetlands, including temporary and permanent lakes, swamps and claypans. Preferred habitat is not present within the project site.	No	Unlikely
Apus pacificus	Fork-tailed Swift	No	Mi, Ma		This Asian species is mostly aerial during its stay in Australia which makes it difficult to detect. It is unlikely to occur on site.	No	Unlikely

Regions: Aus = Australia, **SA** = South Australia
Conservation Codes: EN/E = Endangered, **VU/V** = Vulnerable, **R** = Rare.
Mi = Migratory, Ma = Marine, W = Wetland

5.1.2 BDBSA database search

A total of 884 native flora species and 40 native fauna species (Appendix 2 and 3) have been recorded as occurring within the project area (based on a 20km buffer search). Forty-two flora and two fauna species have state conservation significance (*NPW Act, 1972*) (Tables 8 and 9).

Table 8. Flora species of conservation significance identified as occurring in the Keyneton project site from the BDBSA search (based on a 20km buffer search).

Species name	Common name	Conservation Status	
		Aus	SA
Acacia dodonaeifolia	Hop-bush Wattle		R
Acacia montana	Mallee Wattle		R
Amphibromus archeri	Pointed Swamp Wallaby-grass		R
Anogramma leptophylla	Annual Fern		R
Austrodanthonia tenuior	Short-awn Wallaby-grass		R
Austrostipa densiflora	Fox-tail Spear-grass		R
Austrostipa pilata	Prickly Spear-grass		V
Austrostipa tenuifolia			R
Baumea gunnii	Slender Twig-rush		R
Bothriochloa macra	Red-leg Grass		R
Caladenia argocalla	White Beauty Spider-orchid	EN	E
Caladenia concolor	Crimson Spider-orchid	VU	E
Caladenia rigida	Stiff White Spider-orchid	EN	E
Centrolepis cephaloformis ssp. cephaloformis	Cushion Centrolepis		R
Correa aemula	Hairy Correa		R
Crassula sieberiana	Sieber's Crassula		E
Cyperus sanguinolentus	Dark Flat-sedge		R
Danthonia carphoides var. carphoides (NC)	Short Wallaby-grass		R
Dianella longifolia var. grandis	Pale Flax-lily		R
Diuris behrii	Behr's Cowslip Orchid		V
Dodonaea subglandulifera		EN	E
Eragrostis lacunaria	Purple Love-grass		R
Eucalyptus fasciculosa	Pink Gum		R
Eucalyptus viminalis ssp. viminalis	Manna Gum		R
Gastrodia sesamoides	Potato Orchid		R
Hypolepis rugosula	Ruddy Ground-fern		R
Juncus homalocaulis	Wiry Rush		V
Lachnagrostis robusta	Tall Blown-grass		R
Leptorhynchos elongatus	Lanky Buttons		R
Luzula ovata	Clustered Wood-rush		R

Species name	Common name	Conservation Status	
		Aus	SA
Maireana rohrlachii	Rohrlach's Bluebush		R
Montia fontana ssp. chondrosperma	Waterblinks		V
Myoporum parvifolium	Creeping Boobialla		R
Olearia pannosa ssp. pannosa	Silver Daisy-bush	VU	V
Phyllangium distylis	Tiny Mitrewort		R
Phylloglossum drummondii	Pigmy Clubmoss		R
Prasophyllum pallidum	Pale Leek-orchid	VU	R
Ptilotus erubescens	Hairy-tails		R
Rumex dumosus	Wiry Dock		R
Schoenus latelaminatus	Medusa Bog-rush		V
Senecio megaglossus	Large-flower Groundsel	VU	E
Thelymitra peniculata	Blue Star Sun-orchid		V

Regions: Aus = Australia, **SA** = South Australia
Conservation Codes: EN/E = Endangered, **VU/V** = Vulnerable, **R** = Rare.

Table 9. Fauna species of conservation significance identified as occurring in the Keyneton project site from the BDBSA search (based on a 20km buffer search).

Class	Species name	Common Name	Conservation Status	
			Aus	SA
Amphibia	*Pseudophryne bibronii*	Brown Toadlet		R
Mammals	*Trichosurus vulpecula*	Common Brushtail Possum		R

Regions: Aus = Australia, **SA** = South Australia
Conservation Codes: EN/E = Endangered, **VU/V** = Vulnerable, **R** = Rare.

5.2 Field Survey

5.2.1 Vegetation Associations

A total of twelve vegetation associations were defined across the project site during the 2009 surveys (Table 10), including four associations described in the initial 2008 study. A description and photo of each association follows, and the location and condition of the vegetation associations are shown in Figures 4 and 5. Table 11 shows the area in hectares that each vegetation association covers within the project site. Several areas not previously surveyed during the spring 2008 survey were included in the spring 2009 survey, due to the revision of the project boundary.

A total of 118 flora species were recorded within the project site. Of these, 59 were native and 59 were exotic species. A list of all flora species recorded at each vegetation association is identified in Appendix 1.

Table 10. List of vegetation associations identified within the Keyneton project site.

Vegetation Association	Vegetation Association Description	Average SEB ratio
1	Scattered *Eucalyptus leucoxylon* ssp. *leucoxylon* (South Australian Blue Gum) over exotic grassland/cropping land.	0:1
2	Exotic grassland/herb land, *Avena barbata* (Wild Oats), *Echium plantagineum* (Salvation Jane) dominants.	0:1 – 2:1
3	*Eucalyptus camaldulensis var. camaldulensis* (River Red Gum) open woodland.	0:1 - 4:1
4	*Eucalyptus leucoxylon* ssp. *leucoxylon* (South Australian Blue Gum) +/- *Eucalyptus odorata* (Peppermint Box) open woodland over exotic grassland.	0:1 – 2:1
5	*Eucalyptus odorata* (Peppermint Box) open woodland over exotics	0:1 – 2:1
6	*Allocasuarina verticillata* (Drooping Sheoak) Open woodland	4:1
7	*Triticum* sp. (Wheat) crop.	0:1
8	Remnant *Eucalyptus leucoxylon* ssp. *leucoxylon* (South Australian Blue Gum) / local and non local revegetation.	0:1
9	*Eucalyptus leucoxylon* (South Australian Blue Gum) / *Eucalyptus camaldulensis* var. *camaldulensis* (River Red Gum) woodland.	0:1 – 4:1
10	*Eucalyptus odorata* (Peppermint Box) *+/- Eucalyptus leucoxylon* (South Australian Blue Gum) woodland	0:1
11	*Allocasuarina verticillata* (Drooping Sheoak) and *Eucalyptus leucoxylon* (South Australian Blue Gum) open woodland revegetation area over exotic grassland.	2:1
12	*Allocasuarina verticillata* (Drooping Sheoak), *Acacia paradoxa* (Kangaroo thorn) and *Dodonaea viscosa* (Sticky Hop Bush) over grassland. *Avena barbata* (Wild Oats) and *Echium plantagineum* (Salvation Jane) dominants.	4:1

NB: This table shows the average or predominant range of the SEB ratio for each vegetation association, however it should be noted that the ratio for each individual patch or area may vary considerably (see Figures 3 and 4).

Table 11. Total area (ha) of each vegetation association within the proposed Keyneton project site.

Vegetation association	Vegetation association description	Area (ha)
1	Scattered *Eucalyptus leucoxylon* over exotic grassland / cropping land	1046.53
2	Exotic grassland / herbland	3192.87
3	*Eucalyptus camaldulensis var. camaldulensis* Open Woodland	71.79
4	*Eucalyptus leucoxylon +/- Eucalyptus odorata* Open Woodland over exotic grassland	802.94
5	*Eucalyptus odorata* Open Woodland over exotics	92.35
6	*Allocasuarina verticillata* Open Woodland	6.82
7	*Triticum* spp. (Wheat) crop	54.71
8	Remnant *Eucalyptus leucoxylon* and local and non-local revegetation species	4.66
9	*Eucalyptus leucoxylon / Eucalyptus camaldulensis var. camaldulensis* Woodland	37.93
10	*Eucalyptus odorata +/- Eucalyptus leucoxylon* Woodland	151.25
11	*Allocasuarina verticillata* / *Eucalyptus leucoxylon* Open Woodland revegetation area over exotic grassland	1.91
12	*Allocasuarina verticillata / Acacia paradoxa* / *Dodonaea viscosa* Open Woodland over exotic grassland / herbland	18.34

Vegetation association 1 – Scattered *Eucalyptus leucoxylon* ssp. *leucoxylon* (South Australian Blue Gum) over Exotic Grassland / Cropping Land

Association 1	
Overstorey and midstorey species	*Eucalyptus leucoxylon* ssp. *leucoxylon* (South Australian Blue Gum), *Allocasuarina verticillata* (Drooping Sheoak).
Understorey species	The understorey / ground cover layer of vegetation was dominated by introduced species, however scattered small patches of native grasses and herbs were found within the association.
	Common weed species include: • *Avena barbata* (Wild Oats) • *Echium plantagineum* (Salvation Jane) • *Scabiosa atropurpurea* (Pincushion)
	Native species found include: • *Austrostipa sp* (Spear-grass) • *Austrodanthonia caespitosa* (Common Wallaby -grass) • *Arthropodium strictum* (Common Vanilla-lily)
Conservation significant flora species	No national or state conservation rated flora species were detected during the current survey.
Condition/SEB ratio	Very poor - 0:1.

A list of all flora species, both weed and native species recorded at each vegetation association is identified in Appendix 1.

Vegetation association 2 - Exotic Grassland / Herbland

Association 2	
Overstorey and midstorey species	Very occasional *Eucalyptus leucoxylon* ssp. *leucoxylon* (South Australian Blue Gum) and *Allocasuarina verticillata* (Drooping Sheoak).
Understory species	The understorey / ground cover layer of vegetation was dominated by introduced species, however very scattered small patches of native grasses and herbs were found within the association.
	Common weed species include: • *Avena barbata* (Wild Oats) • *Eroduim botrys* (Long Heron's- bill) • *Echium plantagineum* (Salvation Jane) • *Lagurus ovatus* (Hare's Tail Grass)
	Common native species include: • *Austrostipa sp* (Spear-grass) • *Austrodanthonia caespitosa* (Common Wallaby -grass)
Conservation significant flora species	No national or state conservation rated flora species were detected during the current survey.
Condition/SEB	Very poor - 0:1- 2:1

Vegetation association 3- *Eucalyptus camaldulensis* var. *camaldulensis* (Red Gum) Open Woodland

Association 3	
Overstorey and midstorey species	*Eucalyptus camaldulensis* var. *camaldulensis* (Red Gum)
Understory species	The understorey / ground cover layer of vegetation was dominated by introduced species, however patches of native grasses, herbs and rushes were found within the association, particularly along the creek lines.
	Common weed species include: • *Avena barbata* (Wild Oats) • *Hordeum vulgare* (Barley) • *Echium plantagineum* (Salvation Jane) • *Lolium perrene* (Perennial Ryegrass)
	Common native species include: • *Juncus subsecundus* (Soft Tussock Mat-rush) • *Schoenoplectus litoralis/validus* (Club-rush) • *Triglochin procerum* (water ribbons)
Conservation significant flora species	No national or state conservation rated flora species were detected during the current survey, however, this association is listed as a threatened ecological community at the state level (DEH 2005).
Condition/SEB	Very poor to poor 0:1 – 4:1

Vegetation association 4 – *Eucalyptus leucoxylon* (South Australian Blue Gum) +/- *Eucalyptus odorata* (Peppermint Box) Open Woodland over Exotic Grassland

Association 4	
Overstorey and midstorey species	*Eucalyptus leucoxylon* (South Australian Blue Gum), *Eucalyptus odorata* (Peppermint Box) and *Acacia acinacea* (Wreath Wattle)
Understory species	The understorey / ground cover layer of vegetation was dominated by introduced species, however scattered small patches of native grasses and herbs were found within the association.
	Common weed species include: • *Avena barbata* (Wild Oats) • *Arctotheca calendula* (Cape Weed) • *Echium plantagineum* (Salvation Jane) • *Salvia verbenaca* (Wild Sage)
	Common native species include • *Austrostipa sp* (Spear-grass) • *Enchylaena tomentosa* (Ruby Saltbush)
Conservation significant flora species	No national or state conservation rated flora species were detected during the current survey.
Condition/SEB	Very poor - 0:1- 2:1

Vegetation association 5 - *Eucalyptus odorata* (Peppermint Box) Open Woodland over exotics

Association 5	
Overstorey and midstorey species	*Eucalyptus odorata* (Peppermint Box) and *Eucalyptus camaldulensis var. camaldulensis* (Red Gum)
Understory species	The understorey / ground cover layer of vegetation was dominated by introduced species.
	Common weed species include: • *Avena barbata* (Wild Oats) • *Hordeum vulgare* (Barley) • *Echium plantagineum* (Salvation Jane) • *Medicago polymorpha var. polymorpha* (Burr-medic)
	Common native species include: • *Acaena sp.* (Sheeps Burr) • *Oxalis perennans* (Native Sorrel)
Conservation significant flora species	No national or state conservation rated flora species were detected during the current survey. This association had the potential to be listed as a Threatened Ecological Community under the *EPBC Act, 1999,* however no patches were found to trigger the 'significance test (assessment criteria)* set out in the EPBC Act Policy Statement 3.7 (DEWR, 2007)
Condition	Very poor - 0:1-2:1

* The condition of a patch can be determined by factors such as numbers and types of native plants and animals present; the level of weed invasion; the size of the area; and distance to the next area of native vegetation. Significantly degraded (low condition) areas are not part of a listed ecological community. This means that protection provisions of the EPBC Act are focused on the most valuable elements of Australia's natural environment, while degraded areas, which do not trigger the 'significance test' of the EPBC Act, are largely excluded (DEWR, 2007).

Vegetation association 6 – *Allocasuarina verticillata* (Drooping Sheoak) Open Woodland

Association 6	
Overstorey and midstorey species	*Allocasuarina verticillata* (Drooping Sheoak), *Acacia paradoxa* (Kangaroo Thorn), *Eucalyptus leucoxylon* ssp. *leucoxylon* (South Australian Blue Gum) and *Eucalyptus odorata* (Peppermint Box)
Understory species	The understorey / ground cover layer was dominated by introduced species, however patches of native grasses, herbs and forbs were found within the association.
	Common weed species include: • *Avena barbata* (Wild Oats) • *Arctotheca calendula* (Cape Weed) • *Echium plantagineum* (Salvation Jane) • *Lolium perrene* (Perennial Ryegrass)
	Common native species include: • *Enchylaena tomentosa* (Ruby Saltbush) • *Pimelia stricta* (Erect Riceflower) • *Austrostipa sp* (Spear-grass)
Conservation significant flora species	No national or state conservation rated flora species were detected during the current survey.
Condition	Poor - 4:1

Vegetation association 7 – *Triticum* spp. (Wheat) crop

Association 7	
Overstorey and midstorey species	*Triticum* spp. (Wheat)
Understory species	The understorey / ground cover layer of vegetation was dominated by introduced species.
	Common weed species include: • *Avena barbata* (Wild Oats) • *Echium plantagineum* (Salvation Jane) • *Triticum* spp. (Wheat)
	No native species were recorded
Conservation significant flora species	No national or state conservation rated flora species were detected during the current survey.
Condition	Very poor - 0:1

Vegetation association 8 – Remnant *Eucalyptus leucoxylon* ssp. *leucoxylon* (South Australian Blue Gum) / local and non-local revegetation species

Association 8	
Overstorey and midstorey species	*Eucalyptus leucoxylon ssp. leucoxylon* (South Australian Blue Gum), *Eucalyptus* sp. *Melaleuca decussata* (Totem-poles) and *Acacia myrtifolia* (Narrow-leaf Myrtle).
Understory species	The understorey / ground cover layer of vegetation was dominated by introduced species, however scattered small patches of native herbs were found within the association.
	Common weed species include: • *Avena barbata* (Wild Oats) • *Arctotheca calendula* (Cape Weed) • *Echium plantagineum* (Salvation Jane) • *Trifolium campastre* (Hop Clover)
	Common native species include: • *Asperula conferta* (Common Woodruff) • *Atriplex nummularia ssp.* (Old-man Saltbush)
Conservation significant flora species	No national or state conservation rated flora species were detected during the current survey.
Condition	Very poor - 0:1

Vegetation association 9 – *Eucalyptus leucoxylon* (South Australian Blue Gum) / *Eucalyptus camaldulensis* var. *camaldulensis* (River Red Gum) Woodland

Association 9	
Overstorey and midstorey species	*Eucalyptus leucoxylon* ssp. *leucoxylon* (South Australian Blue Gum) / *Eucalyptus camaldulensis var. camaldulensis* (River Red Gum).
Understory species	The understorey / ground cover layer of vegetation was dominated by introduced species, however areas of native grasses and herbs were found within the association.
	Common weed species include: • *Lolium perrene* (Perennial Ryegrass) • *Sonchus sp.* (Sow thistle) • *Echium plantagineum* (Salvation Jane) • *Morea setifolia* (Thread Iris)
	Common native species include: • *Astropdium strictum* (Common Vanilla-lily) • *Austrodanthonia caespitosa* (Common Wallaby -grass) • *Drosera glanduligera* (Scarlet Sundew)
Conservation significant flora species	No national or state conservation rated flora species were detected during the current survey, however, *E. camaldulensis* var. *camaldulensis (*River Red Gum) woodland is listed under the *Provisional List of Threatened Ecosystems of South Australia* (DEH, in progress) as a threatened ecological community.
Condition	Very poor - poor- 0:1-4:1

Vegetation association 10 – *Eucalyptus odorata* (Peppermint Box) +/- *Eucalyptus leucoxylon* ssp. *leucoxylon* (South Australian Blue Gum) Woodland

Association 10	
Overstorey and midstorey species	*Eucalyptus odorata* (Peppermint Box), *Eucalyptus leucoxylon* ssp. *leucoxylon* (South Australian Blue Gum) and *Dodonaea viscosa* (Sticky Hop Bush)
Understory species	The understorey / ground cover layer of vegetation was dominated by introduced species
	Common weed species include: • *Avena barbata* (Wild Oats) • *Arctotheca calendula* (Cape Weed) • *Echium plantagineum* (Salvation Jane) • *Hordeum vulgare* (Barley)
	No native species were recorded
Conservation significant flora species	No national or state conservation rated flora species were detected during the current survey. This association had the potential to be listed as a Threatened Ecological Community under the *EPBC Act, 1999,* however no patches were found to trigger the 'significance test (assessment criteria)* set out in the EPBC Act Policy Statement 3.7 (DEWR, 2007)
Condition	Very poor - 0:1

* The condition of a patch can be determined by factors such as numbers and types of native plants and animals present; the level of weed invasion; the size of the area; and distance to the next area of native vegetation. Significantly degraded (low condition) areas are not part of a listed ecological community. This means that protection provisions of the EPBC Act are focused on the most valuable elements of Australia's natural environment, while degraded areas, which do not trigger the 'significance test' of the EPBC Act, are largely excluded (DEWR, 2007).

Vegetation association 11- *Allocasuarina verticillata* (Drooping Sheoak) / *Eucalyptus leucoxylon* ssp. *leucoxylon* (South Australian Blue Gum) Open Woodland revegetation area over exotic grassland

Association 11	
Overstorey and midstorey species	*Allocasuarina verticillata* (Drooping Sheoak) and *Eucalyptus leucoxylon* ssp. *leucoxylon* (South Australian Blue Gum).
Understory species	The understorey / ground cover layer was dominated by introduced species, however scattered small patches of native grasses were found within the association.
	Common weed species include: • *Avena barbata* (Wild Oats) • *Arctotheca calendula* (Cape Weed) • *Echium plantagineum* (Salvation Jane) • *Hordeum vulgare* (Barley)
	Common native species include: • *Austrostipa sp* (Spear-grass) • *Austrodanthonia setacea* (Small-flower Wallaby-grass) • *Convolvulus remotus* (Grassy Bindweed) • *Juncus subsecundus* (Finger Rush)
Conservation significant flora species	No national or state conservation rated flora species were detected during the current survey.
Condition	Very poor - 2:1

Vegetation association 12 – *Allocasuarina verticillata* (Drooping Sheoak) / *Acacia paradoxa* (Kangaroo Thorn) / *Dodonaea viscosa* (Sticky Hop Bush) Open Woodland over exotic grassland / herbland

Association 12	
Overstorey and midstorey species	*Allocasuarina verticillata* (Drooping Sheoak) / *Acacia paradoxa (*Kangaroo Thorn) / *Dodonaea viscosa* (Sticky Hop Bush).
Understory species	The understorey / ground cover layer was dominated by introduced species, however many native species were recorded amongst the rocky outcrops.
	Common weed species include: • *Avena barbata* (Wild Oats) • *Lolium perenne* (Perennial Ryegrass) • *Echium plantagineum* (Salvation Jane) • *Trifolium campastre* (Hop Clover)
	Common native species include: • *Austrostipa sp* (Spear-grass) • *Geranium solanderi var. solanderi (* Austral Geranium) • *Cyperus vaginatus* (Stiff Flat-sedge) • *Einadia nutans ssp. nutans* (Climbing Saltbush)
Conservation significant flora species	No national conservation rated flora species were detected within this vegetation association. The state rare *Anogramma leptophylla* (Annual Fern) was observed during the 2009 survey in a gorge located in the north east of the site.
Condition	Poor - 4:1.

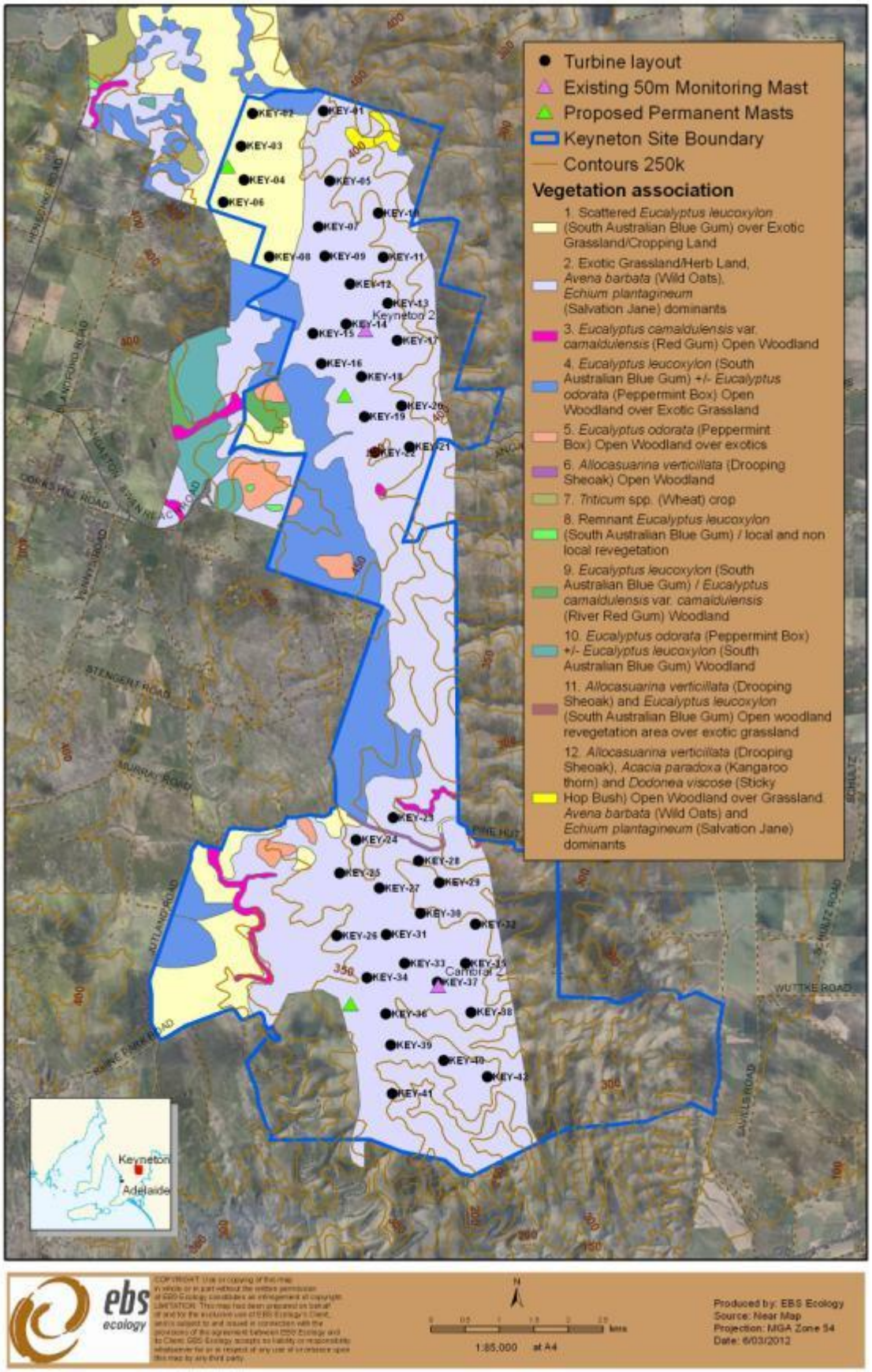


Figure 4. Vegetation associations recorded within the proposed Keyneton Wind Farm project site.

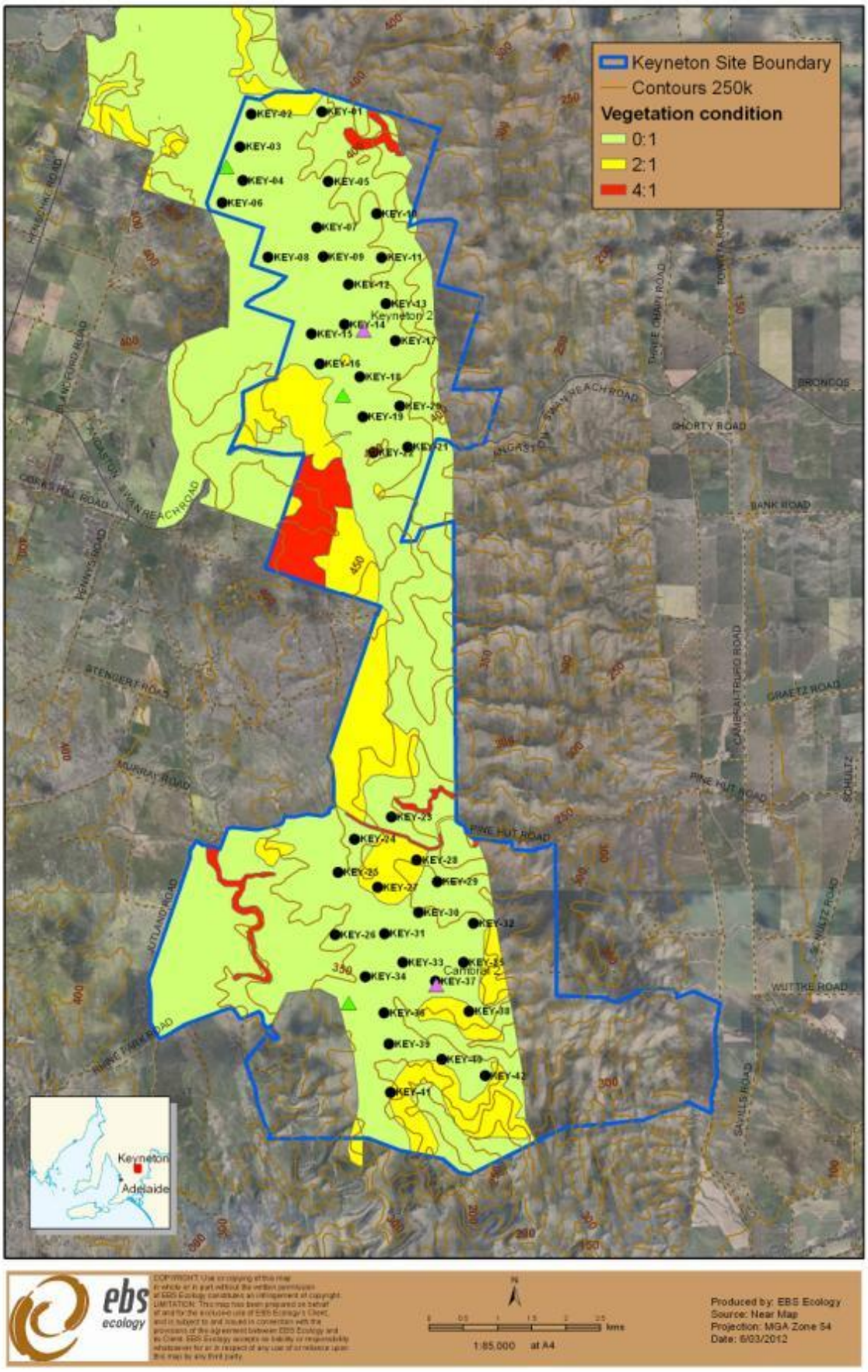


Figure 5. The condition of vegetation associations across the proposed Keyneton Wind Farm project site.

5.2.2 Flora of conservation significance

No EPBC listed flora species of national conservation significance were identified during the survey, however one species of state conservation significance was present:

- *Anogramma leptophylla* (Annual Fern) – listed as rare in SA under the *Native Vegetation Act 1991*. This species was found in vegetation association 12 *Allocasuarina verticillata* (Drooping Sheoak), *Acacia paradoxa* (Kangaroo Thorn) and *Dodonaea viscosa* (Sticky Hop Bush) Open Woodland over Grassland, in a gorge on the north east of the site that is isolated and inaccessible for development.

5.2.3 Threatened Ecological Communities

Based on the initial survey in spring 2008, it was considered possible that the project site may contain two critically endangered, Threatened Ecological Communities (TEC): Peppermint Box (*Eucalyptus odorata*) Grassy Woodland of South Australia and Iron-grass Natural Temperate Grassland of South Australia. The Peppermint Box (*Eucalyptus odorata*) Grassy Woodland was found to occur within vegetation associations 5 and 10 (Table 10). After further assessment in spring 2009, using the assessment criteria ('significance test') set out in the EPBC Act Policy Statement 3.7 (DEWR, 2007) (Table 12), all patches were found to be in poor condition and therefore did not qualify as critically endangered under the *EPBC Act, 1999.*

In order for an area to be included as the listed TEC, a patch must have a good diversity of native species and contain a good selection and cover of perennial native grasses. Table 12 outlines the two condition classes that are considered to be part of the listed Peppermint Box (*Eucalyptus odorata*) Grassy Woodland of South Australia.

Table 12. Condition classes for the Peppermint Box (*Eucalyptus odorata*) Grassy Woodland of South Australia (source: EPBC Act Policy Statement 3.7 (DEWR, 2007).

Classes A and B are indicative of the listed ecological community. Class C is indicative of patches that are degraded but could be rehabilitated to the listed ecological community. For a patch of vegetation to fall within a condition class it must meet or exceed each of the thresholds. For example, to meet condition class A a patch must be greater than 0.1 ha in size **and** have more than 30 native species **and** at least 10 native broad-leaved herbaceous species not on the disturbance resistant list **and** have at least five native perennial grass species.

Condition class	Minimum size	Diversity of native species[1]	No. of broad-leaved herbaceous species[1] in addition to identified disturbance resistant species[2]	No. of perennial grass species[1]
Listed ecological community				
A	0.1 ha	> 30	+10	≥ 5
B	1 ha	> 15	+3	≥ 2
Degraded patches amenable to rehabilitation				
C		> 5	No minimum	≥ 1

Legend:

[1] As measured in a 50 m x 50 m quadrant.

[2] The following species are identifed as disturbance resistant species: *Ptilotus spathulatus* forma *spathulatus*; *Sida corrugata*; *Oxalis perennans*; *Convolvulus erubescens*; *Euphorbia drummondii*; and *Maireana enchylaenoides*.

No areas of Iron-grass Natural Temperate Grassland were found within the project site. Only isolated patches of Iron-grass (*Lomandra densiflora)* were recorded within vegetation associations 1 and 12 (Table 10) and therefore these patches did not qualify as the critically endangered TEC under the *EPBC Act, 1999.*

Vegetation associations 3 and 9 contain *Eucalyptus camaldulensis* var. *camaldulensis* (River Red Gum) woodland that is listed as a TEC (Vulnerable) under the *Provisional List of Threatened Ecosystems of South Australia* (DEH, in progress).

The proposed turbine layout completely avoids vegetation associations 3, 5, 9 and 10 that are outlined in this Section.

5.2.4 Declared & Environmental Weeds

A total of 59 weed species were detected within the study area during the survey. Eight of these are declared plants under the *Natural Resources Management Act, 2004* and a further 17 species are regarded as environmental weed species (Table 13). Landowners have the legal responsibility to control declared plants. South Australia's eight regional Natural Resources Management Boards coordinate and enforce local and regional control programs for declared plants. Declarations of plants (including local requirements for control) vary between and within NRM regions. Priority species for regional control

programs also vary depending on the threats a weed poses in particular localities, whether it is a new invader or widespread, ease of control and time of year (Government of SA, 2009).

Table 13. Declared and Environmental weeds found within the proposed Keyneton Wind Farm project site.

Species name	Common Name	Status
Asparagus asparagoides	Bridal Creeper	D
Asphodelus fistulosus	Onion weed	D
Echium plantagineum	Salvation Jane	D
Echium plantagineum	Salvation Jane	D
Lycium ferocissimum	African Boxthorn	D
Marrubium vulgare	Horehound	D
Oxalis pes-caprae	Soursob	D
Rosa canina	Dog Rose	D
Arctotheca calendula	Cape Weed	E
Avena barbata/fatua	Wild Oat	E
Briza minor	Lesser Quaking-grass	E
Carthamus lanatus	Saffron Thistle	E
Dactylis glomerata	Cocksfoot	E
Ehrharta calycina	Perennial Veldt Grass	E
Hordeum vulgare	Barley	E
Hypericum perforatum	St John's Wort	E
Lolium perenne	Perennial Ryegrass	E
Malva parviflora	Small-flower Marshmallow	E
Pinus radiata	Radiata Pine	E
Plantago lanceolata var. lanceolata	Ribwort	E
Romulea sp.	Onion-grass	E
Scabiosa atropurpurea	Pincushion	E
Schinus molle	Pepper-tree	E
Senecio pterophorus	African Daisy	E
Sonchus sp.	Sow-thistle	E

Status
E = Environmental weed
D = Declared plant under the *Natural Resources Management Act, 2004*

5.2.5 Fauna

Few terrestrial fauna species were observed during the vegetation assessment. However, some opportunistic observations were made (Table 14). While the fauna habitat value of the proposed project site is generally poor, there are a number of locations within the site that may provide important refuge and resources for amphibious species. The area of vegetation associations 3 and 9 (*Eucalyptus camaldulensis* var. *camaldulensis* (River Red Gum) open woodland) in the south-west of the site has a

permanent watercourse which was flowing in October 2009 and has a variety of freshwater flora species. Two species of frog were identified from calls, *Crinia signifera* (Common Froglet) and *Limnodynastes dumerilii* (Banjo Frog). In the north-west of the study site there is a shallow dam where up to 10 individuals of *Limnodynastes dumerilii* (Banjo Frog) were observed near large foamy nests of eggs. The gorge in the far north-east of the survey area also contains an ephemeral wetland which has suitable waterholes and vegetation for frogs.

Many areas of woodland within the site contain trees either with existing hollows or the ability to develop hollows in the future. These trees provide important breeding and feeding sites for a range of arboreal fauna including the state listed Rare *Trichosurus vulpecular* (Common Brushtail Possum), which potentially inhabits the proposed wind farm site.

The rocky outcrops and woodlands within the project site provide breeding, feeding and basking sites for a range of reptiles. Three reptile species were recorded during this survey; *Pogona barbata* (Eastern Bearded Dragon), *Tiliqua rugosa* (Sleepy Lizard) and *Tiliqua scincoides Tiliqua scincoides (*Eastern Bluetongue). A further 24 reptile species were listed in this area from the BDBSA database search (Appendix 3) and may use habitat in the area include: *Pseudechis porphyriacus* (Red-bellied Black Snake); *Pseudonaja textilis* (Eastern Brown Snake); *Christinus marmoratus* (Marbled Gecko) and *Lerista punctatovittata* (Spotted Slider).

Below is a summary of the two fauna species of state conservation significance (excluding avifauna which is addressed in separate reports) that are considered most likely to occur within the proposed project site:

- ***Trichosurus vulpecular*** **(Common Brushtail Possum) State rated rare species**

This species occupies a wide range of habitats, including rainforest, woodland, dry eucalypt forest, pine plantations, semiarid areas and even urban gardens and parks. Although generally found in forest habitats, it may also inhabit treeless areas. The common brushtail possum shelters by day in a den, which may be located in a tree hollow, log, dense undergrowth, cave or animal burrow. Despite facing no major threats, the common brushtail possum has declined drastically in some areas, particularly in arid and semiarid areas of Australia. The main causes of these declines are believed to be predation by dingoes, cats and foxes, as well as habitat fragmentation, the loss of suitable denning sites, and changed fire regimes in some areas.

- ***Pseudophryne bibronii (*****Brown Toadlet) State rated rare species**

Found in forest, heathland, grassland or shrubland, usually singly, unless it is in breeding aggregations. Generally found under rocks and logs and in grassy areas beside creeks. It appears to be closely associated with the edges of small ephemeral creeks and depressions where leaf-litter and grassy-debris has accumulated. Occasionally utilises small, temporary dams and vegetated roadside drainage lines and ditches, which are characterised by a build up of deep leaf-litter and

grassy-debris. In the Adelaide Mt Lofty Ranges, it is found in damp situations but not necessarily in the presence of permanent water.

Table 14. Native fauna species observed during the survey within the proposed Keyneton Wind Farm project site.

Species Name	Common Name	Conservation status	
		AUS	SA
Crinia signifera	Common Froglet		
Pogona barbata	Eastern Bearded Dragon		
Tiliqua rugosa	Sleepy Lizard		
Tiliqua scincoides	Eastern Bluetongue		
Limnodynastes dumerilii	Banjo Frog		
Limnodynastes tasmaniensis	Spotted Marsh Frog		
Macropus fuliginos	Western Grey Kangaroo		
Macropus robustus	Euro		

Regions: Aus = Australia, **SA** = South Australia
Conservation Codes: EN/E = Endangered, **VU/V** = Vulnerable, **R** = Rare.

6 DISCUSSION

6.1 Site summary

The majority of the vegetation within the proposed project site is exotic grassland/herbland with areas of scattered *Eucalyptus leucoxylon* and *Eucalyptus odorata* trees. These areas are considered suitable for turbine placement providing the number of trees removed is minimized, and where possible, turbines are placed in open grassland areas already devoid of trees. The avoidance of woodland habitats and areas of conservation significance has already been embedded within the wind farm design by Pacific Hydro Pty Ltd. The site generally has poor fauna habitat value due to the lack of intact native vegetation and extensively modified understorey vegetation.

6.2 Areas of significance

The following areas have been identified as having high remnant value, high fauna habitat value or containing species or communities of conservation significance (Table 15). Figure 6 shows the location of these areas within the proposed project site. While the Peppermint Box (*Eucalyptus odorata*) Grassy Woodland within vegetation associations 5 and 10 does not qualify as the nationally listed TEC under the *EPBC Act 1999*, these vegetation associations may be amenable to rehabilitation to a condition 'A' or 'B' (Table 12) that does qualify, and are therefore considered significant. These areas could potentially be targeted for rehabilitation as part of any SEB offset requirements that may result from the construction of the wind farm (see section 7.3).

Table 15. Areas of significance within the proposed Keyneton wind farm project site.

Vegetation Association	Vegetation Association Description	Reason for significance	Project site (see Figures 3 and 4)
5	*Eucalyptus odorata* (Peppermint Box) Open Woodland over exotics	Peppermint Box (*Eucalyptus odorata*) Grassy Woodland. Restorative activities may have the potential to qualify patches as the nationally listed TEC under the EPBC Act, 1999	6 scattered patches
10	*Eucalyptus odorata* (Peppermint Box) +/- *Eucalyptus leucoxylon* (South Australian Blue Gum) Woodland	Peppermint Box (*Eucalyptus odorata*) Grassy Woodland. Restorative activities may have the potential to qualify patches as the nationally listed TEC under the EPBC Act, 1999	2 patches in the central-west and 2 patches in the north-west of site
3	*Eucalyptus camaldulensis* var. *camaldulensis* (River Red Gum) Open Woodland.	Threatened ecological community (listed as Vulnerable under the *Provisional List of Threatened Ecosystems of South Australia* (DEH, in progress).	7 scattered patches, often following creek lines
9	*Eucalyptus leucoxylon* ssp. *leucoxylon* (South Australian Blue Gum) / *Eucalyptus camaldulensis* var. *camaldulensis* (River Red Gum) Woodland.	Threatened ecological community (listed as Vulnerable under the *Provisional List of Threatened Ecosystems of South Australia* (DEH, in progress).	1 central patch
4	*Eucalyptus leucoxylon* ssp. *leucoxylon* (South Australian Blue Gum)+/- *Eucalyptus odorata* (Peppermint Box) Open Woodland over exotic	Intact patch	1 central patch

Vegetation Association	Vegetation Association Description	Reason for significance	Project site (see Figures 3 and 4)
	grassland.		
6	*Allocasuarina verticillata* (Drooping Sheoak) Open Woodland.	Intact patch	Central linear roadside strip
12	*Allocasuarina verticillata* (Drooping Sheoak) / *Acacia paradoxa* (Kangaroo thorn) / *Dodonaea viscosa* (Sticky Hop Bush) over exotic grassland / herbland	Intact patch containing *Anogramma leptophylla* (state listed Rare species)	1 patch in the north-east of the site

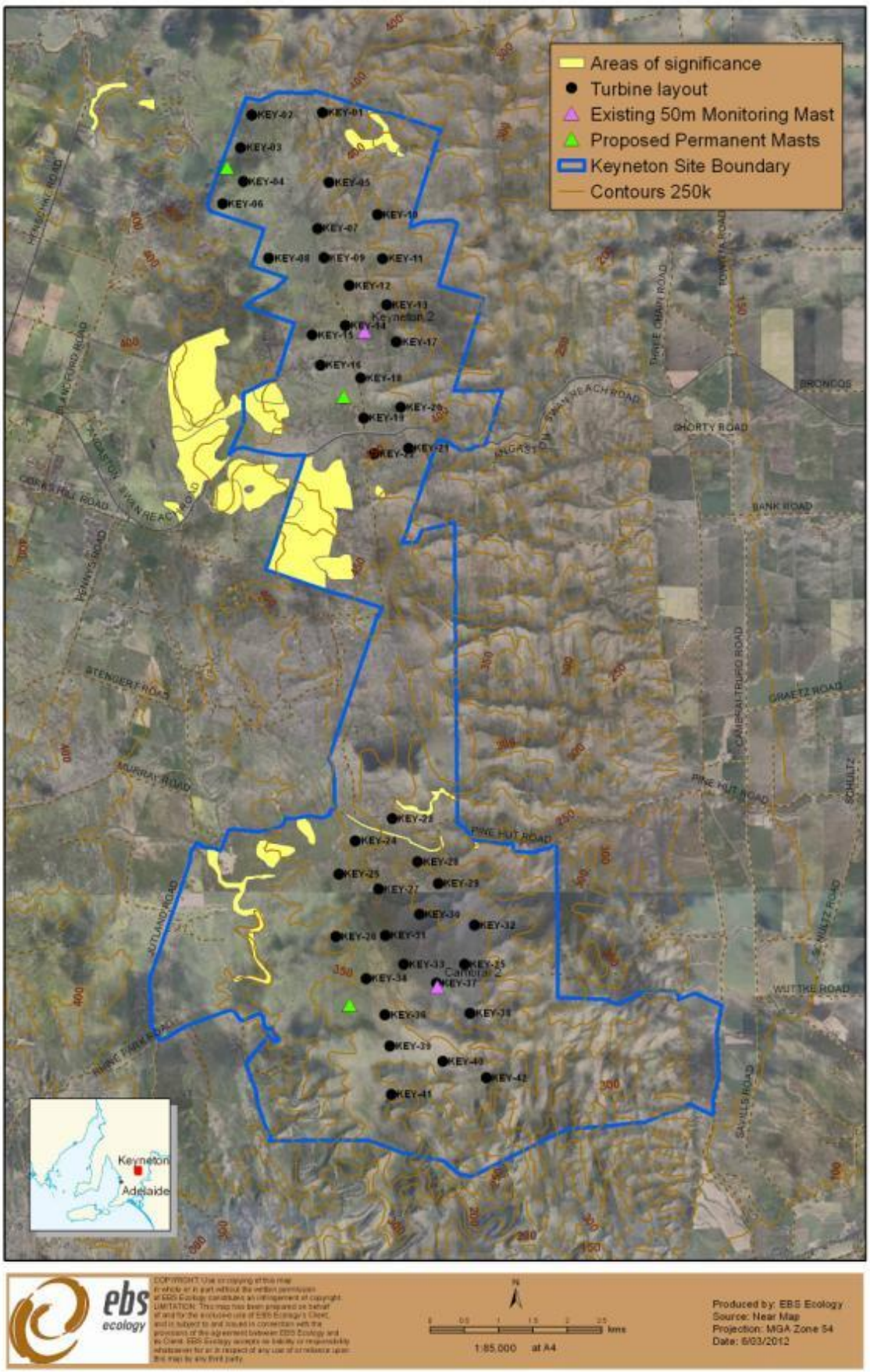


Figure 6. Areas of significance within the proposed Keyneton wind farm project site.

Pacific Hydro's proposed layout has been designed so as to avoid potential impacts to these areas of conservation significance. All turbines are proposed outside theses areas of significance. Associated access tracks and infrastructure will also be designed to follow existing tracks wherever possible and to also avoid areas of significance wherever possible.

Where impacts are unavoidable, it is recommended that impacts are minimised. To this extent, the only potential impacts upon areas of significance are within the project's southern cluster, to site entry/exit points along Pine Hut Road. At these locations, existing site access points to site will be utilised, however some minor impacts to existing native vegetation may be necessary if these points are to be widened.

6.3 Potential clearance of scattered trees and areas of vegetation

As discussed above, Pacific Hydro's design has already sought to avoid impacts on existing native vegetation and the extent of any removal required is likely to be minimal. Nevertheless, any scattered trees proposed for removal within the turbine areas or associated construction areas will need to be assessed individually to calculate an appropriate Significant Environmental Benefit (SEB) to comply with Exemption 5(1) (d) (see Section 3.2) as per the Native Vegetation Council's '*Guidelines for Native Vegetation Significant Environmental Benefit Policy for the Clearance of Scattered Paddock Trees'* (DWLBC, 2007). The process involves utilising the Native Vegetation Council's Wildlife Habitat Assessment Scattered Tree Scoring Table, where a total SEB offset area is calculated based on the scores of each tree. The scores are determined based on a number of physical features including height (m), health (% dieback), number and size of hollows present, habitat value for threatened species, density and proximity to intact stands of native vegetation. A total SEB offset required for the clearance of the scattered trees can then be combined with any additional SEB required to offset intact areas of vegetation (patches)**.**

When a payment into the Native Vegetation Fund is proposed, as an alternative SEB to the management of land, the scattered tree scores and the required SEB in hectares (from clearance of intact areas) are converted into a monetary value using the document developed by DENR (formerly DWLBC) *How the Native Vegetation Group Undertakes its Clearance Application Assessments* (DWLBC, 2007) which outlines the '*Formula for calculating Significant Environmental Benefit payments'.*

7 MITIGATION MEASURES

A number of mitigation measures and recommendations have been made to Pacific Hydro through previous draft reports and associated discussions following the field work undertaken. The following mitigation measures have been adopted by Pacific Hydro within the design of the turbine layout in order to avoid impacts to native vegetation in the first instance and where complete avoidance is not possible to minimise potential impacts:

- All locations within the project site identified as containing Threatened Ecological Communities (or potential Threatened Ecological Communities), listed species and/or areas of significance have been avoided by the proposed turbine layout (Table 12, Table 15 and Figure 6).
- Turbine locations within vegetation association 1 have been sited so as to avoid the removal of any mature South Australian Blue Gums. The understory within this vegetation association is dominated by exotic / cropping grassland.
- Avoidance of clearance of preferable fauna habitat including riparian habitats and rocky outcrops. These areas are generally in the valleys and therefore have been avoided by the turbine design and associated infrastructure being on the ridge tops.

The following further mitigation measures are recommended to further minimise the impact of the Keyneton Wind Farm on native flora and fauna:

7.1 Native vegetation and habitat clearance:

- Areas containing Peppermint Box (*Eucalyptus odorata*) woodland may be suitable for consideration as part of any SEB offset required.
- In addition to avoiding impacts to areas of significance, minimise disturbance of other areas where the vegetation whilst of lesser conservation significance still has a condition rating of 2:1 or higher. It is possible to achieve this considering the majority of the project site is of very poor condition (0:1). This will not only ensure the impact on native vegetation and fauna species is minimised, but will also reduce the potential SEB requirements. Pacific Hydro has committed to avoiding woodland habitats and has embedded this mitigation strategy already within the wind farm design.
- Whilst the extent of the native vegetation impacts will be minimal, if the project is approved and following the completion of detailed design, the level of native vegetation clearance associated with the project can be confirmed to ensure any native vegetation approvals and SEB obligations are met.
- Micro-siting of turbines, roads and other infrastructure during detailed design will further avoid the clearance of any isolated trees, vegetation patches and fauna habitat features.
- Develop appropriate environmental management practices and procedures for the construction and operation of the wind farm.

7.2 Weed and soil pathogen management

- Given that the project site is located in a 'Low Risk' zone for *Phytophthora* (SA DEH, 2002a) the following principles apply and should be incorporated within the project's environmental management plan(s):

  1. Ensure vehicles, equipment and footwear is clean. Visual inspections should confirm that vehicles, equipment and footwear are free of clods of soil, slurry (water and soil mixture) and plant material (in particular roots and lower stem). Dust and grime adhering to vehicles need not be removed.
  2. Ensure that raw materials, such as rubble, gravel, sand, soil and water brought into this Zone are free of *Phytophthora*.
  3. Ensure that all flora brought into this Zone are free of *Phytophthora*. (SA DEH, 2002a)

- Weed management strategies (including weed hygiene procedures) should be implemented to ensure that weed species are not introduced onto the site or further spread throughout the sites or spread off site.

- Ongoing weed monitoring and management as required is recommended to ensure that the construction and operation of the proposed wind farm is not increasing weed abundance, distribution or diversity across the site.

7.3 Compliance and Legislation:

- Following further investigations into the Peppermint Box (*Eucalyptus odorata*) Grassy Woodland patches within vegetation associations 5 and 10, they were not considered to qualify as the nationally listed TEC under the *EPBC Act 1999.* A referral under the *EPBC Act 1999* is therefore not required.

- Clearance of native vegetation is likely to be exempt under the *Native Vegetation Act, 1991* Exemption 5(1) (d) ***Building or provision of infrastructure, including infrastructure in the Public Interest*** providing that it complies with each of the sub-sections of the exemption and that an appropriate Significant Environmental Benefit is implemented (see section 3.2).

- An appropriate Significant Environmental Benefit (SEB) will need to be calculated and implemented to offset any impacts or clearance of the native vegetation. The SEB could include:
  - the protection of remnant habitat within the survey area (i.e. heritage agreements)
  - the protection of remnant vegetation on suitable properties in the region (i.e. heritage
  - agreements)
  - the establishment of an exotic flora control program in the survey area complimented by the bush-regeneration of native vegetation remnants
  - the establishment of a revegetation program in degraded parts of the survey area
  - the establishment of a vertebrate pest control program in the survey area to reduce the

effect of pest animals, such as foxes and rabbits, on the native fauna in the region, or

- a payment to Native Vegetation Fund administered by the Native Vegetation Council.

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9 APPENDICES

Appendix 1. List of flora species occurring within the 12 vegetation associations identified in the proposed Keyneton Wind Farm project site.

Species name	Common name	Exotic	Conservation Rating		Vegetation Associations											
			Aus	SA	1	2	3	4	5	6	7	8	9	10	11	12
Native Species																
Acacia acinacea	Gold Dust Wattle				x			x					x			
Acacia brachybotrya	Grey Mulga-bush									x						
Acacia myrtifolia	Narrow-leaf Myrtle Wattle											x				
Acacia paradoxa	Kangaroo Thorn				x	x				x						x
Acacia pycnantha	Golden Wattle				x					x						x
Acacia retinodes var. retinodes	Wirilda				x											
Acaena sp.	Sheep's Burr				x			x	x	x						
Adriana quadripartita	Coast Bitter-bush				x											
Allocasuarina verticillata	Drooping Sheoak				x	x		x		x						x
Amyema miquelii	Box Mistletoe				x			x								
Anogramma leptophylla	Annual Fern			R												x
Aristida behriana	Brush Wire-grass					x				x						x
Arthropodium strictum	Common Vanilla-lily				x	x		x	x				x			x
Asperula conferta	Common Woodruff											x				
Asplenium flabellifolium	Necklace Fern															x
Atriplex nummularia ssp. nummularia	Old-man Saltbush											x				
Austrodanthonia caespitosa	Common Wallaby-grass					x			x				x			

Species name	Common name	Exotic	Conservation Rating		Vegetation Associations											
			Aus	SA	1	2	3	4	5	6	7	8	9	10	11	12
Austrodanthonia setacea	Small-flower Wallaby-grass				x	x									x	x
Austrostipa sp.	Spear-grass				x	x		x		x					x	x
Bulbine bulbosa	Bulbine-lily									x			x			
Bursaria spinosa ssp. spinosa	Sweet Bursaria							x								x
Calostemma purpureum	Pink Garland-lily				x											
Cheilanthes austrotenuifolia	Annual Rock-fern							x								
Convolvulus remotus	Grassy Bindweed							x							x	
Cyperus vaginatus	Stiff Flat-sedge												x			x
Dianella revoluta var. revoluta	Black-anther Flax-lily								x							x
Dodonaea viscosa	Sticky Hop-bush									x				x		x
Drosera glanduligera	Scarlet Sundew												x			
Drosera macrantha ssp. planchonii	Climbing Sundew												x			
Einadia nutans ssp. nutans	Climbing Saltbush															x
Enchylaena tomentosa var. tomentosa	Ruby Saltbush				x			x		x						
Eucalyptus camaldulensis var. camaldulensis	River Red Gum					x	x		x				x			
Eucalyptus leucoxylon	South Australian Blue Gum				x	x		x		x			x	x	x	
Eucalyptus odorata	Peppermint Box							x	x	x				x		
Eucalyptus sp.	Non local sp.											x				
Galium migrans	Loose Bedstraw							x								
Geranium solanderi var. solanderi	Austral Geranium															x
Gonocarpus elatus	Hill Raspwort									x						x

Species name	Common name	Exotic	Conservation Rating		Vegetation Associations											
			Aus	SA	1	2	3	4	5	6	7	8	9	10	11	12
Chrysocephalum baxteri	Fringed everlasting							x								
Juncus sp.	Rush							x								x
Juncus subsecundus	Finger Rush				x	x	x								x	x
Lomandra densiflora	Soft Tussock Mat-rush				x											x
Maireana enchylaenoides	Wingless Fissure-plant				x	x										
Melaleuca brevifolia	Short-leaf Honey-myrtle											x				
Melaleuca decussata	Totem-poles											x				
Melaleuca halmaturorum	Swamp Paper-bark											x				
Melaleuca lanceolata	Dryland Tea-tree											x				
Mimulus repens	Creeping Monkey-flower															x
Oxalis perennans	Native Sorrel					x		x	x							x
Phragmites australis	Common Reed						x									
Pimelea humilis	Low Riceflower							x								
Pimelea stricta	Erect Riceflower									x						
Ptilotus spathulatus f. spathulatus	Pussy-tails							x								x
Schoenoplectus litoralis/validus	Club-rush						x									
Senecio odoratus	Scented Groundsel															x
Triglochin procerum	Water-ribbons						x									
Typha domingensis	Narrow-leaf Bulrush						x									
Vittadinia gracilis	Woolly New Holland Daisy				x					x						
Wahlenbergia sp.	Native Bluebell															x

Species name	Common name	Exotic	Conservation Rating		Vegetation Associations											
			Aus	SA	1	2	3	4	5	6	7	8	9	10	11	12
Number of Native Species					**18**	**12**	**6**	**18**	**7**	**15**	**0**	**8**	**9**	**3**	**5**	**25**
Exotic / Weed Species																
Aira cupaniana	Small Hair-grass	*				*x*		*x*	*x*			*x*	*x*		*x*	
Anagallis arvensis	Pimpernel	*						*x*								
Arctotheca calendula	Cape Weed	*			*x*	*x*		*x*	*x*	*x*		*x*	*x*	*x*	*x*	*x*
Avena barbata/fatua	Wild Oat	*			*x*	*x*	*x*	*x*	*x*	*x*	*x*			*x*	*x*	*x*
Briza maxima	Large Quaking-grass	*				*x*		*x*		*x*						*x*
Bromus diandrus	Great Brome	*			*x*	*x*		*x*	*x*			*x*	*x*			*x*
Bromus hordeaceus ssp. hordeaceus	Soft Brome	*				*x*	*x*									
Bromus rubens	Red Brome	*			*x*			*x*	*x*			*x*		*x*	*x*	
Carthamus lanatus	Saffron Thistle	*				*x*		*x*	*x*							
Cotula coronopifolia	Water Buttons	*														*x*
Cynara cardunculus ssp. flavescens	Artichoke Thistle	*						*x*								
Dactylis glomerata	Cocksfoot	*						*x*								
Echium italicum	Italian Bugloss	*														
Echium plantagineum	Salvation Jane	*			*x*	*x*	*x*	*x*	*x*	*x*	*x*		*x*	*x*	*x*	*x*
Ehrharta calycina	Perennial Veldt Grass	*			*x*											
Erodium botrys	Long Heron's-bill	*				*x*	*x*	*x*	*x*	*x*					*x*	

Species name	Common name	Exotic	Conservation Rating		Vegetation Associations											
			Aus	SA	1	2	3	4	5	6	7	8	9	10	11	12
Gazania sp.	Gazania	*			x											
Gomphocarpus sp.	Cotton-bush	*								x						
Hordeum vulgare	Barley	*			x	x	x	x	x				x	x	x	
Hypochaeris glabra	Smooth Cat's Ear	*											x			x
Iris germanica	Flag Iris	*						x					x			
Juncus acutus	Sharp Rush	*														x
Lagurus ovatus	Hare's Tail Grass	*				x										
Lepidium africanum	Common Peppercress	*			x											
Lolium perenne	Perennial Ryegrass	*			x	x	x	x	x	x		x	x		x	x
Malva parviflora	Small-flower Marshmallow	*							x							
Marrubium vulgare	Horehound	*								x					x	
Medicago polymorpha var. polymorpha	Burr-medic	*			x	x		x	x						x	x
Medicago truncatula	Barrel Medic	*							x							
Moraea setifolia	Thread Iris	*			x			x					x			
Neatostema apulum	Hairy Sheepweed	*				x										
Nicotiana glauca	Tree Tobacco	*														x
Onopordum acanthium	Scotch Thistle	*						x								
Onopordum acaulon	Horse Thistle	*				x										
Oxalis pes-caprae	Soursob	*											x			
Parentucellia latifolia	Red Bartsia	*						x								

Species name	Common name	Exotic	Conservation Rating		Vegetation Associations											
			Aus	SA	1	2	3	4	5	6	7	8	9	10	11	12
Pentaschistis airoides	False Hair-grass	*				x										
Pennisetum setaceum	Fountain Grass	*														x
Petrorhagia dubia	Velvet Pink	*						x								
Plantago lanceolata var. lanceolata	Ribwort	*			x	x										
Romulea minutiflora	Small-flower Onion-grass	*											x			
Romulea sp.	Onion-grass	*				x		x	x	x						
Rosa canina	Dog Rose	*			x			x								
Rumex crispus	Curled Dock	*				x										
Rumex pulcher ssp. pulcher	Fiddle Dock	*				x			x							
Rumex sp.	Dock	*						x								
Salvia verbenaca form	Wild Sage	*			x	x		x		x						x
Scabiosa atropurpurea	Pincushion	*			x											
Schinus molle	Pepper-tree	*				x										
Sisymbrium erysimoides	Smooth Mustard	*			x											
Solanum nigrum	Black Nightshade	*						x								x
Sonchus sp.	Sow-thistle	*										x	x			
Taraxacum officinale	Dandelion	*			x	x		x								
Triticum spp	Wheat	*			x						x					
Trifolium angustifolium	Narrow-leaf Clover	*										x				x
Trifolium arvense var. arvense	Hare's-foot Clover	*				x	x		x			x	x	x	x	x
Trifolium campestre	Hop Clover	*										x				x

Species name	Common name	Exotic	Conservation Rating		Vegetation Associations											
			Aus	SA	1	2	3	4	5	6	7	8	9	10	11	12
Trifolium glomeratum	Cluster Clover	*										*x*				*x*
Urtica urens	Small Nettle	*				*x*		*x*								
Vulpia myuros	Fescue	*			*x*	*x*		*x*	*x*	*x*		*x*	*x*		*x*	*x*
Number of Exotic Species					**20**	**26**	**7**	**28**	**17**	**11**	**3**	**11**	**14**	**6**	**12**	**19**

Regions: Aus = Australia, **SA** = South Australia
Conservation Codes: EN/E = Endangered, **VU/V** = Vulnerable, **R** = Rare.

Appendix 2. Flora species identified as occurring in the proposed Keyneton Wind Farm project site from the BDBSA search.

Species Name	Common Name	Conservation rating	
		Aus	SA
Acacia acinacea	Wreath Wattle		
Acacia argyrophylla	Silver Mulga-bush		
Acacia brachybotrya	Grey Mulga-bush		
Acacia calamifolia	Wallowa		
Acacia cupularis	Cup Wattle		
Acacia dodonaeifolia	Hop-bush Wattle		R
Acacia euthycarpa	Wallowa		
Acacia hakeoides	Hakea Wattle		
Acacia halliana	Hall's Wattle		
Acacia ligulata	Umbrella Bush		
Acacia ligulata (NC)	Umbrella Bush		
Acacia melanoxylon	Blackwood		
Acacia microcarpa	Manna Wattle		
Acacia montana	Mallee Wattle		R
Acacia notabilis	Notable Wattle		
Acacia nyssophylla	Spine Bush		
Acacia oswaldii	Umbrella Wattle		
Acacia paradoxa	Kangaroo Thorn		
Acacia paradoxa hybrid	Kangaroo Thorn Hybrid		
Acacia pycnantha	Golden Wattle		
Acacia retinodes	Wirilda		
Acacia retinodes var. (NC)	Silver Wattle		
Acacia rigens	Nealie		
Acacia salicina	Willow Wattle		
Acacia sclerophylla var. sclerophylla	Hard-leaf Wattle		
Acacia wilhelmiana	Dwarf Nealie		
Acaena echinata	Sheep's Burr		
Acaena echinata var. (NC)	Sheep's Burr		
Acaena echinata var. retrorsumpilosa (NC)	Sheep's Burr		
Acaena sp.	Sheep's Burr		
Acrotriche patula	Prickly Ground-berry		
Acrotriche serrulata	Cushion Ground-berry		
Acrotriche sp.	Ground-berry		
Adiantum aethiopicum	Common Maiden-hair		
Agaricus xanthodermus			
Alectryon oleifolius ssp. canescens	Bullock Bush		
Allocasuarina muelleriana ssp. muelleriana	Common Oak-bush		
Allocasuarina verticillata	Drooping Sheoak		
Amphibromus archeri	Pointed Swamp Wallaby-grass		R
Amphibromus nervosus	Veined Swamp Wallaby-grass		
Amphipogon caricinus var. caricinus	Long Grey-beard Grass		
Amyema miquelii	Box Mistletoe		
Amyema pendula ssp. pendula	Drooping Mistletoe		
Amyema preissii	Wire-leaf Mistletoe		
Amyema sp.	Mistletoe		
Anogramma leptophylla	Annual Fern		R
Apodasmia brownii	Coarse Twine-rush		
Argentipallium blandowskianum	Woolly Everlasting		
Aristida behriana	Brush Wire-grass		
Aristida contorta	Curly Wire-grass		

Species Name	Common Name	Conservation rating	
		Aus	SA
Aristida holathera var. holathera	Tall Kerosene Grass		
Arthropodium fimbriatum	Nodding Vanilla-lily		
Arthropodium strictum	Common Vanilla-lily		
Asperula conferta	Common Woodruff		
Asplenium flabellifolium	Necklace Fern		
Asteridea athrixioides f. athrixioides	Wirewort		
Astroloma conostephioides	Flame Heath		
Astroloma humifusum	Cranberry Heath		
Atriplex acutibractea ssp.	Pointed Saltbush		
Atriplex acutibractea ssp. acutibractea	Pointed Saltbush		
Atriplex eardleyae	Eardley's Saltbush		
Atriplex paludosa ssp.	Marsh Saltbush		
Atriplex semibaccata	Berry Saltbush		
Atriplex stipitata	Bitter Saltbush		
Austrodanthonia auriculata	Lobed Wallaby-grass		
Austrodanthonia caespitosa	Common Wallaby-grass		
Austrodanthonia duttoniana	Brown-back Wallaby-grass		
Austrodanthonia eriantha	Hill Wallaby-grass		
Austrodanthonia geniculata	Kneed Wallaby-grass		
Austrodanthonia pilosa	Velvet Wallaby-grass		
Austrodanthonia racemosa var. racemosa	Slender Wallaby-grass		
Austrodanthonia setacea	Small-flower Wallaby-grass		
Austrodanthonia sp.			
Austrodanthonia tenuior	Short-awn Wallaby-grass		R
Austrostipa blackii	Crested Spear-grass		
Austrostipa curticoma	Short-crest Spear-grass		
Austrostipa densiflora	Fox-tail Spear-grass		R
Austrostipa drummondii	Cottony Spear-grass		
Austrostipa elegantissima	Feather Spear-grass		
Austrostipa eremophila	Rusty Spear-grass		
Austrostipa exilis	Heath Spear-grass		
Austrostipa flavescens	Coast Spear-grass		
Austrostipa hemipogon	Half-beard Spear-grass		
Austrostipa mollis	Soft Spear-grass		
Austrostipa nitida	Balcarra Spear-grass		
Austrostipa nodosa	Tall Spear-grass		
Austrostipa pilata	Prickly Spear-grass		V
Austrostipa platychaeta	Flat-awn Spear-grass		
Austrostipa scabra group	Falcate-awn Spear-grass		
Austrostipa scabra ssp.	Rough Spear-grass		
Austrostipa scabra ssp. falcata	Slender Spear-grass		
Austrostipa sp.	Spear-grass		
Austrostipa tenuifolia			R
Banksia marginata	Silver Banksia		
Baumea arthrophylla	Swamp Twig-rush		
Baumea gunnii	Slender Twig-rush		R
Baumea juncea	Bare Twig-rush		
Baumea sp.	Twig-rush		
Beyeria lechenaultii	Pale Turpentine Bush		
Billardiera versicolor	Yellow-flower Apple-berry		
Blennospora drummondii	Dwarf Button-flower		
Bolboschoenus medianus	Marsh Club-rush		

Species Name	Common Name	Conservation rating	
		Aus	SA
Boronia inornata ssp. leptophylla	Dryland Boronia		
Bossiaea prostrata	Creeping Bossiaea		
Bothriochloa macra	Red-leg Grass		R
Brachyloma ericoides ssp.	Brush Heath		
Brachyscome goniocarpa	Dwarf Daisy		
Brachyscome lineariloba	Hard-head Daisy		
Bromus arenarius	Sand Brome		
Bromus sp.	Brome		
Brunonia australis	Blue Pincushion		
Bulbine bulbosa	Bulbine-lily		
Burchardia umbellata	Milkmaids		
Bursaria spinosa ssp. lasiophylla	Downy Bursaria		
Bursaria spinosa ssp. spinosa	Sweet Bursaria		
Bursaria spinosa var. (NC)			
Caesia calliantha	Blue Grass-lily		
Caladenia argocalla	White Beauty Spider-orchid	E	E
Caladenia capillata	Wispy Spider-orchid		
Caladenia carnea	Pink Fingers		
Caladenia concolor	Crimson Spider-orchid	V	E*
Caladenia leptochila	Narrow-lip Spider-orchid		
Caladenia rigida	Stiff White Spider-orchid	E	E
Caladenia stricta	Upright Caladenia		
Caladenia tentaculata	King Spider-orchid		
Calandrinia calyptrata	Pink Purslane		
Calandrinia eremaea	Dryland Purslane		
Calandrinia granulifera	Pigmy Purslane		
Calandrinia volubilis	Twining Purslane		
Callistemon teretifolius	Needle Bottlebrush		
Callitris canescens	Scrubby Cypress Pine		
Callitris gracilis	Southern Cypress Pine		
Callitris verrucosa	Scrub Cypress Pine		
Calocephalus citreus	Lemon Beauty-heads		
Calochilus robertsonii	Purplish Beard-orchid		
Calostemma purpureum	Pink Garland-lily		
Calotis hispidula	Hairy Burr-daisy		
Calystegia sepium ssp. roseata	Large Bindweed		
Calytrix tetragona	Common Fringe-myrtle		
Carex bichenoviana	Notched Sedge		
Carex breviculmis	Short-stem Sedge		
Carex fascicularis	Tassel Sedge		
Carex inversa var. major	Knob Sedge		
Carex sp.	Sedge		
Carex tereticaulis	Rush Sedge		
Cassinia arcuata	Drooping Cassinia		
Cassinia laevis	Curry Bush		
Cassytha glabella f. dispar	Slender Dodder-laurel		
Cassytha melantha	Coarse Dodder-laurel		
Cassytha sp.	Dodder-laurel		
Centipeda cunninghamii	Common Sneezeweed		
Centrolepis aristata	Pointed Centrolepis		
Centrolepis cephaloformis ssp. cephaloformis	Cushion Centrolepis		R
Centrolepis polygyna	Wiry Centrolepis		

Species Name	Common Name	Conservation rating	
		Aus	SA
Centrolepis strigosa ssp. strigosa	Hairy Centrolepis		
Chamaescilla corymbosa var. corymbosa	Blue Squill		
Chamaesyce drummondii			
Chamaesyce drummondii (NC)	Caustic Weed		
Cheilanthes austrotenuifolia	Annual Rock-fern		
Cheilanthes distans	Bristly Cloak-fern		
Cheilanthes lasiophylla	Woolly Cloak-fern		
Cheilanthes sieberi ssp. sieberi	Narrow Rock-fern		
Chenopodium curvispicatum	Cottony Goosefoot		
Chenopodium desertorum ssp.	Desert Goosefoot		
Chenopodium desertorum ssp. desertorum	Frosted Goosefoot		
Chenopodium desertorum ssp. microphyllum	Small-leaf Goosefoot		
Chenopodium sp.	Goosefoot		
Chloris truncata	Windmill Grass		
Chorizandra enodis	Black Bristle-rush		
Chrysocephalum apiculatum	Common Everlasting		
Chrysocephalum semipapposum	Clustered Everlasting		
Cladonia humilis			
Clematis microphylla var. microphylla (NC)	Old Man's Beard		
Comesperma volubile	Love Creeper		
Convolvulus angustissimus ssp. angustissimus	Australian Bindweed		
Convolvulus angustissimus ssp. peninsularum	Grassland Bindweed		
Convolvulus clementii			
Convolvulus erubescens (NC)	Australian Bindweed		
Convolvulus erubescens complex			
Convolvulus remotus	Grassy Bindweed		
Correa aemula	Hairy Correa		R
Correa glabra (NC)	Rock Correa		
Correa glabra var.			
Correa glabra var. turnbullii	Rock Correa		
Cotula vulgaris var. australasica	Slender Cotula		
Craspedia variabilis	Billy-buttons		
Crassula colligata ssp. colligata			
Crassula colorata var.	Dense Crassula		
Crassula colorata var. acuminata	Dense Crassula		
Crassula decumbens var. decumbens	Spreading Crassula		
Crassula sieberiana	Sieber's Crassula		E
Crassula sp.	Crassula/Stonecrop		
Cryptandra sp. Floriferous	Pretty Cryptandra		
Cryptandra tomentosa	Heath Cryptandra		
Cryptandra tomentosa (NC)			
Cullen australasicum	Tall Scurf-pea		
Cymbonotus preissianus	Austral Bear's-ear		
Cymbopogon obtectus	Silky-head Lemon-grass		
Cynoglossum australe	Australian Hound's-tongue		
Cynoglossum sp.	Hound's-tongue		
Cynoglossum suaveolens	Sweet Hound's-tongue		
Cyperaceae sp.	Sedge Family		
Cyperus gunnii ssp. gunnii	Flecked Flat-sedge		
Cyperus gymnocaulos	Spiny Flat-sedge		
Cyperus laevigatus	Bore-drain Sedge		
Cyperus sanguinolentus	Dark Flat-sedge		R

Species Name	Common Name	Conservation rating	
		Aus	SA
Cyperus sp.	Flat-sedge		
Cyperus vaginatus	Stiff Flat-sedge		
Dampiera dysantha	Shrubby Dampiera		
Dampiera rosmarinifolia	Rosemary Dampiera		
Danthonia carphoides var. carphoides (NC)	Short Wallaby-grass		R
Danthonia pilosa var. (NC)	Velvet Wallaby-grass		
Danthonia sp. (NC)	Wallaby-grass		
Daucus glochidiatus	Native Carrot		
Daviesia arenaria	Sand Bitter-pea		
Daviesia brevifolia	Leafless Bitter-pea		
Daviesia sp.	Bitter-pea		
Daviesia ulicifolia (NC)	Gorse Bitter-pea		
Daviesia ulicifolia ssp.			
Daviesia ulicifolia ssp. incarnata			
Deyeuxia quadriseta	Reed Bent-grass		
Dianella brevicaulis/revoluta var.	Black-anther Flax-lily		
Dianella longifolia var. (NC)	Pale Flax-lily		
Dianella longifolia var. grandis	Pale Flax-lily		R
Dianella revoluta (NC)			
Dianella revoluta var.			
Dianella revoluta var. revoluta	Black-anther Flax-lily		
Dichelachne crinita	Long-hair Plume-grass		
Dichelachne inaequiglumis	Loose Plume-grass		
Dichelachne rara	Loose Plume-grass		
Dichondra repens	Kidney Weed		
Digitaria ammophila	Spider Grass		
Diploschistes hensseniae			
Dipodium roseum	Pink Hyacinth Orchid		
Distichlis distichophylla	Emu-grass		
Diuris behrii	Behr's Cowslip Orchid		V
Diuris pardina	Spotted Donkey-orchid		
Dodonaea baueri	Crinkled Hop-bush		
Dodonaea bursariifolia	Small Hop-bush		
Dodonaea subglandulifera		E	E
Dodonaea viscosa ssp.	Sticky Hop-bush		
Dodonaea viscosa ssp. angustissima	Narrow-leaf Hop-bush		
Dodonaea viscosa ssp. spatulata	Sticky Hop-bush		
Drosera auriculata	Tall Sundew		
Drosera glanduligera	Scarlet Sundew		
Drosera peltata	Pale Sundew		
Drosera pygmaea	Tiny Sundew		
Drosera sp.	Sundew		
Drosera whittakeri ssp.			
Drosera whittakeri ssp. whittakeri			
Dysphania cristata	Crested Goosefoot		
Dysphania pumilio	Clammy Goosefoot		
Einadia nutans ssp.	Climbing Saltbush		
Einadia nutans ssp. nutans	Climbing Saltbush		
Elachanthus pusillus	Elachanth		
Eleocharis acuta	Common Spike-rush		
Eleocharis gracilis	Slender Spike-rush		
Eleocharis pusilla	Small Spike-rush		

Species Name	Common Name	Conservation rating	
		Aus	SA
Elymus scaber var. scaber	Native Wheat-grass		
Elymus scaber var. scaber (NC)	Native Wheat-grass		
Enchylaena tomentosa var.	Ruby Saltbush		
Enchylaena tomentosa var. tomentosa	Ruby Saltbush		
Enneapogon nigricans	Black-head Grass		
Epilobium billardierianum ssp. cinereum	Variable Willow-herb		
Epilobium hirtigerum	Hairy Willow-herb		
Eragrostis brownii	Bentham's Love-grass		
Eragrostis lacunaria	Purple Love-grass		R
Eremophila alternifolia	Narrow-leaf Emubush		
Eremophila glabra ssp. glabra	Tar Bush		
Eremophila longifolia	Weeping Emubush		
Eremophila maculata ssp. maculata	Spotted Emubush		
Eriochiton sclerolaenoides	Woolly-fruit Bluebush		
Erodium crinitum	Blue Heron's-bill		
Erodium sp.	Heron's-bill/Crowfoot		
Eucalyptus brachycalyx	Gilja		
Eucalyptus calycogona ssp. trachybasis	Square-fruit Mallee		
Eucalyptus camaldulensis var.	River Red Gum		
Eucalyptus camaldulensis var. camaldulensis (NC)	River Red Gum		
Eucalyptus dumosa	White Mallee		
Eucalyptus fasciculosa	Pink Gum		R
Eucalyptus gracilis	Yorrell		
Eucalyptus incrassata	Ridge-fruited Mallee		
Eucalyptus largiflorens	River Box		
Eucalyptus leucoxylon (NC)	South Australian Blue Gum		
Eucalyptus leucoxylon hybrid	South Australian Blue Gum Hybrid		
Eucalyptus leucoxylon ssp.	South Australian Blue Gum		
Eucalyptus leucoxylon ssp. leucoxylon	South Australian Blue Gum		
Eucalyptus leucoxylon ssp. pruinosa	Inland South Australian Blue Gum		
Eucalyptus odorata	Peppermint Box		
Eucalyptus oleosa (NC)	Red Mallee		
Eucalyptus oleosa ssp. oleosa	Red Mallee		
Eucalyptus phenax (NC)	Sessile-fruit White Mallee		
Eucalyptus phenax ssp. phenax	White Mallee		
Eucalyptus porosa	Mallee Box		
Eucalyptus rugosa	Coastal White Mallee		
Eucalyptus socialis (NC)	Beaked Red Mallee		
Eucalyptus socialis ssp. socialis	Beaked Red Mallee		
Eucalyptus socialis ssp. viridans	Beaked Red Mallee		
Eucalyptus viminalis ssp. cygnetensis	Rough-bark Manna Gum		
Eucalyptus viminalis ssp. viminalis	Manna Gum		R
Euchiton involucratus	Star Cudweed		
Euphorbia tannensis ssp. eremophila	Desert Spurge		
Eutaxia diffusa	Large-leaf Eutaxia		
Eutaxia microphylla	Common Eutaxia		
Exocarpos aphyllus	Leafless Cherry		
Exocarpos cupressiformis	Native Cherry		
Ficinia nodosa	Knobby Club-rush		
Gahnia lanigera	Black Grass Saw-sedge		

Species Name	Common Name	Conservation rating	
		Aus	SA
Galium compactum	Compact Bedstraw		
Galium gaudichaudii (NC)	Rough Bedstraw		
Galium sp.	Bedstraw		
Gastrodia sesamoides	Potato Orchid		R
Geijera linearifolia	Sheep Bush		
Geococcus pusillus	Earth Cress		
Geraniaceae sp.	Geranium Family		
Geranium retrorsum	Grassland Geranium		
Geranium solanderi var. solanderi	Austral Geranium		
Geranium sp.	Geranium		
Gigaspermum repens			
Glossodia major	Purple Cockatoo		
Glycine clandestina var. (NC)	Twining Glycine		
Glycine rubiginosa	Twining Glycine		
Gompholobium ecostatum	Dwarf Wedge-pea		
Gonocarpus elatus	Hill Raspwort		
Gonocarpus sp.	Raspwort		
Gonocarpus tetragynus	Small-leaf Raspwort		
Goodenia albiflora	White Goodenia		
Goodenia blackiana	Native Primrose		
Goodenia geniculata	Bent Goodenia		
Goodenia pinnatifida	Cut-leaf Goodenia		
Goodenia pusilliflora	Small-flower Goodenia		
Goodenia willisiana	Silver Goodenia		
Goodia medicaginea	Western Golden-tip		
Gramineae sp.	Grass Family		
Grevillea huegelii	Comb Grevillea		
Grevillea ilicifolia ssp. ilicifolia	Holly-leaf Grevillea		
Hakea carinata	Erect Hakea		
Hakea leucoptera ssp. leucoptera	Silver Needlewood		
Hakea rostrata	Beaked Hakea		
Hakea rugosa	Dwarf Hakea		
Halgania andromedifolia	Scented Blue-flower		
Haloragaceae sp.	Raspwort		
Haloragis aspera	Rough Raspwort		
Hardenbergia violacea	Native Lilac		
Harmsiodoxa brevipes var. brevipes	Short Cress		
Helichrysum leucopsideum	Satin Everlasting		
Heliotropium asperrimum	Rough Heliotrope		
Heliotropium europaeum	Common Heliotrope		
Hemarthria uncinata var. uncinata	Mat Grass		
Hibbertia exutiacies	Prickly Guinea-flower		
Hibbertia riparia (NC)	Guinea-flower		
Hibbertia sericea	Silky Guinea-flower		
Hibbertia sericea var. (NC)	Silky Guinea-flower		
Hibbertia virgata	Twiggy Guinea-flower		
Hyalosperma glutinosum ssp. glutinosum	Golden Sunray		
Hyalosperma semisterile	Orange Sunray		
Hybanthus floribundus ssp. floribundus	Shrub Violet		
Hydrocotyle laxiflora	Stinking Pennywort		
Hydrocotyle plebeya			
Hydrocotyle sp.	Pennywort		

Species Name	Common Name	Conservation rating	
		Aus	SA
Hypericum gramineum	Small St John's Wort		
Hypolaena fastigiata	Tassel Rope-rush		
Hypolepis rugosula	Ruddy Ground-fern		R
Hypoxis glabella var. glabella	Tiny Star		
Hypoxis vaginata var. vaginata	Yellow Star		
Imperata cylindrica	Blady Grass		
Isoetopsis graminifolia	Grass Cushion		
Isolepis cernua	Nodding Club-rush		
Isolepis fluitans	Floating Club-rush		
Isolepis inundata	Swamp Club-rush		
Isolepis sp.	Club-rush		
Isopogon ceratophyllus	Horny Cone-bush		
Ixodia achillaeoides ssp. alata	Hills Daisy		
Juncus aridicola	Inland Rush		
Juncus bufonius	Toad Rush		
Juncus caespiticius	Grassy Rush		
Juncus flavidus	Yellow Rush		
Juncus holoschoenus	Joint-leaf Rush		
Juncus homalocaulis	Wiry Rush		V
Juncus kraussii	Sea Rush		
Juncus pallidus	Pale Rush		
Juncus planifolius	Broad-leaf Rush		
Juncus sp.	Rush		
Juncus subsecundus	Finger Rush		
Kennedia prostrata	Scarlet Runner		
Lachnagrostis aemula	Blown-grass		
Lachnagrostis billardierei ssp. billardierei	Coast Blown-grass		
Lachnagrostis filiformis	Common Blown-grass		
Lachnagrostis robusta	Tall Blown-grass		R
Lachnagrostis sp.			
Lagenophora huegelii	Coarse Bottle-daisy		
Leiocarpa tomentosa	Woolly Plover-daisy		
Lepidium pseudohyssopifolium			
Lepidobolus drapetocoleus	Scale Shedder		
Lepidosperma carphoides	Black Rapier-sedge		
Lepidosperma congestum			
Lepidosperma congestum (NC)	Clustered Sword-sedge		
Lepidosperma curtisiae	Little Sword-sedge		
Lepidosperma longitudinale	Pithy Sword-sedge		
Lepidosperma semiteres	Wire Rapier-sedge		
Lepidosperma viscidum	Sticky Sword-sedge		
Leptorhynchos elongatus	Lanky Buttons		R
Leptorhynchos squamatus ssp. squamatus	Scaly Buttons		
Leptorhynchos tetrachaetus	Little Buttons		
Leptospermum continentale	Prickly Tea-tree		
Leptospermum myrsinoides	Heath Tea-tree		
Leucopogon virgatus var. virgatus	Common Beard-heath		
Levenhookia dubia	Hairy Stylewort		
Lichen sp.			
Liliaceae sp.	Lily Family		
Linum marginale	Native Flax		
Lobelia anceps	Angled Lobelia		

Species Name	Common Name	Conservation rating	
		Aus	SA
Lobelia gibbosa	Tall Lobelia		
Lomandra collina	Sand Mat-rush		
Lomandra densiflora	Soft Tussock Mat-rush		
Lomandra effusa	Scented Mat-rush		
Lomandra fibrata	Mount Lofty Mat-rush		
Lomandra leucocephala ssp. robusta	Woolly Mat-rush		
Lomandra micrantha ssp.	Small-flower Mat-rush		
Lomandra micrantha ssp. micrantha	Small-flower Mat-rush		
Lomandra multiflora ssp.	Many-flower Mat-rush		
Lomandra multiflora ssp. dura	Hard Mat-rush		
Lomandra nana	Small Mat-rush		
Lomandra sororia	Sword Mat-rush		
Lotus australis	Austral Trefoil		
Luzula meridionalis	Common Wood-rush		
Luzula ovata	Clustered Wood-rush		R
Lysiana exocarpi ssp. exocarpi	Harlequin Mistletoe		
Lythrum hyssopifolia	Lesser Loosestrife		
Maireana brevifolia	Short-leaf Bluebush		
Maireana enchylaenoides	Wingless Fissure-plant		
Maireana erioclada	Rosy Bluebush		
Maireana pyramidata	Black Bluebush		
Maireana rohrlachii	Rohrlach's Bluebush		R
Maireana sedifolia	Bluebush		
Maireana sp.	Bluebush/Fissure-plant		
Maireana trichoptera	Hairy-fruit Bluebush		
Malva preissiana	Australian Hollyhock		
Melaleuca brevifolia	Short-leaf Honey-myrtle		
Melaleuca lanceolata	Dryland Tea-tree		
Melaleuca lanceolata ssp. lanceolata (NC)	Dryland Tea-tree		
Melicytus dentatus	Tree Violet		
Microlaena stipoides var. stipoides	Weeping Rice-grass		
Microseris lanceolata	Yam Daisy		
Microtis arenaria	Notched Onion-orchid		
Microtis parviflora	Slender Onion-orchid		
Microtis unifolia complex	Onion-orchid		
Millotia muelleri	Common Bow-flower		
Millotia myosotidifolia	Broad-leaf Millotia		
Millotia perpusilla	Tiny Bow-flower		
Millotia tenuifolia var. tenuifolia	Soft Millotia		
Mimulus repens	Creeping Monkey-flower		
Minuria leptophylla	Minnie Daisy		
Montia fontana ssp. chondrosperma	Waterblinks		V
Moss sp.			
Muehlenbeckia florulenta	Lignum		
Myoporum parvifolium	Creeping Boobialla		R
Myoporum platycarpum (NC)	False Sandalwood		
Myoporum platycarpum ssp. perbellum	Mallee Sandalwood		
Myoporum platycarpum ssp. platycarpum	False Sandalwood		
Myoporum sp. Petiolatum (R.Taylor 484)	Sticky Boobialla		
Myoporum viscosum (NC)	Sticky Boobialla		
Myosotis australis	Austral Forget-me-not		
Neurachne alopecuroidea	Fox-tail Mulga-grass		

Species Name	Common Name	Conservation rating	
		Aus	SA
Neurachne sp.	Mulga-grass		
Nicotiana maritima	Coast Tobacco		
Olearia decurrens	Winged Daisy-bush		
Olearia magniflora	Splendid Daisy-bush		
Olearia pannosa ssp. pannosa	Silver Daisy-bush	V	V
Olearia pimeleoides ssp. pimeleoides	Pimelea Daisy-bush		
Olearia ramulosa	Twiggy Daisy-bush		
Olearia sp.	Daisy-bush		
Omphalolappula concava	Burr Stickseed		
Opercularia ovata	Broad-leaf Stinkweed		
Ophioglossum lusitanicum	Austral Adder's-tongue		
Orthoceras strictum	Horned Orchid		
Oxalis perennans	Native Sorrel		
Oxalis perennans (NC)	Native Sorrel		
Ozothamnus retusus	Notched Bush-everlasting		
Panicum effusum var. effusum	Hairy Panic		
Parietaria debilis (NC)	Smooth-nettle		
Persicaria prostrata	Creeping Knotweed		
Pheladenia deformis	Bluebeard Orchid		
Phragmites australis	Common Reed		
Phyllangium distylis	Tiny Mitrewort		R
Phyllanthus saxosus	Rock Spurge		
Phylloglossum drummondii	Pigmy Clubmoss		R
Picris angustifolia ssp. angustifolia	Coast Picris		
Pimelea curviflora var. gracilis (NC)	Curved Riceflower		
Pimelea flava ssp. dichotoma	Diosma Riceflower		
Pimelea humilis	Low Riceflower		
Pimelea imbricata var. petraea	Rock Woolly Riceflower		
Pimelea micrantha	Silky Riceflower		
Pimelea serpyllifolia ssp. serpyllifolia	Thyme Riceflower		
Pimelea sp.	Riceflower		
Pimelea stricta	Erect Riceflower		
Pittosporum angustifolium	Native Apricot		
Plantago drummondii	Dark Plantain		
Plantago gaudichaudii	Narrow-leaf Plantain		
Plantago sp.	Plantain		
Platylobium obtusangulum	Holly Flat-pea		
Pleurosorus rutifolius	Blanket Fern		
Poa crassicaudex	Thick-stem Tussock-grass		
Poa labillardieri var. labillardieri	Common Tussock-grass		
Poa sp.	Meadow-grass/Tussock-grass		
Podolepis rugata var. rugata	Pleated Copper-wire Daisy		
Podolepis tepperi	Delicate Copper-wire Daisy		
Pogonolepis muelleriana	Stiff Cup-flower		
Polycalymma stuartii	Poached-egg Daisy		
Pomaderris paniculosa ssp. paniculosa	Mallee Pomaderris		
Prasophyllum fitzgeraldii	Fitzgerald's Leek-orchid		
Prasophyllum occidentale	Plains Leek-orchid		
Prasophyllum pallidum	Pale Leek-orchid	V	R
Prasophyllum sp.	Leek-orchid		
Prostanthera aspalathoides	Scarlet Mintbush		
Pteridium esculentum	Bracken Fern		

Species Name	Common Name	Conservation rating	
		Aus	SA
Pterostylis biseta	Two-bristle Greenhood		
Pterostylis nutans	Nodding Greenhood		
Pterostylis pedunculata	Maroon-hood		
Pterostylis robusta	Large Shell-orchid		
Pterostylis smaragdyna			
Ptilotus erubescens	Hairy-tails		R
Ptilotus seminudus	Rabbit-tails		
Ptilotus spathulatus f.	Pussy-tails		
Ptilotus spathulatus f. spathulatus	Pussy-tails		
Pultenaea acerosa	Bristly Bush-pea		
Pultenaea daphnoides	Large-leaf Bush Pea		
Pultenaea largiflorens	Twiggy Bush-pea		
Pultenaea laxiflora	Loose-flower Bush-pea		
Pultenaea pedunculata	Matted Bush-pea		
Pultenaea sp.	Bush-pea		
Pultenaea tenuifolia	Narrow-leaf Bush-pea		
Quinetia urvillei	Quinetia		
Ranunculus lappaceus	Native Buttercup		
Ranunculus pachycarpus	Thick-fruit Buttercup		
Rhagodia crassifolia	Fleshy Saltbush		
Rhagodia parabolica	Mealy Saltbush		
Rhagodia spinescens	Spiny Saltbush		
Rhagodia ulicina	Intricate Saltbush		
Rhodanthe moschata	Musk Daisy		
Rhodanthe pygmaea	Pigmy Daisy		
Rumex brownii	Slender Dock		
Rumex brownii (NC)	Slender Dock		
Rumex dumosus	Wiry Dock		R
Salsola tragus	Buckbush		
Samolus repens	Creeping Brookweed		
Santalum acuminatum	Quandong		
Sarcostemma viminale ssp. australe	Caustic Bush		
Scaevola albida	Pale Fanflower		
Scaevola albida var. (NC)			
Scaevola sp.	Fanflower		
Schoenoplectus pungens	Spiky Club-rush		
Schoenoplectus validus	River Club-rush		
Schoenus apogon	Common Bog-rush		
Schoenus breviculmis	Matted Bog-rush		
Schoenus latelaminatus	Medusa Bog-rush		V
Scleranthus pungens	Prickly Knawel		
Sclerolaena diacantha	Grey Bindyi		
Sclerolaena obliquicuspis	Oblique-spined Bindyi		
Sclerolaena patenticuspis	Spear-fruit Bindyi		
Sclerolaena uniflora	Small-spine Bindyi		
Senecio dolichocephalus	Woodland Groundsel		
Senecio glomeratus ssp. glomeratus	Swamp Groundsel		
Senecio glossanthus	Annual Groundsel		
Senecio megaglossus	Large-flower Groundsel	V	E
Senecio odoratus	Scented Groundsel		
Senecio odoratus var. odoratus (NC)	Scented Groundsel		
Senecio quadridentatus	Cotton Groundsel		

Species Name	Common Name	Conservation rating	
		Aus	SA
Senecio spanomerus			
Senna artemisioides ssp. filifolia	Fine-leaf Desert Senna		
Senna artemisioides ssp. petiolaris			
Senna artemisioides ssp. petiolaris (NC)	Flat-stalk Senna		
Senna artemisioides ssp. X coriacea	Broad-leaf Desert Senna		
Setaria constricta	Knotty-butt Paspalidium		
Setaria jubiflora	Warrego Summer-grass		
Sida petrophila	Rock Sida		
Siloxerus multiflorus	Small Wrinklewort		
Solanum sturtianum	Sturt's Nightshade		
Solenogyne dominii	Smooth Solenogyne		
Sonchus hydrophilus	Native Sow-thistle		
Sporobolus mitchellii	Rat-tail Couch		
Sporobolus virginicus	Salt Couch		
Spyridium parvifolium	Dusty Miller		
Stackhousia monogyna	Creamy Candles		
Stellaria angustifolia	Swamp Starwort		
Stenanthemum leucophractum	White Cryptandra		
Stenopetalum sphaerocarpum	Round-fruit Thread-petal		
Stuartina muelleri	Spoon Cudweed		
Swainsona extrajacens			
Swainsona lessertiifolia	Coast Swainson-pea		
Swainsona tephrotricha	Ashy-haired Swainson-pea		
Templetonia egena	Broombush Templetonia		
Tetragonia tetragonioides (NC)	New Zealand Spinach		
Tetratheca pilosa ssp. pilosa	Hairy Pink-bells		
Teucrium albicaule	Scurfy Germander		
Teucrium corymbosum	Rock Germander		
Teucrium sessiliflorum	Mallee Germander		
Thelymitra juncifolia	Spotted Sun-orchid		
Thelymitra nuda (NC)	Scented Sun-orchid		
Thelymitra pauciflora	Slender Sun-orchid		
Thelymitra peniculata	Blue Star Sun-orchid		V
Thelymitra sp.	Sun-orchid		
Themeda triandra	Kangaroo Grass		
Thysanotus baueri	Mallee Fringe-lily		
Thysanotus patersonii	Twining Fringe-lily		
Tragus australianus	Small Burr-grass		
Tricoryne elatior	Yellow Rush-lily		
Tricoryne elatior (NC)	Yellow Rush-lily		
Tricoryne tenella	Tufted Yellow Rush-lily		
Triglochin striata	Streaked Arrowgrass		
Triodia irritans var. (NC)			
Triodia scariosa	Spinifex		
Triptilodiscus pygmaeus	Small Yellow-heads		
Trymalium wayi	Grey Trymalium		
Typha domingensis	Narrow-leaf Bulrush		
Typha orientalis	Broad-leaf Bulrush		
Typha sp.	Bulrush		
Unverified species - nv			
Velleia arguta	Toothed Velleia		
Velleia paradoxa	Spur Velleia		

	Species Name	Common Name	Conservation rating	
			Aus	SA
	Villarsia umbricola var. umbricola	Lax Marsh-flower		
	Viola cleistogamoides	Shy Violet		
	Viola eminens	Ivy-leaf Violet		
	Viola sieberiana	Tiny Violet		
	Vittadinia australasica var. australasica	Sticky New Holland Daisy		
	Vittadinia blackii	Narrow-leaf New Holland Daisy		
	Vittadinia cervicularis var. cervicularis	Waisted New Holland Daisy		
	Vittadinia cuneata var.	Fuzzy New Holland Daisy		
	Vittadinia cuneata var. cuneata f. cuneata	Fuzzy New Holland Daisy		
	Vittadinia cuneata var. murrayensis	Murray New Holland Daisy		
	Vittadinia dissecta var. hirta	Dissected New Holland Daisy		
	Vittadinia gracilis	Woolly New Holland Daisy		
	Vittadinia megacephala	Giant New Holland Daisy		
	Vittadinia sp.	New Holland Daisy		
	Vittadinia sulcata	Furrowed New Holland Daisy		
	Wahlenbergia communis	Tufted Bluebell		
	Wahlenbergia gracilenta	Annual Bluebell		
	Wahlenbergia littoricola	Coast Bluebell		
	Wahlenbergia luteola	Yellow-wash Bluebell		
	Wahlenbergia stricta ssp. stricta	Tall Bluebell		
	Wahlenbergia tumidifructa	Swollen-fruit Bluebell		
	Westringia rigida	Stiff Westringia		
	Wurmbea dioica ssp. brevifolia	Early Nancy		
	Wurmbea dioica ssp. dioica (NC)	Early Nancy		
	Wurmbea dioica ssp. dioica (NC)	Early Star-lily		
	Xanthoparmelia lineola			
	Xanthorrhoea quadrangulata	Rock Grass-tree		
	Xanthorrhoea semiplana ssp.	Yacca		
	Xanthorrhoea semiplana ssp. semiplana	Yacca		
	Zygophyllum ammophilum (NC)	Sand Twinleaf		
	Zygophyllum apiculatum	Pointed Twinleaf		
	Zygophyllum aurantiacum (NC)	Shrubby Twinleaf		
	Zygophyllum aurantiacum ssp. aurantiacum	Shrubby Twinleaf		
	Zygophyllum confluens	Forked Twinleaf		
	Zygophyllum crenatum	Notched Twinleaf		
	Zygophyllum glaucum	Pale Twinleaf		
	Zygophyllum iodocarpum	Violet Twinleaf		
	Zygophyllum ovatum	Dwarf Twinleaf		
	Zygophyllum sp.	Twinleaf		
*	*Acetosella vulgaris*	Sorrel		
*	*Adonis microcarpa*	Pheasant's Eye		
*	*Agave americana*	Century Plant		
*	*Agrostis capillaris*	Brown-top Bent		
*	*Aira cupaniana*	Small Hair-grass		
*	*Aira sp.*	Hair-grass		
*	*Allium ampeloprasum*	Wild Leek		
*	*Allium vineale*	Crow Garlic		
*	*Alyssum linifolium*	Flax-leaf Alyssum		
*	*Amaranthus caudatus*	Love-lies-bleeding		
*	*Amaranthus muricatus*	Rough-fruit Amaranth		

	Species Name	Common Name	Conservation rating	
			Aus	SA
*	*Anagallis arvensis*	Pimpernel		
*	*Arctotheca calendula*	Cape Weed		
*	*Arenaria leptoclados*	Lesser Thyme-leaved Sandwort		
*	*Argyranthemum frutescens ssp. foeniculaceum*	Teneriffe Daisy		
*	*Asparagus asparagoides (NC)*	Bridal Creeper		
*	*Asphodelus fistulosus*	Onion Weed		
*	*Aster subulatus*	Aster-weed		
*	*Atriplex prostrata*	Creeping Saltbush		
*	*Avellinia michelii*	Avellinia		
*	*Avena barbata*	Bearded Oat		
*	*Avena barbata/fatua*	Wild Oat		
*	*Avena sp.*	Oat		
*	*Brachypodium distachyon*	False Brome		
*	*Brassica tournefortii*	Wild Turnip		
*	*Briza maxima*	Large Quaking-grass		
*	*Briza minor*	Lesser Quaking-grass		
*	*Bromus diandrus*	Great Brome		
*	*Bromus hordeaceus ssp. hordeaceus*	Soft Brome		
*	*Bromus madritensis*	Compact Brome		
*	*Bromus rigidus*	Rigid Brome		
*	*Bromus rubens*	Red Brome		
*	*Buglossoides arvensis*	Sheepweed		
*	*Bupleurum semicompositum*	Hare's Ear		
*	*Capsella bursa-pastoris*	Shepherd's Purse		
*	*Cardamine flexuosa*	Wood Bitter-cress		
*	*Carduus tenuiflorus*	Slender Thistle		
*	*Carthamus lanatus*	Saffron Thistle		
*	*Cenchrus longispinus*	Spiny Burr-grass		
*	*Centaurea eriophora*			
*	*Centaurea melitensis*	Malta Thistle		
*	*Centaurea nigrescens ssp. nigrescens*			
*	*Centaurea sp.*	Centaury		
*	*Centaurium erythraea*	Common Centaury		
*	*Centaurium sp.*	Centaury		
*	*Centaurium tenuiflorum (NC)*	Branched Centaury		
*	*Chamaecytisus palmensis*	Tree Lucerne		
*	*Chamaerops humilis*	European Fan Palm		
*	*Chenopodium murale*	Nettle-leaf Goosefoot		
*	*Chondrilla juncea*	Skeleton Weed		
*	*Chrysanthemoides monilifera ssp. monilifera*	Boneseed		
*	*Cirsium vulgare*	Spear Thistle		
*	*Citrullus colocynthis*	Colocynth		
*	*Citrullus lanatus*	Bitter Melon		
*	*Conyza bonariensis*	Flax-leaf Fleabane		

	Species Name	Common Name	Conservation rating	
			Aus	SA
*	*Cotula coronopifolia*	Water Buttons		
*	*Cynara cardunculus ssp. flavescens*	Artichoke Thistle		
*	*Cynodon dactylon var. dactylon*	Couch		
*	*Cynodon sp.*	Couch		
*	*Cynosurus echinatus*	Rough Dog's-tail Grass		
*	*Cyperus congestus*	Dense Flat-sedge		
*	*Cyperus tenellus*	Tiny Flat-sedge		
*	*Dactylis glomerata*	Cocksfoot		
*	*Datura stramonium*	Common Thorn-apple		
*	*Delairea odorata*	Cape Ivy		
*	*Digitaria ciliaris*	Summer Grass		
*	*Diplotaxis tenuifolia*	Lincoln Weed		
*	*Disa bracteata*			
*	*Dischisma capitatum*	Woolly-head Dichisma		
*	*Echinochloa crus-galli*	Common Barnyard Grass		
*	*Echium italicum*	Italian Bugloss		
*	*Echium plantagineum*	Salvation Jane		
*	*Ehrharta calycina*	Perennial Veldt Grass		
*	*Ehrharta longiflora*	Annual Veldt Grass		
*	*Eragrostis barrelieri*	Pitted Love-grass		
*	*Eragrostis cilianensis*	Stink Grass		
*	*Eragrostis curvula*	African Love-grass		
*	*Erodium botrys*	Long Heron's-bill		
*	*Erodium cicutarium*	Cut-leaf Heron's-bill		
*	*Foeniculum vulgare*	Fennel		
*	*Fumaria bastardii*	Bastard Fumitory		
*	*Fumaria densiflora*	Dense Fumitory		
*	*Fumaria muralis ssp.*	Wall Fumitory		
*	*Galenia secunda*	Galenia		
*	*Galium divaricatum*	Slender Bedstraw		
*	*Gastridium phleoides*	Nit-grass		
*	*Gazania linearis*	Gazania		
*	*Gazania sp.*	Gazania		
*	*Genista monspessulana*	Montpellier Broom		
*	*Geranium dissectum*	Cut-leaf Geranium		
*	*Geranium molle var. molle*	Soft Geranium		
*	*Gladiolus sp.*	Gladiolus		
*	*Glycyrrhiza glabra*	Liquorice		
*	*Gomphocarpus cancellatus*	Broad-leaf Cotton-bush		
*	*Hedypnois rhagadioloides (NC)*	Cretan Weed		
*	*Hedypnois rhagadioloides ssp. cretica*	Cretan Weed		
*	*Herniaria cinerea*	Rupturewort		
*	*Hirschfeldia incana*	Hoary Mustard		
*	*Holcus lanatus*	Yorkshire Fog		

	Species Name	Common Name	Conservation rating	
			Aus	SA
*	*Holcus setosus*	Annual Fog		
*	*Hordeum leporinum*	Wall Barley-grass		
*	*Hypochaeris glabra*	Smooth Cat's Ear		
*	*Hypochaeris radicata*	Rough Cat's Ear		
*	*Iris albicans*	Flag Iris		
*	*Isolepis trachysperma*	Grassy Club-rush		
*	*Juncus acutus*	Sharp Rush		
*	*Juncus capitatus*	Dwarf Rush		
*	*Lactuca serriola (NC)*	Prickly Lettuce		
*	*Lagurus ovatus*	Hare's Tail Grass		
*	*Lamarckia aurea*	Toothbrush Grass		
*	*Lavandula stoechas*	Topped Lavender		
*	*Lepidium africanum*	Common Peppercress		
*	*Lolium perenne X Lolium rigidum*	Hybrid Ryegrass		
*	*Lolium rigidum*	Wimmera Ryegrass		
*	*Lolium sp.*	Ryegrass		
*	*Lycium ferocissimum*	African Boxthorn		
*	*Malus pumila*	Apple		
*	*Malva parviflora*	Small-flower Marshmallow		
*	*Marrubium vulgare*	Horehound		
*	*Medicago minima var. minima*	Little Medic		
*	*Medicago sp.*	Medic		
*	*Melissa officinalis*	Common Balm		
*	*Moraea flaccida*	One-leaf Cape Tulip		
*	*Moraea setifolia*	Thread Iris		
*	*Myosotis discolor ssp. discolor*	Yellow-and-blue Forget-me-not		
*	*Neatostema apulum*	Hairy Sheepweed		
*	*Nicotiana glauca*	Tree Tobacco		
*	*Oenothera stricta ssp. stricta*	Common Evening Primrose		
*	*Olea europaea ssp.*	Olive		
*	*Olea europaea ssp. europaea*	Olive		
*	*Onopordum acaulon*	Horse Thistle		
*	*Onopordum illyricum ssp. illyricum*	Illyrian Thistle		
*	*Ornithogalum arabicum*	Star Of Africa		
*	*Ornithogalum umbellatum*	Star Of Bethlehem		
*	*Oxalis bowiei*	Bowie Wood-sorrel		
*	*Oxalis flava*	Finger-leaf Oxalis		
*	*Oxalis pes-caprae*	Soursob		
*	*Papaver hybridum*	Rough Poppy		
*	*Pentaschistis airoides*	False Hair-grass		
*	*Pentaschistis pallida*	Pussy Tail		
*	*Persicaria capitata*	Japanese Knotweed		
*	*Petrorhagia dubia*	Velvet Pink		
*	*Petrorhagia nanteuilii*			

	Species Name	Common Name	Conservation rating	
			Aus	SA
*	*Phyllopodium cordatum*			
*	*Pinus canariensis*			
*	*Pinus pinaster*	Maritime Pine		
*	*Pinus ponderosa*	Ponderosa Pine		
*	*Pinus radiata*	Radiata Pine		
*	*Pinus sp.*	Pine		
*	*Piptatherum miliaceum*	Rice Millet		
*	*Plantago bellardii*	Hairy Plantain		
*	*Plantago coronopus ssp. commutata*	Bucks-horn Plantain		
*	*Plantago coronopus ssp. coronopus*	Bucks-horn Plantain		
*	*Poa bulbosa*	Bulbous Meadow-grass		
*	*Polycarpon tetraphyllum*	Four-leaf Allseed		
*	*Polygonum aviculare*	Wireweed		
*	*Polypogon monspeliensis*	Annual Beard-grass		
*	*Prunus armeniaca*	Apricot		
*	*Prunus cerasifera*	Cherry-plum		
*	*Prunus persica var. persica*	Peach		
*	*Puccinellia fasciculata*	Borrer's Saltmarsh-grass		
*	*Pyrus communis*	Pear		
*	*Ranunculus muricatus*	Pricklefruit Buttercup		
*	*Reichardia tingitana*	False Sowthistle		
*	*Romulea minutiflora*	Small-flower Onion-grass		
*	*Romulea rosea var. australis*	Common Onion-grass		
*	*Romulea sp.*	Onion-grass		
*	*Rosa canina*	Dog Rose		
*	*Rosa rubiginosa*	Sweet Briar		
*	*Rosa sp.*	Wild Rose/Briar		
*	*Rostraria cristata*	Annual Cat's-tail		
*	*Rubus sp.*	Blackberry		
*	*Rumex conglomeratus*	Clustered Dock		
*	*Sagina procumbens*	Spreading Pearlwort		
*	*Salvia verbenaca*	Wild Sage		
*	*Salvia verbenaca var. verbenaca*	Wild Sage		
*	*Salvia verbenaca var. vernalis*	Wild Sage		
*	*Schinus molle*	Pepper-tree		
*	*Schismus barbatus*	Arabian Grass		
*	*Senecio pterophorus*	African Daisy		
*	*Setaria verticillata*	Whorled Pigeon-grass		
*	*Setaria viridis*	Green Pigeon-grass		
*	*Sherardia arvensis*	Field Madder		
*	*Silene gallica var.*	French Catchfly		
*	*Silene gallica var. gallica*	French Catchfly		
*	*Silene nocturna*	Mediterranean Catchfly		
*	*Silene vulgaris*	Bladder Campion		

	Species Name	Common Name	Conservation rating	
			Aus	SA
*	*Sisymbrium irio*	London Mustard		
*	*Solanum nigrum*	Black Nightshade		
*	*Solanum physalifolium var. nitidibaccatum*			
*	*Sonchus oleraceus (NC)*	Common Sow-thistle		
*	*Sorghum halepense*	Johnson Grass		
*	*Sparaxis tricolor*	Tricolor Harlequin Flower		
*	*Spergula arvensis*	Corn Spurrey		
*	*Spergularia diandra*	Lesser Sand-spurrey		
*	*Spergularia rubra (NC)*	Red Sand-spurrey		
*	*Spergularia sp.*	Sand-spurrey		
*	*Stachys arvensis*	Stagger Weed		
*	*Tamarix aphylla*	Athel Pine		
*	*Tamarix aphylla (NC)*	Athel Pine		
*	*Tamarix parviflora*	Athel Pine		
*	*Tolpis barbata*	Yellow Hawkweed		
*	*Tragopogon porrifolius*	Salsify		
*	*Trifolium angustifolium*	Narrow-leaf Clover		
*	*Trifolium arvense var. arvense*	Hare's-foot Clover		
*	*Trifolium campestre*	Hop Clover		
*	*Trifolium glomeratum*	Cluster Clover		
*	*Trifolium resupinatum var. resupinatum*	Shaftal Clover		
*	*Trifolium sp.*	Clover		
*	*Trifolium subterraneum*	Subterranean Clover		
*	*Trifolium tomentosum*	Woolly Clover		
*	*Ulex europaeus*	Gorse		
*	*Urospermum picroides*	False Hawkbit		
*	*Valerianella discoidea*	Lesser Corn-salad		
*	*Verbascum virgatum*	Twiggy Mullein		
*	*Verbena aristigera*	Mayne's Pest		
*	*Vicia monantha*	Spurred Vetch		
*	*Vicia monantha ssp. triflora*			
*	*Vulpia bromoides*	Squirrel-tail Fescue		
*	*Vulpia muralis*	Wall Fescue		
*	*Vulpia myuros f.*	Fescue		
*	*Vulpia myuros f. myuros*	Rat's-tail Fescue		
*	*Vulpia sp.*	Fescue		
*	*Zaluzianskya divaricata*	Spreading Night-phlox		

* denotes exotic species

Regions: Aus = Australia, **SA** = South Australia
Conservation Codes: EN/E = Endangered, **VU/V** = Vulnerable, **R** = Rare.

Appendix 3. Fauna species identified as occurring in the proposed Keyneton Wind Farm project site from the BDBSA search.

Species name	Common Name	Conservation status	
		Aus	SA
Amphibia			
Crinia signifera	Common Froglet		
Limnodynastes dumerilii	Banjo Frog		
Limnodynastes tasmaniensis	Spotted Marsh Frog		
Litoria ewingii	Brown Tree Frog		
Neobatrachus pictus	Burrowing frog		
Pseudophryne bibronii	Brown Toadlet		R
Mammals			
Cercartetus concinnus	Western Pygmy-possum		
Lasiorhinus latifrons	Southern Hairy-nosed Wombat		
Macropus fuliginosus	Western Grey Kangaroo		
Macropus robustus	Euro		
**Mus musculus*	House Mouse		
**Oryctolagus cuniculus*	Rabbit (European Rabbit)		
Pseudocheirus peregrinus	Common Ringtail Possum		
Sminthopsis crassicaudata	Fat-tailed Dunnart		
Sminthopsis murina	Common Dunnart		
Tachyglossus aculeatus	Short-beaked Echidna		
Trichosurus vulpecula	Common Brushtail Possum		R
**Vulpes vulpes*	Fox (Red Fox)		
Reptiles			
Aprasia striolata	Lined Worm-lizard		
Christinus marmoratus	Marbled Gecko		
Ctenophorus decresii	Tawny Dragon		
Ctenotus robustus	Eastern Striped Skink		
Delma molleri	Adelaide Snake-lizard		
Demansia psammophis	Yellow-faced Whipsnake		
Diplodactylus vittatus complex (NC)	Stone Geckos		
Egernia striolata	Eastern Tree Skink		
Gehyra lazelli	Southern Rock Dtella		
Hemiergis decresiensis	Three-toed Earless Skink		
Hemiergis peronii	Four-toed Earless Skink		
Heteronotia binoei	Bynoe's Gecko		
Lerista bougainvillii	Bougainville's Skink		
Lerista punctatovittata	Spotted Slider		
Morethia boulengeri	Common Snake-eye		
Morethia obscura	Mallee Snake-eye		

Species name	Common Name	Conservation status	
		Aus	SA
Nephrurus milii	Barking Gecko		
Parasuta nigriceps	Mitchell's Short-tailed Snake		
Pogona barbata	Eastern Bearded Dragon		
Pseudechis porphyriacus	Red-bellied Black Snake		
Pseudonaja textilis	Eastern Brown Snake		
Pygopus lepidopodus	Common Scaly-foot		
Ramphotyphlops bicolor	Southern Blind Snake		
Varanus gouldii	Sand Goanna		
Varanus sp.	Goanna		

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